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AN ANNOTATED BIBLIOGRAPHY OF LITERATURE INTEGRATING ORGANIZATIONAL AND SYSTEMS THEORY

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This report presents a summary of articles on organizational and systems theory up to and including 1980. The articles are divided into three categories--(1) Systems Theory, (2) Organizational Behavior, Effectiveness and Development and (3) Simulation and Training. The primary purpose of this report is to examine the literature in this area to identify the dimensions of organizational structure and processes that are related to various organizational outcomes. It is suggested that the identification of these dimensions can lead to increased effectiveness of simulations and training programs.

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TABLE OF CONTENTS

INTRODUCTION

The Behavioral Sciences Research Center (BSRC) of Science Applications, Inc., is pleased to submit this annotated bibliography in fulfillment of Item No. 0002AC: Interim Report of Abstracts of Literature, under US Army Research Institute for the Behavioral and Social Sciences Contract No. MDA 903-79-C-0699. This report represents a summary of the documents to be integrated into a forthcoming theory-based review of current literature on organizational and systems theory in support of the aforementioned research effort.

Guidance for the development of this annotated bibliography was derived from two principal sources: the scope of the research and the theoretical framework, as specified in the Statement of Work. The primary task of this portion of the effort was "to examine the literature to identify the dimensions of organizational structure, organizational processes, and other organizational parameters that have either theoretical or previously demonstrated theoretical relationships with organizational outcomes." The identification of these dimensions served as the initial step in accomplishing the two long-term goals of the overall effort: experimentation through simulation and increased effectiveness through training. As an experiment, this effort seeks to develop a strategy for (1) investigating organizational functioning through the manipulation of important independent and intervening variables, and (2) developing testable hypotheses concerning organizational pathologies that are potentially responsive to management intervention. The strategy specified for development toward this end is simulation. Additionally, this effort seeks to provide, through simulation, the potential for training organization members to behave more effectively through feedback of their performance results. The scope of this research effort, therefore, is three-dimensional: theoretical, experimental, and pedagogical.

As a first step in identifying the critical variables involved in organizational behavior, relevant key words were extracted from review articles contained in *The Handbook of Industrial and Organizational Psychology*, *Annual Review of Psychology*, *Psychological Review*, and several widely-used textbooks. This survey yielded approximately 350 terms related to various aspects of organizational functioning, simulation and training. While many of the concepts were common to all of the reviews (e.g., structure, environment), many others were found to be theory-specific (e.g., alienation, homeostasis). A cursory review of the conceptual frameworks characterizing organizational theory revealed a significant number of different -- if not unreconcilable -- perspectives on the nature and behavior of organizations. Careful thought was given to the advantages and disadvantages of the major theoretical frameworks in the context of the goals and expectations of this investigation. Systems theory was selected as the most promising.

While systems theory is a truly holistic perspective -- combining and integrating all disciplines -- the orientation of this research effort focuses only on those systems-based concepts related to the functioning of the organization. In this light, a second list of key words was formulated and juxtaposed against the first. The latter list served as a honing mechanism for the establishment of a final list of variables. The criteria established for inclusion or exclusion of terms were as follows:

- Variables selected should constitute, as nearly as possible, a <u>comprehensive</u> representation of all recognizable facets of organizational behavior and performance; on the other hand, where multiple terms have accepted meanings that are virtually synonymous, <u>parsimony</u> should be the overriding consideration.

- Variables selected must be an integral component of, coincident with, or readily adaptable to accepted systems-theoretic concepts.

- Variables selected should focus on systemic/subsystemic attributes rather than on essentially individual psychological states or manifestations, e.g., alienation, attitudes, bias, cognition, emotion, morale, motivation, etc. While such characteristics have been recognized as important factors in organizational behavior and performance, they have not been integrated satisfactorily to date into the conceptual logic of systems theory.

The variables selected for inclusion are presented in Figure 1.

The methodology followed in developing this annotated bibliography was comprised of four major tasks: (1) Development of key word list, (2) Identification of sources, (3) Document retrieval, and (4) Abstracting.

1. Development of Key Word List

The first task in identifying documents for review was to adapt the list of variables into a hierarchical list of key words by which documents could be recognized. Three steps were involved in the development of the key word list:

1. The major concerns of the research effort were categorized into five general areas:
    - Systems Theory
    - Organizational Behavior
    - Organizational Effectiveness (OE) and Development (OD)
    - Simulation
    - Training

    It is important to note that each of these areas was considered only as it relates to the understanding of organizational behavior and performance.

1. Absenteeism
2. Adaptability (adaptation, coping, flexibility
3. Authority
4. Boundary
5. Capability (capacity, potential)
6. Centralization
7. Certainty
8. Change (innovation)
9. Change Agent
10. Channel (network)
11. Climate (organizational climate/health/pathology personality)
12. Closed System
13. Communications (bargaining/ information exchange)
14. Communication Barriers/Filters
15. Competence
16. Complexity (dimensionality)
17. Conflict (role conflict, value conflict, competition, confrontation)
18. Conflict Regulation
19. Consensus (agreement)
20. Control (accountability, compliance, conformity, regulation)
21. Creativity
22. Decentralization
23. Decision-Making (choice, problem-solving)
24. Development (dynamic equilibriur heterostasis, evolution)
25. Differentiation (division of labor, specialization)
26. Direction (intentionality)
27. Disorganization (entropy)
28. Effectiveness
29. Efficiency
30. Environment
31. Equifinality
32. Equilibrium (balance, homeostasis, steady-state)
33. Feedback
34. Goals (objectives, requirements)
35. Goal Attainment (performance, productivity)
36. Goal Displacement
37. Goal Setting (expectancy)
38. Goal Succession (ideal-seeking)
39. Group Dynamics
40. Growth
41. Hierarchy
42. Incentive (reinforcement)
43. Independence (autonomy, totipotentiality)
44. Influence
45. Information (experience, knowledge, learning)
46. Initiative (proaction)
47. Input (contribution, resources)
48. Integration (symbiosis)
49. Interaction (cooperation, coordination, human relations, participation)
50. Interdependence (parti-potentiality)
51. Intervention (third-party intervention)
52. Job (function)
53. Job Enrichment/Enlargement
54. Job/Task Analysis
55. Leadership
56. Management
57. Maturity (maturation)
58. Open System
59. Optimization
60. Organization (cohesion, negative entropy)
61. Output (product)
62. Performance Evaluation/ Appraisal
63. Plan/Planning (strategy/ strategize)
64. Power (coercion, dominance)
65. Process (conversion, implementation, throughput, transformation)
66. Resource Allocation/Distribution
67. Response (reaction)
68. Responsibility
69. Rigidity (change resistance)
70. Role (relationship)
71. Sensing (cognition, forecasting, intelligence, scanning)
72. Simplicity
73. Size
74. Standards (critical variables norms, rules, regulations)
75. Structure (design, form, formalization)
76. Suboptimization (equity)
77. Subsystem (component, group)
78. Synergism (gestalt, holism)
79. Task
80. Technology
81. Training
82. Turnover
83. Uncertainty (risk)
84. Values

Figure 1. List of variables for investigation.

2. The 84 variables previously identified were organized under the most appropriate of the five "umbrella" terms, from most to least specific.

3. Additional terms were added under the simulation and training categories. These included: free simulation, experimental simulation, computer simulation, gaming, team training and management training.

The resulting list of 90 terms is believed complete, yet comprehenhensive, enough to identify documents most relevant to this study.

2. Identification of Sources

Extensive use was made of both computerized retrieval systems and manual searches to identify relevant documents. Following a comparative analysis of several available search services, the Lockheed/DIALOG online information system was selected for use. It appeared to offer the greatest breadth of coverage, compreheniveness, and cost-effectiveness. Of the 70 databases accessible through the Lockheed/DIALOG retrieval system, six were selected as the most relevant:

- PASAR (Psychological Abstracts Search and Retrieval)
- NTIS (National Technical Information Service)
- Social SciSearch (Institute for Scientific Information)
- SSIE (Smithsonian Current Research)
- Management Contents
- Sociological Abstracts.

Searches were conducted into each data base using appropriate key words to identify documents dated during the 1960-1980 timeframe. Every attempt was made to be parsimonious where computer costs were involved, while insuring an exhaustive search of relevant databases.

To supplement the computer searches, manual searches were conducted at several of the area university libraries. Indices of relevant journals for the period 1960-1980 (wherever possible) were examined, as well as review articles and bibliographies. The key word list was used as a guide in this search as well. The following major journals are represented:

Academy of Management Journal
Academy of Management Review
Administrative Science Quarterly
American Sociological Review
Annual Review of Psychology
Annual Review of Sociology
Behavioral Science
British Journal of Psychology
Catalog of Selected Documents in Psychology
Cybernetics
Ergonomics
General Systems Yearbook
Group and Organization Studies
Harvard Business Review
Human Relations
Journal of Applied Behavioral Science
Journal of Applied Psychology
Journal of Applies Social Psychology
Journal of Conflict Resolution
Journal of Management Studies
Journal of Personality and Social Psychology
Organizational Behavior and Human Performance
Organizational Dynamics
Personnel Psychology
Psychological Bulletin
Psychological Review
Psychological Reports
Psychonomic Science
Simulation and Games
Theory and Decision
Training and Development Journal
Over 30 other journals.

3. Document Retrieval

Three criteria were developed for the selection and retrieval of documents: currency, completeness and representativeness. In order to meet each of these criteria in a manageable, useful collection of literature, certain trade-offs had to be made. On the issue of currency, it was decided that this review should reflect current state-of-the-art research and theory on organizational behavior and its implications for simulation and training. Greatest emphasis was placed, therefore, on selecting documents from the 1970-1980 timeframe. Less, but substantial, emphasis was then placed on procuring literature covering the 1960-1969 period. A careful study was made of the reference sections of major articles written during this 20-year span; any seminal works consistently referenced were identified and retrieved. The reader interested in research conducted prior to 1960 is directed to those documents including extensive reviews of his earlier literature (e.g., Roeckelein, 1967 and Steers, 1977).

The criteria of completeness was addressed on two fronts. (1) Sources. Over 100 primary sources were surveyed, including refereed journals, professional society journals and proceedings, university publications, theses and dissertations, books, and technical reports of federally- and privately-funded research. Special attention was paid to selecting the most relevant works of key researchers/theorists in each area. (2) Breadth of coverage. Using the key word list, over eighty specific dimensions of organizational behavior, effectiveness, development. simulation and training were investigated, as well as the full spectrum of systems concepts related to human organizing. In keeping with the implicit purpose of this research effort, emphasis was placed on selecting documents which related these concerns to the military environment.

The final criterion, representativeness, was used as the basis for any trade-offs that had to be made between completeness and manageability/feasibility. While this bibliography is not exhaustive of literature pertaining to each constituent variable, it is believed to be representative of current thinking on the problem as it is defined in this particular effort.

4. Abstracting

For abstracting purposes, the documents were categorized into four types: experimental (including quasi-experimental and correlational studies), theoretical, opinion, and literature review. Because the documents differ in format and intent across these four types, the abstracts were tailored in such a way as to best summarize the significant contributions of each. Abstracts of experimental research reports highlight the principal components of the research: background, hypotheses, experimental design (i.e., sample, method, statistical tests), results and practical or research implications. No personal interpretations or evaluations of research results are given.

Theoretical and opinion articles were abstracted in a somewhat different manner. The purpose of these abstracts is to summarize, in the first case, the logical development and key constructs of a particular theory; and in the second, the main arguments or insights forwarded by the author. If the document treats a topic (e.g., systems theory, simulation or training) in a general sense, an attempt was made to include in the abstract those elements of the discussion pertaining only to organizational behavior or performance. Again, no personal evaluation is made of the contents of these documents.

Several literature reviews are included in this bibliography, either as separate documents or as sections of more extensive works. In both cases, the abstract is designed to summarize the findings of the review as they impact on current and future organization theory.

Books have been abstracted within the same guidelines used for journal articles. In many instances, the book is divided into its constituent parts; the significant aspect of each described separately. It should be noted that several of the books on systems theory have been abstracted in more-than-typical detail. Two reasons account for the inclusion of this additional information. First, the pivotal role of systems theory as the theoretical framework within which the entire research effort is being conducted warrants a very detailed account of the concepts driving this theoretical perspective. Second, the newness of the application of systems theory to the understanding and improvement of organizational performance necessitates an adequate explanation of the theoretical and methodological concepts proposed in the literature.

PLAN OF THE REPORT

This annotated bibliography is divided into three categories, paralleling the major concerns defined in this effort.

1. Systems Theory - This section summarizes over 100 articles, books and proceedings on systems theory as it applies to the organization.

2. Organization Behavior, Effectiveness, and Development - Represented in this section are over 250 articles, books, technical reports, and other documents concerned with the dimensions of organizational behavior and performance identified for investigation.

3. Simulation and Training - In the context of simulation as a potential methodology for studying and improving organizational functioning, this section includes approximately 100 theoretical and research reports on various applications of this technique as an educational and research tool. Also included in this section is a representative sample of documents treating the issues involved in team and management training.

I. SYSTEMS THEORY

Ackoff, R. L. Towards a system of systems concepts. *Management Science,* 1971, 17, 105-112.

This article is an attempt to systematize systems terms and concepts. First, system is defined as a set of interrelated elements; in other words, an entity composed of at least two elements and a relation that holds between each of its elements and at least one other element in the set. Distinctions are made among abstract and concrete systems; the state of a system, the environment of a system, and the state of a system's environment; closed and open systems; system events; and static (one-state), dynamic (multi-state), and homeostatic systems.

System changes are characterized as acts, reactions, responses, and behaviors. Further, systems may be classified as (1) state-maintaining systems, whose behaviors are variable but determined (reactive), and whose outcomes are fixed; (2) goal-seeking systems, whose behaviors are variable and chosen (responsive), and whose outcomes are fixed; (3) multi-goal-seeking and purposive systems, whose behaviors are variable and chosen, and whose outcomes are variable but determined; and (4) purposeful systems, whose behaviors are variable and chosen, and whose outcomes are variable and chosen. An ideal-seeking system is a purposeful system which, on attainment of any of its goals or objectives, then seeks another goal and objective which more closely approximates its ideal.

Finally, an organization is defined as a purposeful system that contains at least two purposeful elements which have a common purpose relative to which the system has a functional division of labor; its functionally distinct subsets can respond to each other's behavior through observation or communication; and at least one subset has a system-control function.

Ackoff, R. L. Beyond problem solving. *General Systems*, 1974, XIX, 237-239.

The author calls for moving beyond what traditionally has been one of the primary objectives of the decision sciences: to improve the efficiency and effectiveness of problem solving. First, he suggests that we must think in terms of "messes", rather than merely isolating the independent, component problems that comprise them. Second, he calls for the devotion of more attention to improving solutions to messes over time. The point made is that many of the problems we try to solve change — environmental changes and value changes — even while we are trying to solve them. Finally, he offers a plea for the study of the aesthetics of decision-making as well as its logic, economics, and ethics. There is a tendency to ignore the problem-solution-problem dynamic, i.e., the fact that solutions give rise to new problems.

Ackoff, R. L. & Emery, F. E. On ideal-seeking systems. *General Systems*, 1972, XVII, 17-24.

It is a peculiarity of man and of some of the social systems of which he is a part that they can pursue outcomes and states that they know cannot be obtained. Yet, they draw satisfaction from approaching states that cannot be reached. The approach is called progress and the end-state is called an ideal. It therefore seems reasonable that man and systems be able to formulate objectives that can be pursued without end but which can be continually approached.

The authors of this article seek to define and describe the characteristics of the ideal-seeking individual or system. In so doing, they begin by describing the various environmental responses of systems according to their structural and functional properties. Purposeful individuals and systems are those that can produce the same functional type of outcome in one or more structurally different classes of environment in structurally different ways, and can produce functionally different outcomes in the same and different structural environments. They choose both means and ends. Human beings and social groups are the most familiar examples.

A purposeful system or individual is ideal-seeking if, on attainment of any of its objectives, it chooses another objective which more closely approximates its ideal. Omnipotence is identified as the meta-ideal, the highest of all possible ideals. Progress toward omnipotence requires progress toward the maximization of (1) the availability of efficient choices (the politico-economic state of plenty); (2) the efficiency of choices made (the scientific state of truth); (3) the compatibility of outcomes obtained (the ethico-moral state of good); and (4) the relative values of these outcomes (the aesthetic state of beauty).

Alschuler, L. R. Status equilibration, reference groups, and social fields. *General Systems*, 1973, 99-116.

This article attempts to integrate and formalize the relationships among four bodies of social theory: status equilibration, cognitive dissonance, reference groups, and social fields. With the aid of a formal model, the author demonstrates the necessity of reference group identification. The reference group provides status equilibrium norms of distributive justice by which the individual defines his situation. Cognitive dissonance is a result of the definition of the situation. A dissonant definition of the situation in terms of over- and under-rewardedness, or over- and under-achievement, largely determines the behavioral tendencies toward dissonance reduction.

Among the major statements deriving from the various fields of theoretical thought are the following: (1) From status theory: individuals are evaluated according to prestige along dimensions of social status. (2) From status equilibration theory: an individual holds statuses on several dimensions simultaneously. (3) From reference group theory: equilibrated configurations of statuses are defined by reference groups. (4) From cognitive dissonance theory: perceived status disequilibrium is cognitively dissonant and stressful, including behavioral attempts to reduce the dissonance. (5) From social field theory: an individual stands in a field of social forces, some of which are the stresses resulting from status disequilibria.

Bahm, A. J. General logic of concrete systems. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 520-525.

By focusing on concrete or actually existing systems, instead of abstract systems, this paper proposes a complex hypothesis about sixteen characteristics common to all concrete systems: eight thought of more as structural (whole-part interrelations, interdependence, unity and plurality, simplicity and complexity, opposition, complementarity, and organicity) and eight thought of more as dynamic (permanence and change, causation, emergency, whole-part causation, organic causation, multilevel causation, adaptation, and dialectic).

The paper is significant because it emphasizes the whole-part and unity-plurality characteristics essential to systems, characteristics too often neglected, ignored, and even denied by some theorists. Universality is claimed for these characteristics, not in the sense that we can observe all existing systems, but in the sense that, predictively, they can be found present in all systems observed.

Bailey, K. D. Types of systems. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 26-34.

There is general agreement on the basic definition of a system. However, a number of different types of systems have been defined in the contemporary systems literature. These include conceptual systems, abstract systems, abstracted systems, physical systems, concrete (also referred to as "real" or "veridical") systems, acting systems, and pattern systems. The author of this paper contends that the existence of these different types creates the potential for much confusion. His purpose, therefore, is to eliminate confusion among types by delineating the dimensions upon which types of systems are defined.

The author defines system as "a set of objects spatially located within recognized systems boundaries, with the further condition that the attributes of these objects are related." Further, he argues that there is only one real type of system — the type generally called a "concrete" or "empirical" system. Terms such as "conceptual system" or "abstracted system" are unduly confusing and probably not needed. In no case should they be used in lieu of the definition of an empirical system. However, if used in conjunction with the definition and analysis of am empirical system, and if their relations to that system are made clear, concepts such as conceptual and abstracted systems may have analytical or heuristic value.

Banathy, B. H. The dynamics of integrative design. General Systems Research: A Science, a Methodology, a Technology. *Proceedings of the 1979 North American Meeting of the Society for General Systems Research*, 1979, 191-197.

Design is defined by the author as a creative, disciplined, and decision-oriented inquiry carried out in interactive cycles. The focus of the paper is on the design of human systems. The author's contention is that the design solution space is surrounded by the knowledge space and the problem and experience spaces. Designers constantly explore these spaces and integrate information and knowledge with emerging images of the solution.

An ideal system model approach is characterized, and the dynamics of integrative design are elaborated. This elaboration includes the notions of (1) the designers' moving among the various spaces of the design inquiry; (2) the spiralic/interactive and interactive nature of the process; (3) feedback-feedforward; (4) divergence-convergence; (5) design embracing various system levels; and (6) including parties of various positions and values (participative design).

Baumgartner, T., Burns, T. R., & DeVillé, P. Industrial democracy, self-organization and meta-power. The General Systems Paradigm: Science of Change and Change of Science. *Proceedings of the Annual North American Meeting of the Society for General Systems Research*, 1977, 292-300.

In capitalist and socialist industrialized countries, there is continuing debate about alterations in the ways in which workers may exercise influence in work organizations. Concepts and terms abound; different ideological views, social interests, and academic theories are involved in the debate. The authors present an analytical framework to organize and relate the different concepts. They then introduce the concepts of self-organization (implies that workers

demand and create through their own actions at the base the institutions which allow them to exercise increased control over their environment) and legislated institutionalization (characterizes the introduction of elements to increase workers' influence through contractual agreements and legislatory acts agreed upon on higher levels of a hierarchical control system). The compatibility of these concepts with others is investigated.

Various industrial democracy concepts (work councils and job enrichment programs, profit-sharing and ownership participation) are analyzed for their morphostatic and potentially morphogenic qualities. The conclusion points to a possible model underlying the analysis which also could be applied usefully to the same analysis of transition strategies (including worker control, self-management, and autogestion) and alternative system states.

Beer, S. *Brain of the firm: A development in management cybernetics.* New York: Herder and Herder, 1972.

In most fundamental terms, this book concerns managing large and complicated systems, particularly the corporate enterprise. Part I offers a new perspective on how to approach management's primary task of organization and control: cybernetics. In Part II, cybernetics is put to work to create a model of the management of any viable system. That model is the human body.

The essence of the book, however, is Beer's presentation of the neurophysiological-cybernetic model of the firm. This model views the firm as consisting of five integrated and interactive levels. The basic operating entity in this conception is the division, which is run by its own directorate. These two elements comprise System One. The directorate reports to corporate management, from which instructions are received, and is responsible for managing the division. Essentially, this means that it controls activities in a "line" sense, i.e., it assumes responsibility for programming, planning by objectives, and normative planning throughout the division. The division thus is more-or-less autonomous, operating as it likes but limited by three practical managerial constraints: (1) It must operate within the objectives and intentions of the company as a whole. (2) It must operate within the coordinating framework of System Two; in other words, it must accept the existence of other divisions, on whose interaction the corporate synergy depends. (3) It must submit to the automatic control of System Three, i.e., on occasion it must sacrifice its own needs for the needs of other divisions. In short, System One controls the division in response to policy directives and overriding instructions from above, in reaction to the direct demands of the external world upon it, and in awareness of the needs of sister divisions. The management tool of the Divisional Directorate is the

Divisional Regulatory Center, where the monitoring and filtering functions for input data, and the strategic planning and tactical programming functions for output data, jointly reside.

System Two is the metasystem subsuming all Systems One. It operationalizes in the interlinking of the individual Divisional Regulatory Centers. It thus is an elaborate interface between System One and Three and the only means by which uncontrolled oscillation between divisions can be prevented. System Two operates on the basis of continuous communications (as opposed to continuous planning) and collaborative effort. As any change in the state condition of a particular division occurs, it is transmitted immediately from the Divisional Regulatory Center to the Divisional Directorate, to other regulatory centers, and to the Corporate Regulatory Center, which takes the higher-order view of the situation and reports the information to System Three if required.

System Three is the highest level of autonomic management and the lowest level of corporate management. Its function is primarily to govern the stability of the internal environment of the organization. It does this by handling three kinds of information systems which converge on it: (1) The first of these belongs to the vertical command axis. Since System Three is part of corporate management, it therefore is a transmitter of policy and special instructions to the divisions. It also receives information about the internal environment, which it handles in three ways — as a metasystemic controller downwards, as the most senior filter of somatic news upward, and as an algedonode. (2) System Three is the only recipient of information filtered upward from System Two. (3) System Three handles the parasympathetic (right of direct access) information circuits which are antithetic to those of the sympathetic (System Two) circuits. System Three is distinguishable from Systems One and Two because it alone has a System Four input and thus is the only competent regulator of organic homeostasis. One and Two are regulators (or error-controlled feedback servos), but only of the external environment of their own respective divisions, not of the company's external environment. System Three therefore can generate the requisite variety that Two alone cannot. System Three is designed to make use of every kind of optimizing tool in its direction of current operations, from inventory theory to mathematical programming.

Whereas the focus of System Three is on current, internal matters, that of System Four is on the external environment and the future; and, whereas System Three mediates inputs to System Five, System Four serves as a "big switch" for those inputs. It is always present and represents the set of activities feeding the company's highest decision-making level. System Four is singularly vital to the effective functioning of the total system, for it is the nexus of the system's information links. Through it passes the steady stream of appropriate instructions descending the central command axis

necessary to ensure successful operation of the autonomic system (Systems One, Two, and Three). Furthermore, effective decision-making at System Five depends on proper representation of the autonomic condition, reflected by the filtered information ascending the central axis. Finally, System Four is the source of input from the firm's external environment to System Five. System Four models the organization and operates like a "war room", acquiring and evaluating information, proposing solutions, and implementing adaptive planning processes.

System Five — the Multinode — consists of the Board of Directors and the President and is organized to deliberate policies and make decisions.

Beer, S. *Decision and control: The meaning of operational research and management cybernetics*. Chichester: Wiley & Sons, 1966.

This book is about the uses management can make of science — specifically operations research and cybernetics — to help solve problems of decision and control. The book's first part is a general discussion of the possible interactions between science and management. It is urged that management is not a scientific topic, just as science is not in essence managerial. But, the area of overlap, where management may draw on science, is identified. Here, says the author, lies the scope for operational (operations) research. The second part of the book investigates the workings of operations research, while Part III is a continuation of that line of thinking, with special emphasis on the science of cybernetics. The final part is a discussion of possible outcomes for industry, automation, government, and management science.

In Part I, "The Nature of Operational Research", the first chapter points to the novelty of scientific applications in management. In Chapter 2, the ways in which belief is fixed are shown to be based on mechanisms which, though rational, are not logical. They derive from biological necessity, not from intellectual processes, and result in decisions which have more to do with learning to survive than with the objective analysis of profitability. In light of this, Chapter 3 introduces operations research (OR), its relevance and historical development. Chapter 4 investigates six major aspects of OR which are commonly misunderstood: the stereotyped notions of what the scientist is like, the nature of the problem to be solved, what science itself is like, what sort of solution counts as appropriate, what a study's payoff should be, and what counts as success. In Chapter 5, some of the questions raised about OR's applicability to management are answered, a modern OR study is described, and OR is officially defined.

Part II, "The Activity of Operational Research", is an exposition of how OR does what it tries to do. Chapter 6 investigates the way managers solve problems and contrasts this with the OR approach. It shows how the predictive quality of thinking is critical to a successful decision or policy and expounds the concept of a model as the basis of insight and prediction. The theoretical nature of models is examined with the aid of detailed explanation and practical illustrations. These examples are augmented in Chapter 7. Chapter 8 describes models in more rigorous terms; it specifies the role of mathematics as handling quantity, of mathematical statistics as handling probability, and of symbolic logic as handling qualitative relationships. Chapter 9 explores the nature of the problem situation that OR must penetrate: the manager's responsibility for control of some system(s). Examples of how this can be approached scientifically are presented. Specifically, notes the author, solving the problem of prediction within these systems is the nub of the management task. Chapter 10 therefore addresses forecasting and the OR techniques that can be used to help, particularly modeling.

Part III, "The Relevance of Cybernetics", introduces cybernetics, the science of control and communication. With cybernetics as the science of control and management as the profession of control, we may recognize the subject of management cybernetics, a rich provider of models for doing OR. In Chapter 11, a start is made in exploring the nature of the large, complex, and probabilistic systems which management must control. Ways of describing and measuring such systems are discussed. The argument is continued in Chapter 12. Against this background, Chapter 13 deals with the control of operations. A cybernetic critique of orthodox practice is offered as is a new model of cybernetic control. Chapter 14 extends cybernetic thinking and discusses self-organizing systems, the properties of which form the basis, in Chapter 15, for improving company or organizational designs.

Chapters 16 through 19 of the book, contained in Part IV, provide explicit applications — historical and speculative — of OR and cybernetics in industry, automation, government, and management science. The book ends (Chapter 20) with concluding thoughts on what counts as practical management and practical science in this era of difficulty and change.

Berrien, F. K. *General and social systems.* New Brunswick, N.J.: Rutgers University Press, 1968.

The author's challenge in this book is to provide an economical description of the human organization. How do such ordered complexities evolve from random behaviors? He builds a propositional framework, starting from Miller's "Living Systems" as a base, but modifying and elaborating where appropriate. He places great emphasis on "becoming" — the nascent organization, the evolution of a new subsystem, the preliminaries to conflict, etc. Thus, the empirical findings most critically discussed come from social psychology, the intent apparently being to find appropriate heuristics, models, and even theories from outside the circle of investigators of human groups. Many physical and biochemical analogues are presented.

The core of the book is an external view of adaptation in human groups, with discussion of such factors as uncertainty, evolution, homeostasis, boundaries, and growth. Berrien provides a graphical approach to the representation of group phenomena. His specific problem is to discover a non-arbitrary procedure for identifying the properties of a quantity called group need satisfaction (GNS) and to distinguish it from another called formal achievements (FA). "GNS can be thought of in the first instance as a reverberating feedback loop initiated by the proximity and necessary interactions of the components . . . the 'bonding' of individuals is a necessary consequence of such interactions, the strength of the bonds being a function partly of the predispositions (memories and states) of the individuals and partly a function of the interactions themselves." The formal achievements (FA) are defined by signals coming from the supra-system and represent the degree to which outside expectations are met. In a task-oriented group, they are represented by production or physical output.

An interesting argument is that the ratio GNS/FA is held roughly constant by system-suprasystem interaction. Different groups, even those doing the same task with identical equipment (e.g., day and night shifts in a factory), will maintain markedly different ratios. This means that increases in morale (a major component of GNS) are likely to be accompanied by increases in production (a major component of FA).

Berrien, F. K. A general systems approach to organizations. In Dunnette, M. D., (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand-McNally, 1976, 41-62.

The author reviews the basic elements of general systems theory (GST) and discusses its application to the study of organizations. Systems are described as sets of interacting subsystems, distinguished by boundaries which select the kind and rate of flow of inputs from, and outputs to, the environment. Constructs of system boundaries, inputs and outputs of various types, adaptation, growth, and resource storage are defined and their impact on system viability discussed.

Berrien presents his social system model of organizations, noting that the basic components are role behaviors, interacting with other role behaviors generating Group Need Satisfactions (GNS) which provide a major but not exclusive source of maintenance. The boundary is the set of social norms characteristic of the group. Signal inputs are related primarily to the Formal Achievement (FA) output of the group; that FA must be acceptable to some other system if the system is to survive. Whatever the group produces that is not acceptable to other systems are wastes.

The social system model proposed here is compared with other organizational models, and the point is made that whether organizational performance is viewed primarily in manager-leader or total system terms is a function of the perspective of the conceptualizer. Some of the most prevalent criticisms of GST — its reliance on analogy and its inability to provide a basis for prediction, for example — are reviewed. Currently, it is noted, hierarchical open systems models of organizations appear promising for explaining human behavior within and across organizations. Both the explanatory and the predictive power of GST for organizations may be enhanced if more rigorous operationalizations can be developed for such constructs as social needs satisfaction, systems inputs, and other organizational transactions.

Bertalanffy, L. v. *General system theory.* New York: Braziller, 1968.

The initial premise of this book is that systems theory has tended to evolve primarily as a mathematical field, offering novel and sophisticated techniques and allied closely with computer science. What may be obscured in these developments, however, is the fact that systems theory is a broad view which far transcends technological problems and demands, a reorientation that has become necessary in science in general and in the gamut of disciplines from physics and biology to the behavioral and social sciences and to philosophy. It is operative, with varying degrees of success and exactitude, in various realms, and heralds a new world view of considerable impact.

This book is an introduction to general systems theory and systems thinking. The author points out that an introduction to the field is possible in two ways. First, one can accept an available model and definition of system and rigorously derive the consequent theory. On the other hand, one can — as this book does — start from problems as they have arisen in the various sciences, to show the necessity of the systems viewpoint, and to develop it, in more or less detail, in a selection of illustrative examples. In so doing, the author identifies the three main aspects of the systems perspective that must be considered: (1) systems science (scientific exploration and theory of "systems" in the various sciences — physics, biology, psychology, social sciences — and general systems theory as a doctrine of principles applying to all systems); (2) systems technology (the problems arising in modern technology and society, comprising both the "hardware" of computers, automation, self-regulating machinery, etc., and the "software" of new theoretical developments and disciplines); and (3) systems philosophy (the reorientation of thought and world view ensuing from the introduction of "system" as a new scientific paradigm, in contrast to the analytic, mechanistic, one-way causal paradigm of classical science; this has three parts — systems ontology, systems epistemology, and values).

The author defines the major aims of general systems theory: (1) There is a general tendency towards integration in the various sciences, natural and social. (2) Such integration seems to be centered in a general theory of systems. (3) Such theory may be an important means for aiming at exact theory in the nonphysical fields of science. (4) Developing unifying principles running "vertically" through the universe of the individual sciences, this theory brings us nearer to the goal of the unity of science. (5) This can lead to a much-needed integration in scientific education.

The main body of the book is a tour d'horizon of the multi-dimensional and multidisciplinary facets of general systems theory: its conceptualization in elementary mathematical terms; the view of the organism as a physical system; the model of the open system; applications in biology, human sciences, and psychology and psychiatry.

Bertalanffy, L. v. *Perspectives on general systems theory: scientific and philosophical studies.* (Taschdigian, E. and von Bertalanffy, M. Eds.). New York: Braziller, 1975.

This is a collection of essays, most of which derive from papers originally published in German language periodicals between 1926 and 1950. The early chapters, particularly the essays "Perspectives in Art and Science" (1946) and "New Patterns of Biological and Medical Thought" (1960), represent a tour d'horizon of the transdisciplinary scientific and philosophical bases of general systems theory, as well as its relationship to cybernetics.

Chapters 6 through 12 reflect Bertalanffy's growing conviction of the interdisciplinary powers that general systems concepts offer. Beginning with "Homology as a Concept" (1934), the section progresses to the fully matured summary of Bertalanffy's conceptual framework encompassing both science and philosophy, "History and Development of General Systems Theory" (1971). The chapters between consider the "enormous number of elements and processes" characteristic of organic systems and "follow laws that can already, at least partly, be expressed today in mathematical formula." The key question is are these organizational laws the same as, or different from, physical laws?

Later chapters, "Theoretical Models in Biology" (1965) and "Biological World View" (1967), offer ideas sketched out in "The Organismic Conception" 25 years before. "Open Systems in Physics and Biology" provides further evidence in support of a general systems theory. "Evolution: Chance or Law" (1969) considers the ultimate "reduction of the phenomenon of life to the molecular properties of DNA promised in popular accounts," as something less than convincing "because the conventional categories, concepts and models in physics and chemistry do not deal with organismic characteristics." He outlines seven problems which have not been resolved by conventional theory. These, he says, deserve empirical research and conceptual evaluation to achieve a "revision of the so-called mechanistic approach to science as a whole."

Starting with "A Historical Prelude," the concluding chapter summarizes the foundations of general systems theory, trends in general systems theory, and systems science -- mathematical systems theory, systems technology, and systems philosophy.

Braham, M. A. General theory of organization. *General Systems*, 1973, XVIII, 13-23.

This article is an attempt to develop a general theory of organization. The author suggests that there may be something more primitive than mutation, recombination, and selection in evolution and in nature-at-large. This is the principle of organization. The principle of organization involves two terms: organizing and organization. The first refers to the process through which discrete units or individuals develop their internal structures and functions and at the same time associate, or form relationships, with other units or individuals for some outcome or function. Organization, in turn, refers to the product that results from the organizing process. The "principle of organization" refers to the fact that organizing and organization are ineradicable features of nature, such that, lacking organization, there can be no existence.

The author hypothesizes that the process of organization follows a regular sequence of events of limited reversibility and may well be isomorphic for all organizations and at all levels of complexity. He conceives the process as being cyclic in nature, involving alternating periods of divergence (origination, differentiation, and structure) and convergence (integration, conflict, and concentration). The completion of a cycle leads to the attainment of a stage of complexity. The number of stages required by any organization to reach its optimum state will differ according to its genotypic (or programmed) characteristics. At the level of human organization, no optimum state is inferred since, beyond the physiological, no known limits can be attributed on a genotypic basis. Further discussion is devoted to the relationships between organization on the one hand and energy and environment on the other.

Buckley, W. *Sociology and modern systems theory*. Englewood Cliffs, NJ: Prentice-Hall, 1967.

This book is an exposition of the ideas of general systems theory and a discussion of their applicability to theoretical sociology. The first two chapters present a critique of existing models of social structure and process, specifically the "equilibrium" and "organic" models of society, symptomatic of a basically conservative bias, i.e., a tacit assumption that social changes and conflict are somehow anomalous or pathological. Chapters 3 and 4 deal with the basic concepts of systems theory and an interpretation of certain directions in social psychology in light of these concepts. Chapter 5 deals with organization and institutionalization. The last chapter treats social control, process, legitimacy, and bureaucracy.

Special attention is devoted to what the author calls the morphogenetic process, the determination of development by the transformation of the constituent parts of the system through internal and external interactions. This process, as implied by systems theory, underlies the transformation of society, the development of the embryo, and the evolution of a species. The analogy is not merely impressionistic but instead is a consequence of including information processing and various principles of adaptation, natural selection, growth, etc., in the analysis of system behavior.

Busch, J. A. Cybernetics III: A system-type applicable to human beings. General Systems Research: A Science, a Methodology, a Technology. *Proceedings of the 1979 North American Meeting of the Society for General Systems Research*, 1979, 230-233.

In recent years, a number of theorists have suggested that one can best understand human nature by viewing the human social-psychological system as a morphogenic (structure-changing) system. What is meant by morphogenesis is questioned in this paper, and it is suggested that there may be more than one form of morphogenesis. The question of how open systems maintain themselves in a negentropic state is raised. It is suggested that some open systems are such because their structure involves a positive feedback cycle. The remaining types of open systems must have a control subsystem which monitors the environment and leads to appropriate action via the effector subsystem. Distinctions are made between system-types which use various forms of iconic and indexical controls. It is argued that there are profound differences between such morphostatic (structure-maintaining) and morphogenic system-types and the highly morphogenic Cybernetics III, which involves highly variable controls capable of processing symbols.

Campbell, D. T. Variation and selective retention in socio-cultural evolution. *General Systems*, 1969, 69-85.

This article presents an advocacy of one type of social-evolutionary theory. While there currently is a revival of interest in theories of socio-cultural evolution, the rejection of such theories in the recent past has been so overwhelming that it seems desirable to distinguish carefully among types of evolutionary doctrines and to examine reasons for the rejection of the once dominant thesis of social evolution.

In reviewing the current relevance of the concept of socio-cultural evolution, the analogy to the variation-and-selective-survival mechanism is regarded as more valid and more valuable than the analogy to a progressive direction of increased size and complexity

of integration per se. In line with this, the author attempts to spell out the societal counterparts of variation, selection, and retention that would make an evolutionary process possible at the societal level. The primary sources of doubt, it is noted, lie in the selection process. This comes not only from the variety of intertwined selection processes but also from the difficulty of specifying the selection criteria independently of what seems to have been selected.

Nonetheless, the author assumes that some socio-cultural evolutionary process takes place. Unavoidable organizational requirements in the coordination of individuals in collective action, and specific payoffs from social life, are seen as part of the selection criteria involved. From these, certain requisite social values may be inferred.

Cavallo, R. E. *The role of systems methodology in social science research*. Hingham, MA: Martinus Nijhoff, 1978.

While the conceptual significance of general systems approaches long have been recognized with respect to research in the social sciences, its transformation into working approaches has remained relatively undeveloped. This book develops and presents an integrated conceptual and operational general systems methodological framework directed to the special needs involved in the investigation of complex social and humanistic systems.

The framework not only provides specific procedures and working methods for the investigation of social systems but also establishes an organized and well-formulated problem-solving approach which integrates these and other methods. The integration effectively associates the working methods and operational tools with fundamental systems concepts such as behavior, state, structure simplification, complexity, and decomposition. These concepts then are associated with their counterparts in specific "real-world" social systems.

An extensive example which demonstrates the utility of the framework for social science research is presented. In this example, the ability of the framework — and thus of results in general systems research — to extend and augment the investigative capabilities of researchers in specific areas is demonstrated.

Chakraborty, S. A general systems approach to redesigning corporate organization structures. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research,* 1980, 549-556.

This paper outlines a methodology for redesigning corporate organization structures. The approach has been developed and successfully applied to redesigning a midsized, capital-/technology-intensive Canadian company. Four goals for corporate design are identified: (1) to provide a stable yet adaptive environment in which employees can do their jobs; (2) to develop and maintain a collaborative effort among individual employees necessary for successful operations; (3) to enhance the sense of individual accountability, responsibility, and motivation in visible ways; and (4) to create an organization that is cost-effective -- one that achieves the other goals with minimal duplication of effort.

Benchmarks, or criteria, for improving effectiveness and efficiency of work flows, information flows, and decision structures are defined. The two dominant general systems concepts guiding the organization change-problem solving/redesigning activity are identified and described: (1) a Managerial Problem Solving Methodology, and (2) a Process Hierarchy Framework-based information structure. The Managerial Problem Solving activities consist of preliminary analysis, synthesis, analysis, constraint identification and minimization, and implementation. The main activities of the redesign itself are (1) defining the existing organization structure, (2) defining the ideal organization structure, (3) defining the target organization structure, and (4) defining the program of change.

Clapham, W. B., Jr. Human ecosystems: role of the social system in the human environment. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research,* 1975, 334-338.

This paper focuses on the human ecosystem, defined as an ecosystem whose readily observable characteristics are largely a function of human intervention or management. It is most meaningfully viewed as a stratified multilevel hierarchical system with natural and social components. The natural stratum is recognized as setting constraints on the ecosystem structures that can be maintained, while the social strata perform the functions of control and coordination. The range of possible configurations of human ecosystems is much broader than for natural ecosystems; it is a function of the resources of the social system acting within the constraints set by the natural stratum. Within the social strata lies a decision structure which directs the development of human ecosystems. The secure supply of ecosystem resources depends both on this decision structure's recognizing the constraints set within the natural stratum and on the stable integration of the subsystems comprising the social strata.

Conant, R. C. How much information is enough? The general systems paradigm: Science of Change and Change of Science. *Proceedings of the Annual North American Meeting of the Society for General Systems Research*, 1977, 204-210.

After a warning about a common confusion between several information measures (e.g., entropy vs. entropy rate, transmission vs. transmission rate), this paper derives and briefly discusses a law which partitions the total information flow rate in a system into several components (Hierarchic Decomposition Identity, Sequential Decomposition Identity, and Pyramidal Decomposition Identity). The underlying condition for this law is the desirability of reducing internal communication to the minimum consistent with the viability of the system.

This law carries implications for system architecture. Various architectures are explored (chain, ring, crystal, commune, star, one-level hierarchy, and tree) and for each the viability for an information-processing system is investigated. Last, the case in which subsystems obtain input from a common source is discussed, and it is proposed that the bulk of human communication is in fact via a common source rather than direct.

Coulter, N. A., Jr. Toward a theory of teleogenetic control systems. *General Systems*, 1968, XIII, 85-89.

This article represents an initial step by the author in a process of attempting to develop "a mathematical theory of neurotic and psychotic processes" in order to allow more precision in theories of psychiatric and psychosomatic disorders. Since mere teleological (goal-seeking) systems cannot describe the minimum necessary complexity for this purpose, a basic theory of teleogenetic (goal-producing) systems is introduced.

The minimum requirements for a teleogenetic system are (1) teleological behavior, the ability to control outputs to conform to a "goal signal"; (2) teleogenesis, the ability to propose goals; (3) forecasting, the ability to predict outcomes given adoption of a discrete goal; (4) evaluation, the ability to assign values to forecast outcomes; and (5) decision, the ability to choose the best goal.

In order to perform these functions, a minimum number of system components are required. In addition to the input sensors, output servos, and environmental field that would comprise a conventional servomechanism, a teleogenetic control system also would include: (1) an "apperceptive manifold" to identify, monitor, and

categorize objects or situations; (2) an "executive" to generate specific goals under general guidance of the "director", compare the goals with data from the apperceptive manifold, and command appropriate action; (3) a "forecaster" to predict external situations both independent of and in consideration of possible executive actions; (4) an "evaluator" to judge the value of each alternative action based on the forecasts; and (5) a "director" to formulate generic goals for the system and decide whether to seek more data about a solution or to act.

Coulter, N. A., Jr. Contribution to a triadic theory of development of teleogenic systems. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 75-80.

Classical approaches to human development emphasize hereditary and environmental factors as the determinants of development. Teleogenic systems theory — the theory of systems able to generate their own goals — demonstrates the existence of a third component. This component is neither genetically fixed nor controllable by environmental inputs; it emerges as part of a unique process that is invisible from the perspectives of reductionist science. It is not, however, autonomous; its developmental space, though enormous, is genetically prescribed; and its particular qualities depend in part on historical environmental input sequences.

This paper argues that all three components — hereditary, environmental, and teleogenic — comprise a system, which must be viewed both analytically and holistically to be understood adequately. An important feature of this system is the occurrence of interactions which are synergic — promoting two or more functions while impeding none. Equally important are interactions that promote one function, but impede another. These interactions play a crucial role in the development of teleogenic systems.

DeGreene, K. B. *Sociotechnical systems: Factors in analysis, design, and management.* Englewood Cliffs, NJ: Prentice-Hall, 1973.

The many ailments of all today's societies are symptoms of a common underlying problem: the failure to comprehend things as a whole. Accordingly, economic, social, personal, and environmental costs are increasingly prohibitive and program successes increasingly few. This book, a response to these apparently overwhelming problems, is an introduction to the entire field of sociotechnical systems, and a first book to cover an emerging field definitively. It is interdisciplinary; behavioral science provides an integrating theme. It can also be thought of as a book in "systems science: biological, behavioral, and social" as opposed to "systems science: physical."

The term "sociotechnical system" had a very specific meaning as originally defined by Emery and Trist of the Tavistock Institute in London. In this book, the original concept is extended greatly to include not only intraorganizational and organizational problems, but also large-scale societal problems and political behavior in technological societies. Numerous examples and cases show how managers must face problems, find relationships between technology and people as well as between their organizations and the outside world, and how this information can influence their decisions. The cases for the most part indicate how systems theory and methods, and a bridge between theory and method, can be utilized to ameliorate social, economic, environmental, and political problems engendered by technology.

The major emphases of the book are (1) a review, comparison, evaluation, and integration of relevant theories, and an advancement of new theoretical concepts; (2) provision of a behavioral and social "cement" for a wide variety of political, economic, environmental, and technological material; (3) a definition of problems, methods, and data sources and their usefulness, as well as an evaluation of further data needs; (4) an evaluation of technological developments and projections and forecasts thereof, as well as the impacts of such developments; (5) an interrelating of intra-and extrasystem or organization features associated with people, technology, and environments, whether they be social, physical, or natural ("ecological"); (6) a utilization of complex systems models, including models of society, and determination of at least correlative and at best cause-effect relationships between independent and dependent variables; and (7) determination of principles, particularly predictive principles, for the management of complex organizations, including the management of society.

DeGreene, K. M. Models of man in systems in retrospect and prospect. *Ergonomics*, 1974, 17, 437-446.

This article presents a number of historical and current theoretical and working, or operational, models. It is maintained by the author that none of these models, by virtue of limitations to only a part of human behavior, is completely valid for systems planning and design. Integrated models of man within systems and within environments are required. The need is stressed to develop general systems models capable of describing and predicting individual and collective human behavior of varied populations in a wide variety of systems and environments. Man-machine, sociotechnical, and social systems involving military, industrial, and civil applications must be considered.

The author contends that our models should be reconcilable with models involving man in organizations and with ecological and economic models. Models must reflect the changing tenor of the times

with regard to evolving social thought and practice. Criteria therefore must include quality of life and limits to growth as well as economic costs and performance effectiveness. Increasingly, there must be considered in systems development the impact of the system on the environment, not just the environmental constraints on the system. Ideas of stressful environments thus must be amended to include stressful systems. Concepts of open systems theory are of particular value.

Our new models further must be consistent with the dynamic properties and forces within complex systems. Increasingly, motivations, attitudes, values, complex learning and problem-solving, and other aspects of higher-order hierarchical organization must be reflected in systems development. These issues, with an emphasis on working models, are discussed in relationship to problems of education, research, systems effectiveness, and system-environment interactions.

DeGreene, K. B. Limits to societal systems adaptability. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 234-241.

In this paper, two recent theoretic approaches in physical science are reviewed briefly with an eye toward obtaining constructs applicable to the evolution and adaptability of societal systems. These approaches are the modern field theory of critical phenomena in physics and the theory of fluctuations and self-organization of physical chemical systems far from equilibrium. A number of major constructs are identified and applied to the description of biological, behavioral, and social phenomena and processes.

Some characteristics of the world-system field in the next two decades are envisioned and several situations that can limit societal systems adaptability discussed. The distinction between natural societal evolution and human desires and ability for regulation and control is stressed. The author's main thrust is that complex living systems are characterized by a number of interrelated dynamic processes which, until recently, have scarcely been recognized. In toto, these processes underlie the evolution of living systems. However, evolution, especially of ecosystems and societies, may be more a reconfiguration of the total field than a matter of neat change in variables. And, the natural course of evolution of the world-system is unlikely to be what most participants want.

Dolgoff, T. Models of organizational growth and development. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research*, 1975, 310-316.

Most research and speculation about small group behavior are based on linear-progressive models which assume that groups prototypically develop in a time-bound sequence: testing and dependence (forming), intra-group conflict (storming), development of group cohesion (norming), and functional role relatedness (performing). Some writers reject this model by assuming a recurring or cyclical tension between the group members' ambivalent desires for fusion in the group and the assertion of personal autonomy and individuality. Pendular or recurring cycle models avoid serveral pitfalls when findings of small group behavior are extrapolated to complex organizations. This paper focuses on the extent to which these models are congruent with general systems concepts of (1) boundary creation, (2) maintenance, (3) transformation, and (4) dissolution at intrapsychic, interpersonal, and organizational levels.

Duncan, D. M. Training business managers in general systems concepts, in Rubin, M.D., (Ed.). *Man in Systems*, New York: Gordon and Breach, 1971, 271-322.

This paper describes a program undertaken at the General Motors Institute (GMI) to inculcate practicing managers with a general systems view of the organization. At the outset, the author suggests that managers and scholars of the business organization hold mental models, or images, of the organization. Five such mental models are identified: the firm as (1) an instrument of personal power, (2) an economic amplifier, (3) a mechanistic object, (4) a social-psychological phenomenon, or (5) a vehicle of social responsibility. Individually and collectively, these traditional models are inadequate. It therefore is the author's contention that a model of the organization as a living system is more appropriate.

The author describes a management development program undertaken at GMI, the objectives of which were (1) to help managers view the organization as an integrated system, (2) to provide managers with skill in analyzing and designing organizations from the systems framework, and (3) to apply the systems viewpoint and solve organizational problems. Participants were taught that the systemic mental model can be obtained by detailed understanding of their organization's environment, mission, subsystems, geographical units, relationships, and system-wide processes. In the author's mind, this served to engender new insights: Using the systemic framework, the business organization may be viewed as a discernible level consisting of an

integrated organized complexity. Holistic characteristics may be observed apart from the characteristics of subsystems which are statically and dynamically related. Adjustment processes requiring flows and decisions operating under multiple causation obtain and maintain steady state. Termination is likely under such circumstances. Finally, the author posits hypothetical answers to several questions about future effects of this systemic perspective.

Duncan, D. M. James G. Miller's living systems theory: Issues for management thought and practice. *Academy of Management Journal*, 1972, 15, 4, 513-523.

This article is essentially an abbreviated recapitulation of James G. Miller's early works on living systems theory, particularly his January 1972 Behavioral Science article, "Living Systems: The Organization".

Using the fundamentals of (1) space and time, (2) matter and energy, and (3) information as building blocks, Miller identifies three kinds of systems: conceptual (thought), concrete (measurable in space/time), and abstract. To be considered a living system, a concrete system must meet the following criteria: (1) be open and exchange commodities with its environments; (2) be able to repair internal breakdown and thereby maintain certain levels of energy and order; (3) be complex beyond a certain minimum degree; (4) evidence some program, template, or originating blueprint; (5) be composed largely of protoplasm; (6) contain a decider subsystem; (7) carry out 19 critical subsystem processes to survive; and (8) be integrated totalities with the characteristic of self-regulation, the capability of development and reproduction, and the trait of having purposes and goals.

Miller identifies seven distinct levels of living systems: (1) the cell, (2) the organ, (3) the organism, (4) the group, (5) the organization, (6) the society, and (7) the supranational system. Each of these levels has similar salient characteristics and can be described in terms of five major elements: structure, process, subsystems, relationships, and systems processes.

Duncan points out that living systems theory will be extremely attractive to organization and management theory and practice. He suggests that its viability will occur empirically, by comparison with other theory -- the classical school, the human relations school, the decision theory school, behavioral science, and value theory -- and by application to practical affairs.

Duncan, D. M. Systems perspectives for practicing managers. *Organization & Administrative Sciences*, 1975, 6, 89-99.

In this article, the author suggests that practitioners are leading the field of management thought, that the conceptual tools available to these practitioners are inadequate, and that general systems theory should be made available to them as soon as possible.

The author describes the practicing manager (1) as an information processor who (2) is aware of some general principles which apply to most organizations and (3) sees the organization as an integrated, interrelated whole in which a perturbation at one point can spread and show consequences at numerous distant points. This practicing manager wants a theoretical perspective that is concrete, generic, comprehensive, holistic, and capable of describing managerial behavior. Duncan therefore suggests Miller's living systems model as an effective operating paradigm.

Adoption of the living systems perspective would serve a number of purposes. It would attune managers to the idea of differentiating between systems by levels. It would sensitize managers to the importance of spatial relationships. It would afford a better understanding of the organization-environment interface. It would legitimate and formalize the organizational design function. It would provide management a better understanding of the dynamics of growth. It would facilitate an understanding of change at different levels. It would provide new insights for designing organizational command networks. It would force managers to pay greater attention to information processing. It would improve organizational level decision-making. Finally, it would underscore the manager's role as one of entropy control.

Duncan, D. M. The definition of management: A convergence of theoretical and operational perspectives. The General Systems Paradigm: Science of Change and Change of Science. *Proceedings of the Annual North American Meeting of the Society for General Systems Research*, 1977, 82-95.

This paper starts from the premise that managers are continually looking for new insights that will enable them to untangle the threads of organizational life. They don't feel that the tools they have or the tools they are being provided come to grips with the issues they wrestle with in the midst of increasingly complex environments. The author therefore proposes a marriage of Miller's Living Systems Theory and Beer's neurophysiological model of management (Brain of the Firm, 1972). He feels that the identification of

Miller's subsystems processes within the components of the Beer model can be achieved with both conceptual systems remaining intact.

The author sets forth eight reasons that this theoretical integration is likely to coincide with managers' mental images of the real world. Among the most significant reasons given are the following: (1) Miller's concept of the organization includes both the matter-energy and information processing aspects of the organization. Managers reject dictums which ignore the presence and consequence of complex technologies, budgets, delivery pressures, resource shortages, and the nuts-and-bolts of daily organizational life. (2) Beer's scheme clarifies the notion that a manager will operate from a number of different perspectives: superior, subordinate, peer.

Durkin, J. E. The structure of autonomy: Boundarying in living groups. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 634-645.

In this paper, von Bertalanffy's concept of boundarying (opening/closing) model of biological life is generalized in general systems theory (GST) to the autonomous living structure, embodied from cell to society. Like several other scientific doctrines, GST is undergoing a paradigm shift because of new outlooks and discoveries and the inability of the paradigm of objectivity to deal with living structure. The foundational ideas of autonomy are called forth as a new conecptual framework for understanding living structure: (1) complementarity of action and language structure, (2) free self-hierarchicalization both up and down, (3) linear and metabolic self-referential control, and (4) boundarying with opening/closing as the basic operation of autonomy. Applying this model to therapy groups, says the author, leaders should (1) use a physical boundary, (2) shift back and forth from content to structure levels, (3) use their own living structure as a tool, and (4) engage in summing and systeming by being closed to closedness and open to openness.

Emery, F. E. & Trist, E. L. The causal texture of organizational environments. *Human Relations*, 1965, 18, 21-32.

A main problem in the study of organizational change is that the environmental contexts in which organizations exist are themselves changing -- at an increasing rate, under the impact of technological change. This means that they demand consideration for their own sake. Towards this end a redefinition is offered, at a social level of analysis, of the causal texture of the environment.

The authors classify four "ideal types" of environment according to the degree of "system connectedness" that exists among components of the environment. Components are incorporated in relation to the systems' actual and potential transactional interdependencies (both input and output). The four ideal types are (1) the placid, randomized environment; (2) the placid, clustered environment; (3) the disturbed-reactive environment; and (4) the turbulent field (environment). This fourth type is new and important in understnading the setting of modern and future organizations. The turbulent environment consists of "dynamic properties arising not simply from the interaction of identifiable component systems, but from the field itself (the ground). The turbulence results from the complexity and multiple character of the causal interconnections. Individual organizations, however large, cannot adapt successfully simply through their interactions."

The authors contend that organizational adaptation to the turbulent environment promises to be the most significant factor in the effectiveness of tomorrow's organizations. In simple environments, predetermined solutions and strategies guide human actions and involve little risk, but in the complex, turbulent environment the adoption of a determined action includes a high degree of risk because future events always present new, often unforeseen, possibilities for solving problems. Thus, continuous monitoring of the turbulent environment normally will have the effect of continually modifying organizational goals and policies by implying the need for new methods or by requiring new ways of doing things to meet various challenges. This reveals both the promise and the risk of the adaptive organization.

Emery, F. E. *Systems thinking*. Middlesex, England: Penguin, 1969.

This book is a collection of readings designed to depict the emergence and clarification of the view that living systems are essentially "open systems" and not "closed systems". It focuses primarily on the question, "What systems thinking is relevant to the thinking required for organizational management?" The editor at the outset cites six principles that provide the philosophical orientation of the book: (1) The primary task of management is to manage the boundary conditions of the enterprise. (2) The goals or purposes of an enterprise can be understood only as special forms of interdependence between the enterprise and its environment. (3) An enterprise can achieve a "steady state" only when there is constancy of direction toward the same end(s) and a rate of progress that falls within tolerance limits. (4) The task of management is governed by the need to match constantly the actual and potential capacities of the enterprise to the actual and potential requirements of the environment. (5) In a human organization, the two requirements for a steady state,

unidirectionality and progress, can be achieved only by leadership and commitment. (6) An enterprise can only achieve the conditions for a steady state if it allows to its human members a measure of autonomy and selective interdependence.

Part I, "Precedents to Systems Theory", contains early papers that explicitly or implicitly argue for a new logic in the study of complex systems that display purposive or adaptive behavior. The selections only partly argue their case by pointing to principles of system action that can be inferred from their definition of a system.

Part II, "Properties of Open Systems", contains representative attempts to describe the characteristics of open and living systems. One key point made is that, given the importance of system properties, it does not follow that maximum scientific payoff comes from seeking to identify the most general of these. To pursue this goal is to risk masking the environmental characteristics and the nature of the component parts that enter into the adaptive success or failure of concrete systems or classes of concrete systems.

Part III, "The Environment of a System", recognizes the importance of attempting to characterize the environments within which systems must adapt to survive or duplicate themselves. It is pointed out that boundary conditions or exchange processes are as much subject to the heteronomous processes in the environment as they are to processes within the system. Thus, open systems analysis cannot hope to stop with a specification of an exchange equation; it can hope to approach adequacy only where there is some characterization of the environment. Past reluctance to tackle environmental analysis appears to reflect environmental complexity and the incommensurability of systemic and environmental processes.

Part IV, "Human Organizations as Systems", points out that analyses of human organizations typically confine themselves to such abstract dimensions as economic allocation, information flows, and allocation of power and responsibility. It is usual to find (a) a closed-systems approach and (b) an either-or perspective to the analysis of social and technical systems.

Part V, "Systems Management", highlights the point that the principle guiding the management of separate but correlated systems seems to be "joint optimization". It is suggested, however, that the principle of "the leading part", i.e., optimizing conditions for the part of the system which is for the time the leading part — even at the expense of the other parts — might be the best way for attaining the ends of the system.

Eoyang, C. K. Requisite variety in organizations. Avoiding Social Catastrophes and Maximizing Social Opportunities: The General Systems Challenge. *Proceedings of the 22nd Annual North American Meeting of the Society for General Systems Research*, 1978, 369-378.

This paper attempts to apply Ashby's Law of Requisite Variety to the field of organizations. It examines the formulation of the law and suggests several extensions and elaborations of the cybernetic paradigm. Parallels between this view and current theories of organizations indicate significant isomorphisms. Organizational variety is suggested to be a meaningful concept in interpreting the diverse literature on interactions between organizations and their environments.

Ashby defines variety as the number of distinguishable elements in a given set. Systems variety is defined as the number of distinct actions in the set of alternatives available to the system; similarly, environmental variety may be thought of as the number of alternatives, or action states, that the environment can assume with respect to the system. Systems can achieve greater utility from interactions with their environments if they increase the variety in their own behavior, decrease the variety exhibited by the environment, or modify the consequences or utilities of the interactions.

The author feels that one of the basic reasons for the failure of organization research to utilize fully the theoretical contributions of cybernetics, game theory, information theory, etc., has been the difficulty of translating theoretical constructs into testable organizational variables that have available measures.

Eoyang, C. K. & Haga, W. J. Old wine in new bottles. *Behavioral Science*, 1977, 22, 53-55.

This is a critique of Toronto's 1975 Behavioral Science article, "A general systems model for the analysis of organizational change." Toronto sought to apply general systems theory to the study of organizations; a recurring theme was that organizational change is so complex that only a general systems perspective can unravel it. Eoyang and Haga contend that Toronto's application demonstrated neither the utility of general systems theory nor the complexity of organizational change. His approach is characterized by (a) descriptions of peculiar data, (b) methodological errors, and (c) questionable generalizations. Among Toronto's substantive conclusions that are questioned are the following: (1) "Permanent change in system activity data requires a change in and the subsequent equilibration of both the system and its suprasystem." (2) "The major authority figure in a system is the critical locus of any organizational change program." (3) "Crucial aspects of social systems cannot be discovered by taking them apart. Organizational change, therefore, cannot be studied in isolation by extracting a small portion from the whole but it must be studied in toto."

Feit, E. Insurgency in organizations: A theoretical analysis. *General Systems*, 1969, XIV, 157-168.

This article attempts, using mathematical reasoning, to design a general model of insurgent behavior in social organizations. Social organization can be considered as a dynamic, autonomous system made up of organizations of various kinds and sizes. In view of its complexity, neither it nor any other organization can be described fully. Internal communications in such a system are fully predictable as long as all organizations act in accordance with a schedule based on values given priority within the system as a whole and mediated by a government. The schedule sets the constraints within which each organization is free to set its own goals. When the system is functioning properly, there is minimal internal interchange of information between the organizations, information being defined as statistically unexpected communications.

For human organizations, order and predictability contribute to security; therefore, all organizations aim at a state of zero entropy, where no information is exchanged. In such a system, all actions and changes are completely predictable. This "ideal" state is never achieved.

The object of the insurgents is to intorduce information; and, as the level of information is a measure of disorder, the insurgent's goal is to increase the flow of information to the point where the government can no longer maintain order. This is evidenced when the government is forced continually to transgress its own schedule. The government is compelled to act to maintain order for the rest of the system while maximizing disorder for the insurgents, and this causes intense strain in the organization of the government, which can be called a dissonance in entropy. The winner in the conflict is likely to be that organization that can best harness the entropic dissonances of its opponent while retaining cohesion in its own organization.

Fried, J. A transdisciplinary model of technological and social organization. General Systems Theorizing: An Assessment and Prospects for the Future. *Proceedings of the 1976 Annual North American Meeting of the Society for General Systems Research*, 1976, 85-91.

This article presents a model which describes how changes in technological, social, and cultural conditions produce impacts on social institutions. The model is based on the central premise that while specific institutions of a technological order or a socio-cultural order (kinship, legal, political, religious, etc.) are differentiated into institutions, all institutions per se operate on the basis of organizing people, materials, and resources

in some sort of pattern in order to attain a desired end. Therefore, the central analytic concept is that abstract modalities of organization can be used to model the behaviors of any institution or social entity. For the policy planner, the model offers the possibility of measuring the differing abilities of competing strategies of change to achieve necessary levels of institutional and managerial responses to match the nature of the tasks that technologies create.

Geyers, R. F. Alienation and stress: A review of their modern forms from the perspective of general systems theory. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research*, 1975, 73-82.

This paper discusses similarities and differences between alienation and stress. Alienation is conceived as a generic term for information processing disturbances of individuals. Isomorphisms are identified between five dimensions of alienation and the elements of a system-environment interaction model. General systems theory also, it is noted, can be applied to the causes of alienation. Modern forms of alienation are seen as consequences of a recently increased complexity differential between the individual and his environment: scanning and selection problems (input); assimilation of new experiences (state functions); flexibility, identification, and overchoice problems (decisional functions); and self-actualization problems (output). The following hypothesis is posited: communication problems over and above those caused by specific personality structures ("psychiatric" alienation) and socialization in specific (sub)cultures ("sociological" alienation) exist between those who live in environments of different complexity, and/or who differ in their perception of this complexity, and/or who have a differential ability to cope with it.

Glanville, R. The form of cybernetics: whitening the black box. General Systems Research: A Science, a Methodology, a Technology. *Proceedings of the 1979 North American Meeting of the Society for General Systems Research*, 1979, 35-42.

Among cyberneticians, there has developed a deep intellectual divide, occasioned by what has come to be called the "New Cybernetics," the "Cybernetics of Cybernetics," or "Second Order Cybernetics." Essentially, this divide derives from examination of observing as well as observed systems. The purpose of this paper is to discuss observing and observed systems, in order to shed light on both sides of the divide, and to explain the psychological relevance and power of the concepts generated.

The author's principal argument is that both the observer of a cybernetic system and the observed system itself comprise a unitary, mutually interactive whole. The actions of an (experimenting) observer are actions involving control and communication between the observing and observed systems. Not only does the observer describe the system, including its feedback property, he also describes and changes the input, and describes the output. Furthermore, his description of the output causes him to act, possibly changing the input.

Glimell, H. *Designing interactive systems for organizational change.* Goteborg: Foretagsekonominska Institutionen, 1975.

This report concerns the introduction of an interactive, computer-based management information system, MARKISETT, designed to support and improve interactive, unstructured decision-making. The author develops hypotheses concerning the introduction of new thought patterns and analytic tools into existing organizations. The hypotheses, a combination of project experience and published theory, are to form the core of emerging substantive theory for introductory interventions.

Glimell's key idea is that there exists something called unstructured decision-making where the decision-maker must use information with unclear cause-effect relations and where the underlying reality is incompletely and ambiguously mapped. In the intervention discussed, he hoped to introduce a management information system which would support interactive decision-making where the user " . . . inquires the available information system and where subsequent responses stimulate further steps or redefinitions of the problem."

The author draws upon various domains of theory and literature to guide both the intervention and MARKISETT's design. From the seriality and limited quantity of human information processing comes a guideline calling for highlights, emphases, and summaries in information displays. From cognitive and personality styles there is a requirement for flexible methods of accessing the data base along with built-in cues for further inquiry. From organizational change theory come guidelines about the user's involvement in planning and designing the system's capabilities.

The key theoretical framework is decision theory. Inadequacies in unstructured decision-making are identified: (1) sequential attention to goals and actions, (2) satisfactory rather than optimal levels, (3) overuse of standardized operating procedures, (4) misaggregation of data, (5) undue confidence in early trends,

(6) biased judgements of probability, and (7) defense mechanisms. MARKISETT's solution to these problems is to support the search and storage functions of problem solving, act as an extended short-term memory, and invite the use to use multiple perspectives in analyzing the problem.

Perhaps the most useful part of the book is the discussion of the failure of this intervention, due to such things as over-high client expectations, improper use of the system, reorganization, and time and cost overruns.

Gomez, P. Organic problem-solving in management: Systems-methodology applied to the design of viable systems. The General Systems Paradigm: Science of Change and Change of Science. *Proceedings of the Annual North American Meeting of the Society for General Systems Research*, 1977, 243-252.

In the most general sense, management can be characterized as problem-solving in order to control complex, probabilistic, and self-regulating systems. Organic problem-solving in sociotechnical systems demands a methodology that accepts their complexity, uncertainty, and self-regulation in the process of modeling as well as in the development of problem-solutions. This paper presents a systems-methodology that instructs the manager how to model the problem situation from the point of view of his own possibilities of control and how to act as a catalyst or constraint-engineer when designing problem solutions. This methodology also allows the integration of special reference frames to deal with the self-organizing capabilities of sociotechnical systems in the process of their organization.

Groff, G. K. System theory and organizational decision making. General Systems Theorizing: An Assessment and Prospects for the Future. *Proceedings of the 1976 Annual North American Meeting of the Society for General Systems Research*, 1976, 92-94.

This paper explores the interface between general systems research and organizational studies. Organizational problem areas for which advances in general systems theory are needed and the existing concepts and methodologies that are of greatest value are discussed. The author contends that existing tools for studying organizations and management are inadequate. They need to be embedded in general solution strategies, or planning processes, that are more effective in opening up solution spaces and in providing efficient means for examining these spaces. Guidance, for example, is needed in establishing organizational goals and in devising innovative organizational strategies. A larger and more effective theoretical and methodological base is needed, and the development of this knowledge must be forthcoming from those such as general systems researchers who are not wedded to the analytical paradigm and who are concerned with behavioral, structural, and functional adaptation.

Haberstroh, C. J. & Gerwin, D. Climate factors and the decision process. *General Systems*, 1972, XVII, 129-141.

This article is an attempt to deal with the theoretical and empirical aspects of the concept of external organizational climate -- an explicitly conceptualized dimension of the environment that materially affects the functioning of a whole organization. Categories include resource availability, technology, social values, community expectations, and total structure. The theoretical content of the article describes the complex process by which the authors believe climate factors, and especially their changes, influence the strategy of an organization. The empirical content of the article is aimed at providing examples of climate factors, climate states, and policy reactions, as well as highlighting areas for potential model refinements. Both of these aspects concentrate on the decision-making processes by which the organization informs itself, develops explicit cognitions of the structure of the environment and of its own operations, and synthesizes strategy for future operations.

The authors suggest the following: (1) An explicit problem list exists within the executive group of any organization. (2) The sources of these problems lie in results pressure, including anticipation thereof. (3) Where changes in climate are believed to be associated with problems, explicit information channels that carry information on climate will be found to exist. (4) These may be embodied in search processes that select and filter climate information and draw implications. (5) Policy responses will be attributed to specific problems or changes in climate, thus forming a complete episode, information processing sequence, or functional action. (6) Conceptualization within the organization of such episodes should predispose it to "standardized" responses, i.e., a specific fix to a specific problem, based on standard, known technology, and exerting minimal influence on ongoing operations.

Halal, W. E. The corporation evolving. Avoiding Social Catastrophes and Maximizing Social Opportunities: The General Systems Challenge. *Proceedings of the 22nd Annual North American Meeting of the Society for General Systems Research*, 1978, 216-220.

In this paper, the state of the large business corporation is analyzed using general systems concepts in order to forecast its role in the future. Using an open system model which describes the firm as a social institution, it is seen that the corporation is beset by a turbulent environment in which its various constituent groups are becoming active elements in establishing corporate policy. The thrust of the changes confronting the corporation is

to move it from its past concern with more rudimentary, physical, financial matters into a new realm of larger, more subtle and more complex affairs involving the firm as a holistic economic system. Thus, the corporation seems likely to evolve into a larger holistic system that integrates its constituent subsystems into an economic community of shared interests.

Harries, T. E. Stress-related system/environment interaction and the law of requisite variety. Avoiding Social Catastrophes and Maximizing Social Opportunities: The General Systems Challenge. *Proceedings of the 22nd Annual North American Meeting of the Society for General Systems Research*, 1978, 349-359.

Stress is experienced when inadequate intra-system variety limits a system's capacity to resolve cultural complexity into manageable arrangements. Both the system and its environment must be included in stress analysis. This paper suggests such analysis by means of a living systems paradigm overlaid by three analytical grids: (1) basic human agendas — genetically determined and culturally reinforced dominance behaviors which insure that security, identity, and stimulation agendas will be fully satisfied; (2) information significant events — the "meaning" of events and symbols which are constructed by the observing system from direct experience (i.e., referent events); and (3) information processing competence — the capacity of an observing system to resolve relevant environmental complexity into appropriate constructs, adapted to the perceived complexity, i.e., the capacity to respect the Law of Requisite Variety.

It is suggested that cultural complexity/stress is created by extensions of the detecting and effecting capacities of human systems without a corresponding increase in selecting or judgment capacities. In-depth public awareness of stress-related variables is a precondition for emergence of effective stress-reducing policies or programs.

Jantsch, E. *Design for evolution: Self organization and planning in the life of human systems.* New York: Braziller, 1975.

This book is an exploration into the acquisition and use of knowledge for human purposes. It elaborates on the theme that rational knowledge cast into the form of internally consistent, logically constructed and closed models of science constitutes a useful, but by no means sufficient, tool for dealing with matters of human design for a human world. In such matters, the "know-how" of ordering and implementing well-perceived, goal-oriented action, the very domain in which the objectivating models of science are helpful, constitutes the lowest level in a hierarchy of knowledge for human purpose. The

author's principal aim is to forge the beginnings of a new paradigm expressing the life of human systems and transcending traditional modes of thought. He seeks (1) to extend the principle of "order through fluctuation" that governs physical and biological systems to human and knowledge systems; and (2) to lay a modern foundation for the profound truth that "the evolution of mankind forms a meaningful and integral part of a universal evolution -- that mankind is an agent of this universal evolution . . ."

Part I, "The Challenge of a Dynamic World", lays a foundation for the remainder of the book. In Chapter 1, the author scans possibilities for the setting of policies, or rules for regulation, and concludes that the emerging task is not to select and fix another rigid policy but to understand that regulation in times of rapid and significant change depends on flexibility. Chapter 2 expresses the thought that not only can there be no one-sided resolution of the tension between opposites, but that this tension constitutes the very energizing factor keeping the human system in continuous motion. Chapter 3 surveys various evolutionary world views and brings forth the principle of "order through fluctuation". Chapter 4 links the idea of evolution to recent notions about the self-organization of human systems.

Part II, "Design: The Human Way of Relating to the World", concerns basic notions underlying individual, social, and cultural creativity, the sources from which the life of human systems feeds. Chapter 5 introduces one of the basic concepts used throughout the book: the triplicate structure of levels of perception, or inquiry — rational (separation between subject and object), mythological (feedback relation between subject and object), and evolutionary (union of subject and object). Complementary views of reality result which permit the elevation of the reductionist view (quantity) obtained at the rational level toward a holistic (quality) and ultimately toward a nondualistic, four-dimensional space/time view (process). In Chapters 6 and 7, the author develops a model of the basic human design process, depicted as the interaction of processes in a toroidal model. This model is composed of elements arranged in two planes as ternary systems. One of them links physical, social, and spiritual domains, the other consciousness, the "appreciated world", and reality in each of the above domains.

Part III, "Consciousness Evolving", deals with the feedback processes shaping human consciousness. In Chapter 8, the author tries to show how the processes playing between consciousness and reality realize innate norms which become explicit at the three levels of perception/inquiry. Chapter 9 introduces notions beyond the grasp of conventional science, e.g., intuition, spiritualism, etc. Chapter 10 concerns the balancing of consciousness through apperception between the processes on both sides -- reality and the appreciated world.

Part IV, "The Appreciated World Evolving", deal with some of the major processes by which we extend our basic experiences into the future -- by which we plan. Chapter 11 focuses on the crucial feedback process leading to the formation of subjective models, which then return in the disguise of objective myths. Chapter 12 is a review of the basic planning processes in light of a moral systems approach -- in other words, the postulate of an ethics of whole systems. Chapter 13 is devoted to an investigation of interdisciplinary and inter- and transexpimental forms of inquiry necessary to elevate planning to the mythological level.

Part V, "Reality Evolving", elaborates on some of the implications the new paradigms seem to hold for human systems. Chapter 14 views the organization of the human world as passing through successive "waves" of dominant forms of organization -- from ecological over social and cultural to psychic organization. Chapter 15 is a discussion of implications for the phase of organization the Western world is passing through, in particular the requirement for more flexible institutional role playing.

In the "Epilogue", the author identifies planning and love as the two essential and complementary aspects of human design. Where planning, the masculine element, aims at stabilization which in turn makes it possible to act out power or focused energy, love, the feminine element, introduces the instabilities which elevate the plane of human action to over-new dynamic regimes, thereby ensuring the continuously renewed conditions for human creativity, for the life of human systems. Thus the design process itself seems to work by the ubiquitous basic principle of "order through fluctuation", like all aspects of evolution. Human design for evolution is not only a distinct possibility — it is also the foremost element of hope in times already marked by increasing fluctuations and turbulence.

Jantsch, E. & Waddington, C. H., Eds. *Evolution and consciousness: Human systems in transition.* Reading, MA:: Addison-Wesley, 1976.

The evolutionary paradigm is still almost totally neglected by a social science which finds its purpose in reducing the human world to the equilibrium perfection, structural unambiguity and permanence, hierarchical control, and predictability of machine-like structures. In contrast, the contributions to this book try to develop a new understanding of an evolving world of human systems characterized by the same aspects of imperfection, nonequilibrium, and nonpredictability, of differentiation and symbiotic pluralism, which seem to govern life in all its manifestations. The authors argue that the human world, analegous to physical and biological evolution, incorporates a basic principle of "self-transcendence",

of venturing out by changing its own phsycial, social, and cultural structures -- above all, by changing its own consciousness. What is real in this drama of continuous self-renewal and self-expression are self-bounding processes rather than the elusive and transitory structures which arise from their interaction in ever-changing forms and complexities.

Part I of the book deals with the evolutionary paradigm in an emergent perspective. Chapter 1 summarizes the recent thrust of evolutionary theory in the subhuman domain. Chapter 2 discusses the basic characteristics of living systems and the possibility of their representation through science. Chapter 3 is an attempt to link the concepts developed in the book by discussing evolution as self-realization through self-transcendence.

Part II deals with formal approaches to evolving systems which are based on process thinking and therefore, in contrast to structure-oriented mechanical and behavioral approaches, are capable of representing to some degree that basic characteristic of life which expresses itself as "continuity in change". Chapter 4 concludes from empirical studies of natural ecological systems that their dynamics cannot be explained by an equilibrium-centered view. Nonequilibrium also emerges as a principle inherent in life in Chapter 5. Discussing systems of interactive populations -- systems with a history -- in a sweeping view from physical-chemical systems through animal aggregations and societies to natural ecosystems and further to human sociocultural systems, the concept of "order through fluctuation" emerges as a basic nonequilibrium ordering principle governing dynamic aspects of evolving systems at many levels. Chapter 6 discusses macrodynamics and morphogenesis in the light of still other recent theoretical and experimental developments, namely, catastrophe theory and the observations made with the macroscope. Chapter 7 discusses recently developed approaches to the simulation of interactive natural processes characterizing self-renewing systems (such as cells) with a view to their potential application to human systems management.

Part III deals with selected aspects of sociocultural evolution in the human domain. Chapter 8 discusses process and structure in socio-cultural systems with the help of cybernetic models of a single system, of two geopolitical systems in interaction, and of the successive stages of emergent geopolitical systems with an impending switch from nation-state to planetary scope. Chapter 9 presents the cognitive modality, or method, of scientific inquiry. Chapter 10 discusses the development of heterogeneity, or pluralism, in sociocultural systems. Chapter 11 traces the transformation of human consciousness by discussing five examples: cultural revitilization, sicentific revolutions, heroic mythology, psychotherapy, and general creativity. Chapter 12 discusses the evolution of images of man in connection with the processes of integration and differentiation in three "waves": grounding, socialization, and individuation.

Johnson, R. A., Kast, F. E., & Rosenzweig, J. E. *The theory and management of systems.* (3d Ed.) New York: McGraw-Hill, 1973.

The vast growth in size, complexity, and diversity of operations of the modern organization has made the managerial task exceedingly difficult, but more essential to the success of the enterprise. It is the contention of this book that today's large-scale organization should apply the systems approach to cope with the growing complexities and proliferation of operations. It provides a framework within which the manager can integrate his operations more effectively.

Part I develops the theoretical framework for the systems approach and sets the stage for subsequent discussion. Chapter 1 sets forth conceptual foundations and shows how general systems theory is applicable as a framework for scientific investigation and understanding in a wide variety of fields or disciplines. It then traces the transition from a general systems theory to systems concepts for management. Attention is focused on the relationship of the systems approach to organizational subsystems — strategic, coordinative, and operating. The next four chapters discuss the relationship between systems concepts and the primary managerial functions — organization, planning, control, and information/communication. Chapter 6 concerns the merging of the theoretical systems concepts with practical applications.

Part II is concerned with the implementation of the systems approach in the management process. Chapter 7 covers systems design, one of management's most vital functions. This concerns, among other things, the strategic considerations of relating the organization to its environment and developing comprehensive systems and plans. Chapter 8 considers the contributions of quantitative techniques to the implementation of the systems approach. One type of simulation, network analysis, is the subject of Chapter 9. The impact of the systems approach on people is covered in Chapter 10. The discussion includes such points as the human need for systematic relationships, the need for systems change, and how people resist change.

Part III provides examples of the application of systems concepts. Chapter 11 is concerned with flow systems for both goods and services. Chapter 12 discusses automation and describes a recent development in producing machines — numerical control. Chapter 13 deals with the program management concept, the management of large scale, complex programs, from design to production to delivery to utilization. Chapter 14 is concerned with planning-programming-budgeting systems (PPBS). Chapter 15 reviews the role of data processing in keeping track of organizational transactions, as well as in providing information for managerial decision-making.

Part IV concerns future applications. Although the past provides a limited basis for evaluating future trends, the authors attempt to "crystal-ball" the future by pointing up some of the most important applications, innovations, and problems that may arise from the utilization of the systems approach.

Kaiser, L. R. The ecosystem model: designing organizational environments. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Ssytems Research,* 1975, 304-309.

The quality of life in America is increasingly dependent upon the qulity of life in its organizations. The main purpose of an organization is the conversion of social ideas into institutional realities. This paper outlines a seven-stage ecosystem model for the intentional design of social environments.

Initially, a philosophy underlying ecosystem design is set forth. The philosophy is based on nine assumptions, the dominant one of which states that "the organizational environment should be deliberately designed to effectively and efficiently fulfill its societal role as well as provide a vehicle for the self-actualization of its residents." Based on this, the seven-stage design process is detailed: valuing, goal-setting, programming, fitting, mapping, observing, recycling.

The organizational environment is viewed as an outer space, i.e., the stimuli originate outside the person. In the same way, stimuli that originate inside the person's consciousness constitute inner space. A person in an organization may be viewed as a living interface between outer space and inner space. A hierarchy of nine levels of consciousness existing within the organization is defined: exploitive, subsistive, contractual, paternalistc, interactive, self-actualizing, exclusive, inclusive, synthetic. In turn, the organization is conceptualized as moving through six developmental stages: unconscious, conscious, egocentric, ecological imbalance, inclusiveness, synthesis. Finally, organizational form building is viewed as a seven-step process: creation, implementation, leadership, administration, evaluation, extrapolation, engineering.

Kast, F. E. & Rosenzweig, J. E. General systems theory: applications for organization and management. *Academy of Management Journal*, 1972, 15, 447-463.

The authors introduce the reader to general systems theory by reviewing briefly its historical evolution and summarizing its most prominent concepts. While systems theory has been embraced for its potential in studying organizations, its application and exploitation has been much less than perfect. One of the reasons for this is the perhaps inappropriate analogy that has been drawn between the organization and the organism. Similarly, the distinction between organization and "an organization" too rarely has been recognized. Another dilemma has been the tendency to dichotomize all systems as open or closed, without recognizing that most social organizations

are a matter of degree. Other difficulties have been continued subsystems thinking, the fact that we know more about certain relationships than we can fit into a systems framework, the failure to delineate specific systems for consideration, and the applicability of systems theory to "contrived systems". Finally, the distinction between system effectiveness and organizational effectiveness has not always been made.

The authors maintain that systems theory provides a new paradigm for the study of social organizations and their management, but that we are not sufficiently sophisticated to use it. Sophistication will come when we have a more complete understanding of organizations as total systems, so that we can prescribe more appropriate organizational designs and managerial systems.

Kast, F. E. & Rosenzweig, J. E. The modern view: Systems and contingency concepts, in *Organization and management: A systems and contingency approach*. New York: McGraw-Hill, 1979, 97-119.

This chapter of the Kast and Rosenzweig book reviews the elements of the systems approach, its utility to organization theory and management practice, and its integration with the contingency approach. System is defined and the key concepts of systems theory reviewed: subsystems or components; holism, synergism, organicism, Gestalt; open systems view; input-transformation-output model; boundaries; negative entropy; steady state, dynamic equilibrium, homeostasis; feedback; hierarchy; internal elaboration; multiple goal seeking; and equifinality.

The historical development of systems theoretic insights in organization theory is reviewed. Additionally, an elaboration of the organization as an open system is offered. This provides the basis for an integrated view of the organization as a sociotechnical system composed of five subsystems: the goals and values subsystem, the technical subsystem, the psychosocial subsystem, the structural subsystem, and the managerial subsystem. This suggests a substantially different role for management than the one it played in traditional theory. In traditional theory, the emphasis was on economic-technical rationality. In the systems view, however, management assumes the vital role of perceiving and determing environmental relationships and designing internal subsystems to meet the objectives of effectiveness, efficiency, and participant satisfaction.

Finally, an attempt is made to marry the systems and contingency approaches. Systems concepts are directed toward

providing a broad model for understanding all organizations. Contingency views recognize that the environment and internal subsystems of each organization are somewhat unique and provide a basis for designing and managing specific organizations. Contingency views represent a middle ground between (1) the view that there are universal principles of organization and management and (2) the view that each organization is unique and that each situation must be analyzed separately.

Katsenelinboigen, A. Vertical and horizontal mechanisms in complex systems. Avoiding Social Catastrophes and Maximizing Social Opportunities: The General Systems Challenge. *Proceedings of the 22nd Annual North American Meeting of the Society for General Systems Research*, 1978, 276-280.

The formation and integration of the variety of units seems to be the leading function of a system. The variety of units is determined first of all by the search for more effective ways of performing a variety of operations. This paper suggests that any complex system requires a synthesis of vertical (control relationship) and horizontal (independent relationship) types of mechanisms in view of the inexpediency or impossibility of preserving just one class of mechanisms. An unsophisticated approach to the functioning of a complex system will be to attempt to unify the various mechanisms. This is particularly characteristic of certain authoritarian social systems.

The author presents different structures — Acracy, Totacracy, Plurocracy, and Deocracy — that result from combinations of functions which form and integrate the variety of units with given classes of mechanisms. It is pointed out that vertical and horizontal mechanisms may have invariant structures, i.e., integration of a system with the help of coordinators. The paper reveals some conditions under which it would be inexpedient or impossible to utilize only vertical mechanisms.

Kefalas, A. G. & Smith, A. W. The future of the corporation: An overview. Avoiding Social Catastrophes and Maximizing Social Opportunities: The General Systems Challenge. *Proceedings of the 22nd Annual North American Meeting of the Society for General Systems Research*, 1978, 208-215.

In the past two decades, there has been a marked growth in research on the future. Little of that research, however, has dealt with the future of the corporation. This article, by comparing popular characterizations of the future with current thinking about private enterprise, asks where tomorrow's corporation should head.

Popular characterizations of the future have tended to coalesce around the following principles: (1) conservation, (2) safety, (3) leisure, (4) freedom, (5) participative decision-making, (6) quality environment, (7) guaranteed employment, (8) labor-intensive technology, (9) adequate housing, and (10) participation in ownership of the wealth-creation mechanisms. In one sentence: Maximization of the Quality of Life.

In contrast, current thinking about private enterprise embodies the following principles: (1) maximum production and distribution of goods and services; (2) maximum utilization of renewable and non-renewable resources; (3) minimum expenditure of money and managerial talent for "nonproductive" activities (e.g., environmental quality and social responsibility); (4) maximum concentration (vertical and horizontal); (5) location of plant facilities within or near urban centers; (6) capital-intensive technology; (7) planned obsolescence of products; (8) ownership by the few; (9) maximization of profits; and (10) continuous growth. In one sentence: Maximization of Stockholder Wealth.

Kim, J. Y. Communication models, the image of cybernetic man, and human behavior. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research*, 1975, 532-538.

The concept of feedback, originating in the hard sciences, has been utilized widely in theorizing about human communication. The feedback model of communication, however, creates the image of cybernetic man: man as a feedback automata. At first, a feedback system may appear to be an open system because it seems to engage in mutual exchange of information or energy with environment. But, a careful second look at the principle of feedback would reveal that it is not: a feedback system actually reacts to its own output. It has a specific goal; the control center actuates its effector, whose action is then monitored back to the control center through the receptor; then the control center again acts upon the results of the output (own behavior), and so on. Such is a very closed system phenomenon.

What is needed, says the author, is a new conceptual tool with the properties which would account for the other category of teleology, to account for the goal-seeking, purposeful yet non-teleological behaviors. The author proposes teleogeny for this purpose. The difference between teleology with its feedback principles and teleogeny is conceptually subtle yet crucial. In teleological feedback, the goal is externally and passively given; teleogeny has its feedback system internally and actively generate its own goal. Thus, the concept of teleogenic feedback is able to account for the unique ability of open, living systems to increase their negentropy level with the power of internal organization in their interaction with an ever-entropic environment.

Klir, G. J. An approach to general systems theory. *General Systems*, 1968, XIII, 13-20.

Many attempts have been made to establish a clear and precise meaning of the concept of the system. The author attempts to elaborate a general systems theory whose generality and content would be in an adequate equilibrium with regard to its applications. In order to retain an essential content of special systems in general systems, the concepts of general systems theory are established and elaborated by an inductive procedure.

The theory proposed is characterized by the following properties: (1) The theory is based on precisely defined concepts. Vague concepts (the object, the device, the whole, etc.) are rejected. (2) The theory is based on a consistent set of definitions of general systems, each of which is applicable for a particular problem. (3) The theory is applicable to every scientific or engineering discipline where the concept of system is used. (4) The theory is applicable to all systems with the exception of systems with infinite number of quantities or infinite number of elements. It thus is valid for all bounded systems. (5) The theory is applicable for both the description of system properties and the solution of systems problems, i.e., both the descriptional and operational points of view are included. (6) The universality of the theory does not oppose the multiplicity of general systems. (7) The theory is based on fundamental traits obtained by successive generalization up to a reasonable level in order to reach a proper compromise between its generality and its content (effectiveness in application). (8) No a priori classification of external quantities to input and output quantities is generally required. (9) The theory does not exclude teleological formulations of behaviors.

Klir, J. The general system as a methodological tool. *General Systems*, 1965, X, 29-42.

In this article, the author asserts early that "the system concept is utilized by different scientific disciplines in different ways, and used for the solution of different problems." He suggests that the notion of the general system is useful in cutting across the various disciplines because, generally, "in our experimental investigation of objects, we concentrate on the observation of a distinct set of quantities at a given resolution level, on the relations between these quantities, and the search for the properties . . . which determine the relations mentioned." The implied goal of research, therefore, is to search for relations and properties in a systemic framework.

The author states that the behavior of a system can be specified if one knows the elements of the universe of the system, certain laws of superposition in which the system operates, and the environment of the system. He then outlines rules for defining a general system, using concepts previously defined; specifically, a general system (1) should be based on characteristic traits assumed to be completely known; (2) should be based on constant traits; and (3) should be based on those traits by which it is possible to determine (logically) all the other constant traits. Thus, a general system can be uniquely determined by the set of external quantities, resolution level, permanent behavior, and real structure.

Once the system has been specified, the payoff comes from being able to surmise causal relations, themselves a function of time-invariant relations. Klir tends to couch reality in terms of "well-ordered pairs of cause (leading to) result." Quantities independent of the system, or in a research context variables manipulated by the researcher, are called independent quantities (variables), while those produced by the system — a result of the independent quantities — are the dependent quantities (variables). An automaton is a special case of a causal system in which the independent quantities are inputs and the dependent quantities are outputs (an input-output machine). This understanding can be used to help solve the three fundamental systems problems: analysis, which matches behavior to corresponding structure; synthesis, which matches structure to corresponding behavior; and the "black box" problem, in which both structure and behavior are unknown but can be experimentally manipulated.

Kramer, N. & Smit, J. *Systems thinking: Concepts and notions.* Leiden: Martinus Nijhoff, 1977.

There is no generally accepted, clearly delineated body of knowledge concerning systems thinking. The multiplicity of thinking is well illustrated by the various names such as (general) systems theory, systems thinking, systems approach, systems analysis, systems synthesis, systems engineering, etc. These terms refer to various fields of knowledge that either overlap or are completely different. For this reason, the authors consider it useful to try to develop a common language, a common set of concepts. This book is an attempt to develop such a common language.

Chapter 1 is an introductory chapter that describes the general concept of a system, provides historical background concerning the evolution of systems appreciation, clarifies the objective of systems thinking, and identifies the parallels between systems thinking and theories of organization and management.

Chapter 2 presents concepts designed to enable description of the inner structure and behavior of systems. "System" is distinguished from "aggregate", and definitional clarification is offered concerning entities, relations, structures, states, and sub- versus aspect systems.

Chapter 3 concerns the system's environment and involves discussion of the key elements which define that subject: system boundaries, open and closed systems, and the environment itself ("that set of entities outside the system, the state of which set is affected by the system or which affects the state of the system itself.").

Chapter 4 focuses on the behavior and characteristics of the system. Discussion centers on the concepts of system process, system states (transient, steady state, and equilibrium), equifinality, and stability.

Chapter 5 concerns information and entropy. Information is described in terms of (1) its role in communication; (2) syntax, semantics, and pragmatics; (3) signal and message; (4) redundant, relevant, and irrelevant information; and (5) mathematical information theory. Entropy is clarified via discussion of both its thermodynamic and statistical forms. Finally, the relation between information and entropy is discussed.

Chapter 6 describes the modeling process and the importance of models to systems thinking. "Model" is defined and the concepts of isomorphism and homomorphism clarified. The model construction process is summarized, and the typological classification of models is specified: (1) based on the nature of systems, (2) according to function, and (3) according to method or working principle. Other discussion concerns the quantitative description of systems, the concept of the "black box" (ideal model), and the importance of understanding system response (the system's reaction to a specific input or change in input, measured by the output).

Finally, Chapter 7 is devoted to a particular group of systems: cybernetic systems. The concept of control is elaborated fully to include a description of various control systems (e.g., cause-control and error-control) and examples of such systems (e.g., technical systems and man-machine systems).

Krippendorff, K. Communication and the genesis of structure. *General Systems*, 1971, XVI, 171-185.

This article is an attempt to state and give evidence for a fairly definite, basic, and general law involving communication processes in animals, machines, men, or society. In the context of society, the law could read: any communication process, once initiated and maintained, leads to the genesis of social structure — whether or not such structure is anticipated or deemed desirable. Structure in this context is defined as a non-decomposable relation at any one moment in time or with possible time differences between the relata ignored. Communication, in turn, is regarded as a process of transmission of information between two or more parts of a system that are identifiable in time and space regardless of the materiality of the parts.

A summarization of the law suggests that: Whenever the behavior of the individual components of a system exhibit some regularity, e.g., can be characterized by conditional preferences, by statistical biases in response to stimuli, by rational choices, etc.; whenever communication is circular though not necessarily closed against communication from the outside, irrespective of the number of components or the temporal length of the circle; whenever communication is somewhat permanent and maintained without significant alteration of the communicators involved . . ., then the very process of communication causes a structure among the communicating parts of a system to emerge, whereby the certainty of structural genesis increases with the complexity of the situation, both in terms of the number of communicators involved and the number of states or messages distinguishable by each; whereby the speed of structural genesis decreases with the level of awareness and the number of messages controlled by each communicator, irrespective of whether the result is anticipated or desirable.

Kristiansen, E. G. General systems methodology — Applied to corporate development. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 557-568.

This paper presents an integration of concepts from general systems theory, informatics, and cybernetics in a pragmatic methodology for the control of systems and future systems. First, the system components that must be specified in a system analysis are identified: hierarchical structure, cybernetic structure, relational structure, and temporal structure. Next, the general systems development philosophy is described: to be able to overview and control the functions and dynamics of the system in order to be able to achieve the desired state at a given period of time.

The paper describes the steps involved in corporate development: (1) system analysis (present operation, control system, present information system, environment, hierarchical structure, matter/energy/information flow, goals and expected results, effectiveness), (2) system synthesis (scenario, conditions, design), (3) development analysis, and (4) development synthesis (consequence analysis, development planning). Next, the general procedure for system management -- those steps necessary to monitor the performance and effectiveness of the organization and to plan and control the changes or redesign of the corporate system/subsystem -- is delineated: analysis, functional design, media analysis, and assessment. Each of these is defined in terms of its sequential realization: functional, technical, construction, implementation, follow-up.

Kuhn, A. Boundaries, kinds of systems, and kinds of interactions. *Organization & Administrative Sciences*, 1975, 6, 39-46.

This article establishes theoretical relationships between boundaries and systems. Boundaries may be either spatial, functional, or analytic; they are set by the observer, rather than by the nature of the thing observed. Nonetheless, the nature of the thing observed will make certain boundaries more workable than others, and the category of the system being studied is an important part of its nature.

Clear analysis requires that a system be bounded by reference to the kind of system and the kind of interaction(s) involved. Concerning type, systems analysis should be applied only to acting systems, not to pattern systems. Furthermore, components of the system also should be acting systems. Having restricted one's analytical focus to acting systems, attention then should be directed to whether the systems involved are controlled (having goals) or uncontrolled (having no goals). If the system of interest is controlled, it is essential that its detector, selector, and effector subsystems be identified rather precisely. If the system is uncontrolled, boundary definition is both more difficult and less important.

The nature of the interaction also must be considered. Since different kinds of interactions occur at different locations within the system, analysis will be clearest if the system is bounded at the point(s) where relevant input or output enters or leaves. Finally, if a system interaction actually occurs between a subsystem and the environment of the main system, analysis will be clearest if the system is bounded at the level one might otherwise consider a subsystem, thereby avoiding extraneous entities or variables.

Kuhn, A. Natural-social vs. system-based categories of science. General Systems Theorizing: An Assessment and Prospects for the Future. *Proceedings of the 1976 Annual North American Meeting of the Society for General Systems Research*, 1976, 76-84.

The author contends that we should not categorize system studies as natural vs. social, but as dealing with (1) controlled (cybernetic, or goal-oriented) or uncontrolled systems, (2) simple or sophisticated information processing, (3) intra- or intersystem focus, or (4) an idiographic (pertaining to an individual concept or isolated case which defies mathematical description or classical empirical validation) or nomothetic (pertaining to the abstract, the recurrent, and the universal which are used in formulating general statements and scientific laws) approach.

Except for ecosystems, he asserts, most uncontrolled systems require only matter-energy (and not information) science. But, controlled systems also need a special syllogistic causal explanation and an expanded science of pattern match. A bias is urged toward considering systems as uncontrolled until a control mechanism is clearly identified.

The dichotomy of information/matter-energy is of little use for understanding the human-level parallels of semantic communication and value-based transactions. An important question, about which the author is skeptical, is whether "systems analysis" should include interactions between systems.

Kuhn, A. Is there life beyond organisms? Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 185-189.

This paper takes the position that sharp differences in decomposability between organismic and social systems question the advisability of considering the latter "living". There are also questions about when to build a science around a whole system and when around its control subsystem (decider) alone. Social sciences can probably do best, says the author, by attending solely to the control subsystems of their actors. What he sees is not a true central control mechanism, per se, but rather a separate control subsystem for each defined function. It further seems possible that some system variables are not monitored at all, but simply fall where they happen to fall under the multifaceted circumstances achieved by the monitored subsystems. The author sees the whole as only modestly centralized — an exquisitely tuned mutual ecological adaptation in which each part helps to produce and maintain an environment that is highly congenial for some other part(s).

There seems to be a sharp discontinuity in the meaning and form of the dichotomy of matter-energy vs. information when one moves from biological systems or their components to systems involving multiple humans. This discontinuity enlarges doubt about putting social systems too solidly in the same category with "living" systems. Finally, both biological and social systems require more attention to ecological relations.

Laszlo, E. *Introduction to systems philosophy*. New York: Gordon and Breach, 1972.

Systems philosophy is an attempt to discover, or provide, the basic philosophical foundations for special systems and the basic structure (system) of the universe as a whole. The author sees systems philosophy as reintegrating "the concept of enduring universals with transient processes within a non-bifurcated, hierarchically differentiated realm of invariant systems, as the ultimate actualities of a self-ordering world".

The volume has two parts. Part One outlines a general theory of natural systems with applications not only to the physical, biological, and social sciences, but also to the mind and cognitive systems. Laszlo proposes his own theory of natural systems, "mapping explicitly but a handful of systems properties". These include four "independent variables": ordered wholeness in the state of the system resulting from coactive relation of parts ("systemic state property"); re-establishment of a previous steady state in the system resulting from the function of adaptation to environmental disturbances ("system cybernetics I"); reorganization of the system's state resulting from adaptation to disturbances, involving, with a high degree of probability, an overall gain in the system's negentropy and information content ("system cybernetics II"); dual functional-structural adaptation, i.e., with respect to subsystems (adaptation as a systemic whole) and supra-systems (adaptation as a coacting part) ("holon property"). "The hierarchy concept conserves its appeal on the basis of its supreme potential as an ordering principle, relating through invariant hierarchical relationships, empirically dissimilar phenomena."

Part Two, "Studies in Systems Philosophy," explores consciousness and the mind-body problem (concluding with "biperspectivism"), hierarchy ("emergence" and "evolution"), cognition, and freedom ("interdetermined natural systems correlated with self-determined cognitive systems in biperspectival natural-cognitive systems"), value ("normative values to be correlates of certain states of a system within the system-environment continuum, defined by the degrees of adaptation of the system to its environment, rather than by its level of organization"), survival ("What we need today is a new morality ... the adaptation of mankind, as a global system, to its new environment"), and metaphysics (the search for ultimate principles).

Laszlo, E. A general systems view of evolution and invariance. *General Systems*, 1974, XIX, 37-43.

This article offers a scientific reaffirmation, based on general systems theory, of the concept of a continuous, even if internally highly differentiated, process of evolution. This view of evolution derives from two, initially opposing, currents of thought within 19th century science: (1) Darwin's theory of the origin of species and (2) the early formulations of the laws of thermodynamics. The second law of thermodynamics is especially insightful in this regard, suggesting as it does that instead of building up, the universe as a whole is inevitably running down. Every process dissipates energy and renders it unavailable for performing work. The great arrow of evolution, therefore, points not toward increasingly differentiated and complex things, but toward progressively disorganized, simple, and random aggregates. These concepts are linked to that of the "dissipative structure" — a structure which dissipates energy in the course of their self-maintenance and self-organization.

The author contends that the new general systems concept of evolution allows that the second law of thermodynamics is an adequate description of the real universe only if it is integrated with the concept of "hidden" or "potential" strata of stability upon which the flows can hit. Every system in nature is the actualization of some such stratum of stability. The result of evolution on earth is a multilevel hierarchy which encompasses atoms on the one end and large-scale multi-organic systems on the other. The higher systems are composed of integrated sets of lower-level systems. Systemic interactions among systems yield higher systemic units; other types of interactions produce differentiation and lead to specialization. Evolution proceeds from a state of partly ordered chaos — energy fluxes interacting with some relatively stable configurations of flows. It tends toward higher levels of organization in structures of greater complexity.

Lawrence, P. R. & Lorsch, J. W. *Organization and environment: Managing differentiation and integration.* Homewood, IL: Irwin, 1969.

This book describes a research study that attempts to determine what types of internal organizational characteristics will be effective under different kinds of environmental change, especially at different rates of economic and technological change. The authors recognize that organizations differ in the manner in which they achieve functional status of differentiation and integration under different external conditions. Organizations are viewed as "open systems" in which the behaviors of the members are themselves interrelated and interdependent with the formal organization. In order for these

systems to function as they become larger, they must differentiate into parts, and the functions of these parts in turn must be integrated if the entire system is to remain viable.

The authors define differentiation as "the difference in cognitive and emotional orientation among managers in different functional departments" and integration as "the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment."

Phase 1 of the study is a comparison of six firms operating in the same industry and environment (the plastics industry). Phase 2 is a comparison of a successful and less successful firm in two other industries (container and food packaging). Phase 1 demonstrated that there is an inverse relationship between differentiation and integration: the more similar in structure and orientation of personnel, the more effective is integration, whereas the more different, the more difficult. Further, direct confrontation seems to be the most effective method of conflict resolution at all levels within the plastics industry.

Phase 2 showed that, while all the organizations studied favor direct confrontation for conflict resolution, this occurs at different levels depending on the organization. This demonstrates how integration becomes more difficult and requires more elaborate formal devices as one proceeds from a relatively undifferentiated organization to a highly differentiated organization.

The authors suggest a "contingency theory of organization" as a conceptual framework for designing organizations according to the tasks they are trying to perform.

Locker, A. & Coulter, N. A., Jr. A new look at the description and prescription of systems. *Behavioral Science*, 1977, 22, 197-206.

The present day status of general systems theory makes it appropriate to propose the notion of a kind of system that is able to generate the goal(s) for its own activity, a teleogenic system. This concept may apply to all levels and types of concrete systems. Some prerequisites for conceiving of such a system, and eventually founding a theory dealing with it, are outlined in this article.

The intimate relations that exist between system and observer are underscored. Any alleged property ascribed to reality is relative to the perspective of the observer. Description is facilitated through iterative modes of reflection and the concomitant setting of a

context. This permits distinguishing between a local and a global description. It is shown that the former tends to assume a causal aspect, whereas the latter is in conformity with a final aspect. It is necessary to distinguish between an unconcerned observer and a concerned observer or designer. The former only designs models to explore the system he observes, while the latter also builds the system he prescribes.

The interplay between descriptive language and prescriptive language is considered. Any description is not only a representation of a reality, but, conversely, any reality exists for the observer/designer, in the description made. In order to obtain a global view, one encompassing the meaning or significance of a description for the observer/designer, the assumption or prescription of goals is inevitable. According to the role goals assume, it is necessary to distinguish between goal-directed, goal-selecting, and goal-generating systems.

Louis, M. R. A clash between homeostatic and adaptive systems: Socialization and recruitment in organizations. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 594-599.

This paper suggests that there is evidence of a natural tension between two input-processing systems found in most modern organizations. Recruiting of new organizational members serves <u>adaptive</u> purposes, while socialization of new members serves <u>homeostatic</u> purposes. In addition to natural systemic tensions between them, dysfunctional tensions or clashes have been fostered by trends in the practical conduct of recruiting and socialization. A common element underlying the sources of tension is interdependence. At a basic sytems level, recruiting and socialization are complexly interconnected. However, in practice, mutual design and intersystem coordination almost never occur.

Recruiting is oriented almost solely on filling positions; in order to do so, there is a tendency to glamourize and "sell" (or oversell) the organization to prospective members. The result is short-sighted, narrow, and suboptimal strategies and practices. The author maintains that, instead of merely filling positions, recruitment should be aimed at individuals. To do this would require reintegration of overlapping socialization functions. It is in and through socialization that discrepancies between the glorified images of life in the organization engendered during recruitment and the organizational realities are experienced.

McIntosh, S. S. Equilibrium and stability: Conceptual distinctions and methodological analysis. *Organization & Administrative Sciences*, 1975, 6, 67-79.

This article defines and distinguishes between the concepts of equilibrium and stability as they relate to dynamic systems. Equilibrium is defined as the expected range of responses within which the members of a system react and within which they expect interaction. This implies, for example, that an organization in a dynamic context will possess a predetermined amount of resources to handle situations over a given time period. A system is stable, in turn, when it is able to maintain its activities by obtaining additional resources, even though those resources were not originally allocated to that system. This assures that the equilibrium range falls within the bounds of the stability range. Three system states are suggested: stable-equilibrium, stable-disequilibrium, or unstable-disequilibrium. Several graphical presentations are used to describe the nature and parameters of these conditions.

Martin, W. H. *A general systems model for measuring organizational effectiveness.* (Doctoral dissertation). Washington: The George Washington University, June 1976.

This study concerns the development of a model, grounded in general systems concepts, for measuring organizational effectiveness. At the outset, the report describes the development of the conceptual framework. Approaches for developing a taxonomic organizational structure are detailed. Primitive taxonomies that were rejected and a functional structure compatible with general systems theory are discussed.

Characteristics of the model for measuring organizational effectiveness are defined. This includes a rationale for the estimating relationships of each organizational function and state selected. The empirical data collection effort, including data sources and procedures, is discussed. A summary of variable values obtained for each organization analyzed is presented, along with a discussion of problems encountered and data refinements.

Actual model development is described. This includes evaluation of hypothesized estimation relationships for organizational states and functions and derivation of relevant variable coefficients contributing to an overall measure of organizational effectiveness. A sample organization is used to validate the model. Estimates for that organization and an error analysis are detailed.

Finally, the need for the research is reiterated, with discussion of the appropriateness of the model for that purpose. The effect of model limitations on the results are discussed and areas for future research suggested. Some implications of the study are anticipated.

Maruyama, M. Causal meta-types in social and biological theories. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 190-194.

The author of this paper compares four meta-types of causality: non-reciprocal causal models; independent-event causal models; homeostatic causal loop models; and morphogenetic causal loop models. The first sees evolution as having one path and in hierarchical competitive terms, and history as progressing in leaps. The second sees evolution as due to random changes, occurring in leaps. The third sees evolution and culture as arriving at and maintaining perfected, mutually beneficial interaction patterns among heterogeneous elements under a given external condition, and changes occurring in leaps. The fourth sees evolution as a continuous process of heterogenization and symbiotization.

Maslow, A. H. *Eupsychian management*. Homewood, IL: Richard D. Irwin, 1965.

This book is a journal of notes and observations made by the author during the course of a summer of study and consultation with a commercial firm involved in industrial and managerial psychology. It is a sampling of normative or ideal social psychology. The author has coined the work Eupsychia and defined it as "the culture that would be generated by 1,000 self-actualizing people on some sheltered island where they would not be interfered with." Then, by contrast with the classical Utopian and Dystopian dreams of fantasies, the questions become quite real: How good a society does human nature permit? How good a human nature does society permit? How good a society does the nature of society permit?

Since, the author notes, we know more about the heights to which human nature can attain, it is possible to extrapolate to the "higher" forms of interpersonal and social organization which this taller human nature makes possible in principle. We might, he says, call this simply "planning". Or we might get more flossy and call it the History of the Future, or use the newly coined word "cybercultural".

Maslow prefers "eupsychian" as implying only real possibility and improvability rather than certainty, prophesy, inevitability, necessary progress, perfectibility, or confident predictions of the future.

The author suggests further that the word eupsychia can also be taken in other ways. It can mean "moving toward psychological health" or "healthward". It can imply the actions taken to foster and encourage such a movement, whether by a psychotherapist or a teacher. It can refer to the mental or social conditions which make health more likely. Or it can be taken as an ideal limit, i.e., the far goals of therapy, education, or work.

Miller, J. G. *Living systems*. New York: McGraw-Hill, 1978.

This seminal work is the culmination of over 20 years of developmental work by the author and consists of a complete explication of his general living systems theory. While general systems theory is a set of related definitions, assumptions, and propositions which deal with reality as an integrated hierarchy of organizations of matter and energy, general living systems theory (LST) is concerned with a special subset of all systems: the living ones.

Miller defines system as a set of interacting units with relationships among them. There are three types of systems: (1) conceptual (words, numbers, other symbols), (2) abstracted (relationships conceptually selected by an observer in light of his interests, theoretical viewpoint, or philosophical bias), and (3) concrete (a nonrandom accumulation of matter-energy, in a region in physical space-time, which is organized into interacting, interrelated subsystems or components). Living systems are a special subset of concrete systems, composed of the plants and the animals. Such living systems have the following characteristics: (1) They are open systems. (2) They use inputs of foods or fuels to restore their own energy and repair breakdowns in their own organized structure. (3) They have more than a certain minimum degree of complexity. (4) They contain genetic material or have a charter, or both. One or both of these is the template — the original "blueprint" or "program" — of their structure and process from the moment of their origin. (5) They are composed largely of protoplasm. (6) They have a decider, the essential critical subsystem which controls the entire system, causing its subsystems and components to interact. (7) They also have certain other specific critical subsystems, or they have symbiotic or parasitic relationships with other living or nonliving systems which carry out the processes of any such subsystem they lack. (8) Their subsystems are integrated together to form actively self-regulating, developing, reproducing, unitary systems, with purposes and goals. (9) They can exist only in a certain environment. Any change in their environment of critical variables outside a relatively narrow range produces stresses to which they cannot adjust, and under which they cannot survive.

Living systems can be classified in a hierarchy of levels, with systems at each being composed of systems at lower levels. Seven levels are identified: cell, organ, organism, group, organization, society, and supranational systems. The fundamental distinction between groups and organizations is that organizations have formal echelons of decision-making responsibility while groups do not. An echelon differs from a level, the former being defined only with respect to decision-making (as in chain of command). In other words, echelons are system components which make different types of decisions or different parts of an overall decision.

One of the central postulates of LST is that 19 subsystems are essential for the survival of a living system at any level. A subsystem is a component or group of components that carries out a particular process in a system. The processes carried out are those which keep system variables within their steady state ranges. In complex systems, one or more subsystem processes may be carried out for a system by another system which is not part of it; such subsystems are said to be dispersed either upwardly to a higher level system or downwardly to a level below a system's own subsystems. The only process which cannot be dispersed to another system is decision-making; a living system ceases to exist independently if it cannot make decisions. Subsystem processes also can be dispersed laterally, if they are accomplished by several components of the system, which together make up the subsystem. Of the 19 critical subsystems, two — reproducer and boundary — process both matter-energy and information, eight process only matter-energy — ingestor, distributor, converter, producer, matter-energy storage, extruder, motor, and supporter — and the remainder process only information — input transducer, internal transducer, channel and net, decoder, associator, memory, decider, encoder, and output transducer.

In every living system, a large number of subsystem and systemwide variables fluctuate continuously. Adjustment processes work to keep one or more variables in a steady state within a normal range of stability. Approximately one dozen variables per subsystem are suggested by Miller, and they can be categorized into six classes: matter-energy input, internal, and output variables, and information input, internal, and output variables. Most of the variables can be operationalized within the context of various subsystems and can be measured by some instrument or technique, called an indicator.

An additional important part of LST is the development of cross-level hypotheses concerning identities between various levels of living systems. Such hypotheses give the theory predictive as well as descriptive power. The central cross-level hypothesis is that 19 subsystems are critical for survival at each system level.

Miller provides 173 additional cross-level hypotheses which are supported to varying degrees by experimental evidence. The hypotheses are categorized as either systemwide or applicable to specific subsystems, and each is purportedly true at at least two levels. Examples are (1) that higher level systems have a higher cost per correct information unit processed, and (2) that two or more systems which interact become alike in storing and processing common information.

Mitroff, I. I. & Sagasti, F. A systems approach for the analysis and design of stimuli, responses, and experiments. *General Systems*, 1973, XVIII, 149-160.

The purpose and plan of this paper is fourfold. First, the authors show that the concepts stimulus (S) and response (R) can be defined in systems terms. This enables the authors to demonstrate that the terms S and R can be given a purely abstract, conceptual interpretation in addition to their having a concrete (physcial) interpretation. This provides the basis for making the point that S/R can never exist as isolated, independent entities. They can only be defined and given meaning by reference to the surrounding system of which they are a part or with which they are in contact.

Second, the authors discuss some basic (archetypal) kinds of systems. This allows them to indicate explicitly the range of possible kinds of distinct S's and R's that can exist. Since these systems derive from epistemology, this step facilitates indicating some philosophies of science particularly appropriate for the behavioral sciences.

Third, the authors develop a matrix of S and R permutations. This step indicates the basic kinds of distinct S/R experiments that can exist.

Fourth, the authors indicate some of the archetypal kinds of experiments that result from their classification.

In effect, the first two steps permit explicit acknowledgement of the fact that there <u>are</u> a multiplicity of ways for defining S's and R's and that each of these ways is equally valid; the last two steps provide a rich enough conceptual framework to see how each of these ways relates to and builds on the others. The last two steps also show how the range of conceivable experiments has been greatly limited by our failure to recognize, develop, and utilize the full range of conceivable S/R types.

Myers, K. C. Rationale for a corporate resilience strategy. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 540-547.

Based on ecological studies, Holling (1976) suggests that collapse in human organizations can be brought about by maximizing stability and resisting fluctuations. He recommends that organizations relax this fail-safe strategy and adopt a safe-fail strategy in which the allowance of fluctuations and mini-failures increases the system's ability to persist. Holling's argument is related to existing management orientations, and his theories help explain examples of corporate collapse. This paper assesses some implications of a safe-fail strategy in corporate planning.

Resilience (a measure of the ability of a system to absorb changes and still persist) is offered as the preferred alternative to stability (the ability of a system to return to an equilibrium state after a temporary disturbance). Resilience lies at the heart of the safe-fail strategy. This is best facilitated by the adoption of an adaptivizing philosophy (finding new structures, objectives, and alternatives which allow performance closer to the ideal), rather than the more common optimizing or satisficing philosophies. Adaptivizers in contrast to satisficers, do not accept routinized decision procedures which produce merely adequate outcomes, nor do they, like the optimizers, spend an inordinate amount of resources to search out the best decision within a given situation.

Nelson, C. W. & Smith, E. V. A frame of reference for the measurement of institutional leadership concepts and the analysis of system states. *Human Relations*, 1976, 29, 589-606.

This article sets forth a conceptual and methodological approach for effecting change strategies in social institutions. The authors first identify the subsystems that comprise any general system and function to maintain its existent state. These elements are called GIST, for Group (G) processes and the Individual (I) in roles, which together constitute the informal organization, and for formal legal Structure (S) and the Technology (T) of production, which together constitute the formal organization.

Next, the authors present a hierarchic taxonomy of values underlying the social-psychological identification of system states. Four different leadership orientations are identified: bureaucratic, technocratic, idiocratic, and democratic; additionally, four basic individual needs are defined: security, self-esteem, self-actualization, and significant membership status; finally, four general styles of

interaction based on the leader's assumptions concerning subordinate motivation are suggested: regulative, directive, manipulative, and integrative. From these are derived a number of leadership styles that reflect appropriate organizational values: (1) the Bureaucratic-Regulative Concept, (2) the Technocratic-Directive Concept, (3) the Idiocratic-Manipulative Concept, and (4) the Democratic-Integrative Concept.

The authors then discuss an approach for measuring system-state values via a leadership attitude scale.

Nelson, E. G. & Machin, J. L. J. Management control: Systems thinking applied to the development of a framework for empirical studies. *Journal of Management Studies*, 1976, 13, 274-287.

This article outlines the basis upon which a new framework for analyzing the management control process has been developed, and then describes the application of the framework in a managerial study of a major organization. The authors believe that, by bringing together a selected number of the developed threads within control theory and some of the elements of general systems theory, a framework can be developed that will go some way towards helping managers analyze the complexity of the management control process. They then can both determine the potential opportunities available to them for raising the level of control, or adjusting the balance of controls within the organization, and then, subsequently, explain and demonstrate the results of the decisions they make.

The authors develop an analytical framework based on (1) objects of control — assuring effective interaction, assuring coordinated functioning, and assuring efficient operations — and (2) categories of constraint — resource utilization, commitments, and relationships. They apply the framework to the analysis of the nursing services in a large group of hospitals and conclude, among other things, that formal procedures can be introduced into an organization in such a way that a greater degree of control on the management process can be effected without raising the level of constraint. At the same time, the part of the organization into which formal procedures were introduced became more open to external sources of information and influence. This suggests that increases in the level of control are not inconsistent with open systems qualities.

Oppacher, F. GST and ethics. Avoiding Social Catastrophes and Maximizing Social Opportunities: The General Systems Challenge. *Proceedings of the 22nd Annual North American Meeting of the Society for General Systems Research*, 1978, 395-400.

This paper sketches arguments for some high-level values and norms from the perspective of general systems theory (GST). Specifically, it is argued that survival presupposes harmony, which presupposes variety or complexity, which presupposes decentralization. Decentralization leads to cultural diversity, decentralized communities, and soft technology. Decentralized communities lower impact on the environment and enhance internal controls and social integration. Soft technology, while also lowering impact on the environment, increases employment and possibly job satisfaction. Internal controls and social integration seem to be capable of reducing alienation and crime rates and increasing participation in the political process. In light of the many studies supporting the hypothesis that emphasis on decentralized decision-making and individual responsibility increases self-esteem, esteem of others, and quality of performance, it seems correct to maintain that the above factors correlate strongly with the so-called quality of life.

Peery, N. S. General systems theory: An inquiry into its social philosophy. *Academy of Management Journal*, 1972, 15, 4, 495-510.

This essay examines some of the values and assumptions of general systems theory (GST) in an attempt to show that: (1) many GST concepts constitute nonrefutable hypotheses which serve the purposes of social philosophy as well as those of science; (2) the basic tenets of GST are held in common with structural-functionalism, making it subject to the same criticisms commonly associated with the functionalist approach within sociology; and (3) the premises of consensus, growth, and hierarchy are basic to GST formulations found within administrative theory.

These values and assumptions cause theories developed within the GST paradigm to be ideologically biased toward an order perspective which emphasizes stability and system maintenance rather than change. Also, the order perspective views conflict as dysfunctional rather than as a source of organizational adaptation.

Piehuta, J. A. A dynamic of cross level behavior. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research*, 1975, 275-281.

This paper is an introduction to the functions and properties of triads (or triangles). It is the author's position that roles and practices of the past are no longer acceptable (or at least are held suspect); as these practices change, so too will the patterns of interaciton and relationship system. A two-person (dyad) system is an unstable system that immediately forms a series of interlocking triangles.

The author attempts to summarize the work of Caplow (1968) and Bowen (1966, 1971, 1974) and apply their findings to various levels of organized social systems, e.g., family and organizations. Various properties and dynamics of triads are considered: power, coalition, and catalysis. Eight basic types of power triads are identified. The triadic coalition is suggested as an operative and helpful concept in explaining human behavior in the context in which it occurs. If the dynamics and binds of triangles were better understood, we could anticipate and perhaps avoid some problems and counteract much of the potential stress in social systems.

Platt, J. Hierarchical restructuring. *General Systems*, 1970, XV, 49-54.

This article emphasizes that sudden changes of structure appear to be important phenomena of living systems. Generally, these changes are described as the sudden formation of larger integrated systems from malfunctioning or conflicting subsystems. They occur at all systemic levels — individual, societal, and universal. If we wish to channel the world in the direction of a more humane and meaningful future, this hierarchical restructuring must be understood.

The author explores the phenomenon of sudden transitions of the flow systems that comprise the universe to new self-maintaining, stable arrangements. The general pattern is that of a stable hierarchical structure (level i) with stable patterns at the lowest levels (i-1) which changes ("grows") to a new structure (i+1) because it comes in contact with new information and/or organisms. Level i will become unstable until it breaks apart or restructures at the i+1 level to make a new stable pattern encompassing the larger experience. This self-restructuring is not teleological (purposeful) but teleonomical (with the appearance of purpose). It is neither externally designed (like a watchmaker) nor internally designed (like a flower); rather, it is a self-transformation to better organized levels of structure that did not exist before.

Common characteristics of hierarchical jumps are as follows: (1) Jumps are always preceded and accompanied by cognitive dissonance. (2) Jumps result in an "overall" and expanded restructuring. (3) Jumps occur very quickly. (4) The direction of the jumps is always toward simpler and more general explanations. (5) In the process of restructuring, subsystems generally must jump across the system level to the new supersystem being formed.

It is not clear whether self-structuring hierarchical jumps can be anticipated or guided. By examining their inner workings, there is a chance that purposive participation or intervention can direct the restructuring toward creative and fruitful, rather than destructive, results.

Ragade, R. K. Optimization in general living systems. General Systems Research: A Science, a Methodology, a Technology. *Proceedings of the 1979 North American Meeting of the Society for General Systems Research*, 1979, 159-164.

In this paper, the author cites Miller's General Living Systems Theory as offering a new conceptual approach to understanding and managing many facets of complex systems. For its applications, one needs critical general measures which allow characterization of both system pathologies and system improvements. The author proposes the use of thermodynamic entropy for matter-energy processes and informational entropy for the information processes in general living systems. Natural evolution of general systems is seen as a complex strategy of balancing various local entropies.

It is hypothesized by the author that "system well-being is increased, whenever the pathology in one of its subsystems (or components) is removed, without creating new pathology or increasing existing pathology in any of its other subsystems or components." He suggests further that, whenever feasible, an informational entropy-producing activity is generally more desirable than a thermodynamic entropy-producing activity. This happens, for example, when living societies consciously substitute communication for transportation, and when peaceful negotiations are substituted for violent conflict resolution.

Richards, L. D. Beyond planning: Controllability vs. predictability. The General Systems Paradigm: Science of Change and Change of Science. *Proceedings of the Annual North American Meeting of the Society for General Systems Research*, 1977, 314-323.

This paper challenges the appropriateness of the currently popular rational planning paradigm to the types of environment evolving in today's world. Four phenomena that contribute to this conclusion are discussed: (1) the closure resulting from selective perception, (2) the self-reinforcing cycle of planning and technology, (3) the recursive nature of richly-joined environments, and (4) the irresolvability of conflicting goals. An allegory is used to illustrate the argument. The alternative is to place emphasis in social design on controllability rather than predictability; controllability refers to the degree of flexibility, predictability to the deviation from a specified line of behavior. The concept of negative planning is introduced to describe a process for shifting from a rational planning paradigm to a paradigm for designing flexibility.

Rosen, N. A. Open systems theory in an organizational sub-system: A field experiment. *Organizational Behavior and Human Performance*, 1970, 5, 245-265.

This article reports on a leadership change experiment conducted in a major component part (sub-system) of a manufacturing organization (system). The purpose of the experiment was to test certain central aspects of open systems theory as applied to formal organizations.

The study was conducted in the upholstering department of a factory within a large furniture manufacturing organization. The leaders (foremen) in seven of eight groups comprising the department were reassigned on two days' notice in accordance with an experimental plan designed by the author. By means of a questionnaire administered to workers prior to the experiment and again on a later occasion after the experiment, the following measures were obtained: (1) group attraction or cohesion, (2) foreman preference, (3) status consensus on foreman, and (4) group money motivation. The following additional measures were developed from organizational records: (1) group productivity levels, (2) post-experimental percentage change in group productivity, and (3) mean length of longest style run for relevant time periods.

The findings lend support to the following: (1) Negative feedback to a stable system (or sub-system) from its environment, coupled with a substantial manipulation of a central variable within the system (leadership in this case), will create disequilibrium and

lead to corrective energy mobilization. (2) Feedback mechanisms (weekly paychecks reflecting incentive earnings) within the system will assist it to right itself and establish a new equilibrium. (3) The essence of the system component relationships, after its temporary disruption, will restabilize in a form closely resembling its initial state.

Rousseau, D. M. Technological differences in job characteristics, employee satisfaction, and motivation: A synthesis of job design research and sociotechnical systems theory. *Organizational Behavior and Human Performance*, 1977, 19, 18-42.

A review of job design research and sociotechnical systems theory suggests that both of these approaches to organizational change converge in their emphasis on a common set of job characteristics important to employee satisfaction and motivation (skill variety/ learning, feedback from agents, dealing with others, task identity, feedback from job, and autonomy). This article reports on a study undertaken to examine the relationship of job attitudes and motivation to the aforementioned job characteristics. Additionally, the study examined variations in job attitudes and characteristics of work content across technological classifications.

Job characteristics were examined in a survey of employees in 19 production units, classified into three technological categories: long-linked or serially interdependent technologies (assembly line producers), mediating technologies (banks), and intensive or custom technologies (engineering firms, nursing staff). Significant differences were found between job characteristics, employee satisfaction, and motivation across technology. Additionally, there were substantial positive relations between job characteristics, satisfaction, and motivation. The job characteristics Variety and Task Significance were found to be particularly important to employee satisfaction and motivation.

Rousseau, D. M. Assessment of technology in organizations: Closed versus open systems approaches. *Academy of Management Review*, 1979, 4, 531-542.

The primary theme of this article is that tehcnology is a multiphasic, multilevel input/output mechanism that is interdependent with its environment. Past research on technology generally has reflected static, closed systems thinking. It has lacked a systematic framework for technology assessment, instead focusing for the most part on different phases of the same transformation process. It generally has ignored input and output activities as well as critical energy exchanges between the technology and the environment.

The author proposes a framework for assessing technology in organizations, based on organizational levels (individual, subunit, organization) and phases (input characteristics, input control, conversion, output control, and output characteristics). She asserts that the environment shapes an organization's technology in at least two ways: (1) through the relationship of the environment to input-output activities, and (2) through the effect of the technological environment and management's perceptions of the environment on technological choice. Thus, the suggested framework provides a basis for research evaluating both the relationship of technology to the environment and traditional concerns such as the links between technology and structure.

Ruben, B. D. & Kim, J. Y. *General systems theory and human communication.* Rochelle Park, N. J.: Hayden, 1975.

This book offers indirect argumentation in anthological form for an integrated theory of human communication within the framework of general systems theory (GST). The book's first section provides a recapitulaiton of basic GST concepts. A distinction is made between hard and soft definitions of a system. The hard definition of a system is one that permits an unambiguous recognition of the components of things defined. Aspects of human communication are concomitant with this formulation. Most research in the language sciences concurs with the soft definition of a system with its heavier emphasis on intuition and intent.

Section Two provides various perspectives for analyzing the organization of human communication. The biological model, in which language is viewed in terms of code systems, is contrasted with the intrapersonal organizational, sociological, and cultural models. The discussion of intrapersonal organization is particularly informative, suggesting as it does that communication is more than the mere structural arrangement by which messages are coded. A necessary emphasis is placed on the tacit assumptions of the speaker and the unquestioned expectations of the hearer.

The remainder of the book (Section Three) consists of commissioned articles on human communication from a systems theoretic perspective. Krippendorf provides a convincing argument that different modes of inquiry not only exist within the systems approach to communication, but that these modes necessarily represent different levels of knowledge and even require different criteria of validation and interpretation. The role of the individual in the communication process is discussed by Ruben, in terms of the sociology of knowledge, transactional psychology, and symbolic interaction.

Other articles in the final section include a discussion of the prospects offered by GST for a unifed theory of human communication. Fisher argues for an integrated theory. Kim discusses the role of feedback as a fundamental concept in the social science. Mickelson speculates about the organic model and finds similarities with communication systems. Finally, Thayer provides an epistemological overview of knowledge, order, and communication.

Sagasti, F. A conceptual and taxonomic framework for the analysis of adaptive behavior. *General Systems*, 1970, XV, 151-160.

The author's primary objective is to suggest a framework for studying different concepts of adaptive behavior. Adaptation is defined as a series of two or more events, the first of which is the stimulus and the following ones the response, such that whatever modification of the functional properties of the system was induced by the event called stimulus, it becomes neutralized by the events called response, either by maintaining or modifying its function.

Adaptation may be either structural or functional. Structural adaptation occurs when any modification of a system's structure or structural properties "is followed by some other changes in its structure in such a way that the functional properties of the system are not altered." In other words, a specified class of entities, Y, is produced again at a later time (the function of the system remains the same, but the structure has been modified). The author identifies four types of structural adaptation: Darwinian-External, Darwinian-Internal, Singerian-External, and Singerian-Internal.

Functional adaptation, in turn, is when a modification of a system's structure or structural properties is followed by a change in the system's functional properties so that a new class of entities, Y, is produced (the function of the system is modified). The author utilizes Ackoff's interpretation of systems as either goal-seeking, purposive, or purposeful. Further differentiation is made between homogeneous systems, in which the function of the elements of the system is to serve the function of the whole, and heterogeneous systems, where the functions of the elements are served by the function of the whole.

Schon, D. A. *Beyond the stable state*. New York: W. W. Norton, 1971.

Schon contends that in any society in which people believe the situation to be stable, any change will provoke a transition that will create a zone of crisis and instability. The societal response to this crisis usually will force change in the vital elements of the system, or the stable state. This, in turn, will threaten to disrupt the stable state, the achievement and maintenance of which historically has been a central theme to the existence of the organization.

The author suggests further that we are living in a period of unprecedented and accelerating change. In the past, the illusion of a stable state was created by the amount of time required for the diffusion and adaptation of a new concept. The purpose of this book, therefore, is to show that "the loss of the stable state means that our society and all of its institutions are in continuing processes of transformation . . . . That we must learn to understand, guide, influence, and manage these transformations . . . . The way for doing this is to invent and develop institutions that are learning systems . . . capable of bringing about their own continual change. Therefore the task that is imperative is to learn about learning."

The principal organizational level focused upon by Schon is the social system, defined as "a complex of individuals which tends to maintain its boundaries and its patterns of internal relationships." Social systems are characterized by (1) structure, the relation of control and interaction among the functional units; (2) theory, the view held within the social system about its purpose, operation, environment, and future; and (3) technology, the tools and techniques used to perform the social system's major function(s). These elements are interdependent, having evolved in relation to one another, and a change in one induces change in the others.

Schon discusses the concept of "dynamic conservatism" — the forces within the system that resist change through the strategies of ignoring it, attacking it, trying to contain it, or yielding to it. The amount of change permitted through dynamic conservatism is related proportionally to the structural level threatened by change. Organizations, and people, constantly strive to protect their stability and interests by responding to, and protecting themselves from, external change-inducing forces. The author argues that while "d.c." organizations can survive their own failures to adapt and change, what are needed are more organizations with built-in adaptive learning tendencies rather than ingrained conservative tendencies. Business firms, because they are the primary vehicles for diffusion of innovation, should be agents of social learning for society at large.

Scott, W. G. Organization theory: A reassessment. *Academy of Management Journal*, 1974, 17, 242-254.

During the 1960s, the management paradigm was elaborated by systems theory. Whereas the then-accepted classical model was considered deterministic, closed, mechanistic, inflexible, narrowly adaptable to change, and oriented toward hierarchy as the means of coordination and control, the systems model was viewed as probabilistic, open, organic, flexible, broadly adaptable to change, and oriented toward lateral and diagonal organizational interfaces as the source of coordination and control. The author contends that the two models actually differ only in their operational premises, not in their underlying values. The failure to discern these values has fostered two analytical errors: (1) ignoring the ambience in which organization theory exists, and (2) treating classical and systems theory as essentially different organizational models.

Growth, abundance, and consensus are singled out as the paradigmatic values that control both the classical and systems models. The author suggests, however, that old values are eroding. He refers to declining reserves of natural resources, resistance to environmental contamination, changes in work expectations, and declining confidences. These changing values may produce a paradigmatic revolution that produces a radical model based on the values of stability or decay (rather than growth), scarcity (rather than abundance), and conflict (rather than consensus).

Scott, W. G. Organicism: The moral anesthetic of management. *Academy of Management Review*, 1979, 4, 21-28.

Scott contends that systems theory was adapted to the management paradigm in America during an era of unparalleled growth. The problem is that the post-World War II period fueled our expectations toward unlimited economic growth, while current conditions signal a decline in the material and financial resources that fuel growth. Thus, there is reason to believe that management is on the verge of experiencing a crisis of legitimacy, for while an end of growth is likely to diminish material affluence, it is unlikely to lessen proportionally organizational size, power, and ubiquity.

Systems thoery, as it has been adapted to the management paradigm, can tell us little about management's present dilemma over its legitimacy. Management has seen fit to concern itself merely with the growth phase of the organic model, conveniently ignoring the less pleasant aspects of the life-cycle -- stability, decline, and demise. With its constrained vision about the full meaning of organicism, it is not surprising that management's interest is directed toward processes that pertain to growth and toward the outcomes of these processes that include consensus, harmony, and cooperation. The author suggests a much-needed reorientation.

Shrode, W. A. & Voich, D., Jr. *Organization and management: Basic systems concepts.* Homewood, IL: Richard D. Irwin, 1974.

Organization and management theory and practice have been undergoing considerable change due to the rapidly changing nature and growing complexity of the environment. Unprecedented scientific discoveries and technological innovations are redirecting our educational systems in order to keep pace with an expanding knowledge base, increased professionalism, and a greater concern for social-human values. Traditional management theory, with its reliance on formal authority and structure, has been unable to cope effectively with these changes. More sophisticated managerial concepts and techniques, including the systems perspective, are evolving. The purpose of this book is to present managerial concepts essential for managers of the future, with special emphasis on the systems approach.

Part I is an introduction to the nature of organization and management. Chapter 1 views an organization as composed of five basic elements: people, techniques, information, structure, and purpose. Chapters 2 and 3 describe the recent management science and behavioral science revolutions and their impact upon the structure and process of management.

Part II is an introduction to systems philosophy. Chapter 4 discusses the systems revolution as a natural outgrowth of the management science and behavioral science revolutions. Problems related to the increasing complexity of the environment, the knowledge explosion, increased specialization, and changing social-human values have placed additional burdens upon traditional management theory and practice that require a more integrated, dynamic, and viable approach to management. Basic systems concepts and language are described in Chapter 5, as background to the view of organization and management as systems in Chapter 6. This view serves as the systemic framework for the assumptions and working principles of management by system presented in Part III.

Part III focuses on the basic assumptions and working principles for Management by System in relation to the organizational elements of purpose, techniques, structure, people, and information. The assumptions and working principles developed are derived from the systems philosophy described in Part II, specifically the notion that organization and management are systems in a dynamic environment. Chapters 7 and 8 discuss the necessity of searching for and identifying equitable values to define organizational purpose. Management by Objectives as a general principle for achieving organizational purpose also is discussed. In Chapters 9 and 10, the need for objectivity and rationality in making optimal decisions is discussed in the context of the scientific method and its techniques, refinements, and limitations

in a changing environment. Chapter 11 examines techniques for achieving organizational flexibility. It contrasts the characteristics of systems organizations with traditional organizational structures and presents some examples of systems organizations, including project and matrix forms. Chapters 12 and 13 examine the basic assumptions and working principles for developing integrative attitudes, and behavioral concepts and techniques are presented for achieving integration and effective management by people. Chapters 14 and 15 discuss the design, communicative, and analytical functions of information, together with modern developments in management information systems.

Part IV, "Toward the Theory of Management by System," emphasizes that the Theory of Management by System ultimately will be derived from scientific analysis, testing, and synthesis of the assumptions and principles pertaining to the management of organizational systems. This will result from an integrative and interdisciplinary set of developments. These developments can be expected to culminate in theoretical constructs related to the systemic properties of purposive behavior, openness, input-output transformation, interaction and interface, integration, and self-regulation.

Simon, H. A. The architecture of complexity. *General Systems*, 1965, X, 63-76.

This article provides insights gained from the behavioral sciences concerning complex systems. The author notes that the complexity or simplicity of a structure depends critically upon the way in which we describe it. Most of the complex structures found in the world are enormously redundant, and we can use this redundancy to simplify their description. But to use it, to achieve the simplification, we must find the right representation.

The author's contention is that one path to the construction of a non-trivial theory of complex systems is by way of a theory of hierarchy. Empirically, a large proportion of the complex systems we observe in nature exhibit hierarchic structure. On theoretical grounds, we could expect complex systems to be hierarchies in a world in which complexity had to evolve from simplicity. In their dynamics, hierarchies have a property -- near-decomposability -- that greatly simplifies their behavior. Near-decomposability also simplifies the description of a complex system and makes it easier to understand how the information needed for the development or reproduction of the system can be stored in reasonable compass.

The notion of substituting a process description for a state description of nature has played a central role in the development of modern science. Dynamic laws, expressed in the form of systems of differential equations, have in a large number of cases provided the clue for the simple description of the complex. The author attempts to show the purpose and utility of this characteristic.

Skvoretz, J. & Fararo, T. J. Languages and grammars of action and interaction: A contribution to the formal theory of action. *Behavioral Science*, 1980, 25, 9-22.

The languages of action and interaction studied in this article arise from a formalization of the concept of a "production system" found in several recent empirical studies of human action. From a systems viewpoint, the concern is with the temporal structure of the activity of living systems — organisms, groups, and/or organizations. The theory is applicable at any of these levels to the extent that actions of units at each level can be specified appropriately.

The article starts with the idea that acts of an acting unit are evoked only when certain conditions are satisfied. An action is identified as an act together with the class of conditions under which it is evoked. Formal interest centers on action strings (concatenations of actions that meet criteria derived from episode constraints relating actions) and how well-formed they are. An episode constraint holds between two actions if one of the associated acts establishes a condition in the class evoking the other act. Two basic types of episode constraints are identified, several propositions proved, and conjectures advanced about the type of automaton that will accept only well-formed action strings under various assumptions about the type and number of constraints that obtain. The approach then is generalized to n-party interaction.

Slawski, C. Love, power and conflict: A systems model of interparty negotiation. The General Systems Paradigm: Science of Change and Change of Science. *Proceedings of the Annual North American Meeting of the Society for General Systems Research*, 1977, 17-26.

This paper presents a number of basic hypotheses and corresponding definitions in an effort to define the relationship among three of social science's most basic concepts: love (relating deeply with or toward another in a potentially fulfilling, personal, and/or social way), power (the probability that A can get B to do what A wants B to do), and conflict (opposition or disagreement of any kind on the part of one party in relation to the other). Four hypotheses are posited: H_1: Conflict in an ongoing relationship leads to love. H_2: The state of attraction is the basic determinant of (1) the influence potential (or quasi-power base) of A over B, and (2) the favorability of the power aim. H_3: A will have more potential influence (or quasi-power) over B, the more B loves A. H_4: The ultimate probability of a solution to conflict, as well as the proximate resolvability of an issue, varies with (1) the reconcilability of the issue, (2) optimum knowledge, (3) integrative bargaining, (4) channel(s) for dissent, and (5) sharing depth.

The model proposed is designed to be applicable to both micro and macro levels of analysis. A flow diagram facilitates visualization of the theory. A partial application illustrates the procedure and some of the basic hypotheses. Recommendations for promoting love and avoiding harmful conflict are made.

Stamps, J. S. Metapatterns: Levels and complements. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 533-539.

This paper reports on a study of the common concepts, principles, and laws of general systems theories. Levels and complements are identified as the metapatterns (patterns of connection common to a diversity of general models) in comprehensive evolutionary models. Level structure refers to hierarchy and has long been an important systems idea — organisms composed of organs composed of cells, etc. Although it appears less explicitly in the literature, complementarity has always been implicit in the development of the systems concept, particularly in the recognition of a second (to entropy) universal process — i.e., negentropy, order, syntropy, morphic tendency, anamorphosis. Some complements in human life include right/left brain lateralization, freedom/responsibility, and good/evil.

Three archetypal variations of these patterns are described: genesis, emergency, and succession. Six additional subpatterns are outlined which together constitute a theory of emergent evolution: beginning, emergence, inclusion, complexity, chaos and acceleration. The pattern of evolution is elaborated further in a four-stage cycle of emergence: slow change; accelerated change; peaks, regressions, and novelties; and stabilization and emergence.

The paper concludes with the suggestion that levels and complements might be considered a synthetic rule of thumb, subsuming the analytic prescription of repeated fragmentation.

Stein, A. The administration and management of organizations in a cybernetic and humanistic milieu. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research*, 1975, 324-330.

The author of this paper asserts that anticipated profound transformations in every dimension of mankind's development present a complex question regarding the possible cybernetic and humanistic quality of our future. Two disciplines are of central relevance: philosophy and history. A perception emerges of the administration and management of organizations as process, profession, and science. The

fusion of general systems theory and cybernetics and an elaboration of "Theories of General Cybernetic Systems," with primary emphasis on design, development, and control, are proposed. Humanism and neo-humanism are compared, and the significance of the latter in light of Pitirim Sorokin's thesis concerning the "ideational" culture ("a unified system of culture based upon the principle of a supersensory and superrational God as the only true reality and value") is stressed.

The author suggests that the primary task of administration and management is to become a science with an explicity neo-humanistic orientation. "If administration and management are cybernetic, if human beings are perceived to be subsystems, elements of all social organizations, and if these organizations are operating in a truly cybernetic mannter, then the process is humanistic and in harmony with the enveloping humanistic milieu. A necessary condition, though not a sufficient condition, is the presence of as full a flow of information as is possible into, through, and out of these organizations."

Sutherland, J. W. *Systems: Analysis, administration, and architecture.* New York: Van Nostrand Reinhold, 1975.

This book is designed to give the widest possible overview of the system sciences to the widest possible audience. As such, the subjects selected for discussion are those aspects of the system sciences that are context-independent. The book is an inventory of system concepts that blends the mathematical, statistical, and engineering bases of the system sciences with the qualitative, deductive, metaphysical, and idiographic capabilities normally associated with the social or behavioral sciences.

In the first chapter, a brief attempt is made to set forth some of the more basic and important aspects of the system approach itself. Particularly stressed are the imperatives for the interdisciplinary attack on complex problems and the necessity for not being bound to any particular methodological alternative. The key concept of the isomorphism is introduced (a property shared between two or more superficially different systems that tends to allow us to approach them as a defined "class" of phenomena). In Chapter 2, the author approaches the identification and exploitation of isomorphisms by exploring the several different structural modalities that most real-world systems tend to exhibit. He then moves on, in Chapter 3, to the several different behavioral or dynamic isomorphisms that predominate among real-world phenomena. Also introduced is the concept of the analogy, for which isomorphisms provide the building blocks. Chapter 4 delves into the realm of integrated systems — those phenomena in which structural and behavioral properties are treated simultaneously.

The author approaches the difficult and critical task of treating complex systems as "wholes" through the use of the hypothetico-deductive method.

The book's next section involves consideration of the methods and instruments available to the system scientist and a detailed discussion of the procedural and operational aspects of system sciences. Chapter 5 concerns the concept of "analytical congruence", the efficiency and effectiveness of the instruments employed in the production of information pertinent to the solution of a decision or policy problem. It is shown that the attempt to use instruments that are not powerful enough in the face of the properties of a particular problem leads to a condition of ineffectiveness (where the instruments simply cannot get the information required for an adequate comprehension of the problem). On the other hand, the use of instruments that are too powerful results in inefficiency or "overkill", which is tantamount to a misallocation of analytical resources. This chapter also introduces the concept of the learning curve, whereby it is possible empirically to audit the rate and efficiency of learning about a problem.

Chapter 6 introduces what is called the "system architecture" platform. This, basically, is a procedural paradigm for problem-solving, with special emphasis on a systematic approach to the solution of extremely complex problems. Chapter 7 offers a system-based methodology for policy-setting and decision-making. The significant differences between these two activities are discussed and suggestions offered for joining them in a single procedural framework.

The last section of the book deals with system administration and control. The immediate potential of system sciences for extending the bounds of managerial rationality — in both the commercial and non-commercial sectors — is stressed.

Sutherland, J. W. *Societal systems: Methodology, modeling, and management*. New York: North-Holland, 1978.

A societal system is a collection of individuals, bound together by complex and possibly amorphous sets of interests, pursuing a complex and possibly indeterminate set of ambitions. In the past, societal systems have been ill-studied largely because of their basic incompatibility with the preferred procedures of social science — because (1) societal systems are not always empirically accessible in all their components, (2) their critical properties are not always amenable to precise measurement, either directly or through surrogation, and (3) being essential "organic" entities, societal systems cannot be taken apart and studied analytically in a laboratory environment. Because societal systems represent the highest level of analytical challenge, they are a proper subject for the system scientist.

The author of this book takes the position that the analysis and management of societal systems implies some minimal innovation, but relies primarily on an amalgamation of skills, data, and techniques that already have a long and honored history. He therefore sets out to attack societal phenomena by providing syncretic (a process of inquiry which seeks to reconcile competitive paradigms by raising the subject of inquiry to a higher level of abstraction) and interdisciplinary interfaces among existing disciplines; he restores the hypothetico-deductive method to parity with inductive procedures, and pays constant attention to the empirical dictate that all constructs eventually should be validated through experimentation; and he attempts to establish critical linkages between qualitative and quantitative constructs to produce levels of insight and discipline that neither could obtain in isolation.

Part I concerns methodological matters. Chapter 1 reflects the great diversity of opinion and presumption about societal phenomena and suggests that at least some of this diversity is due to the operation of parochial perspectives that social scientists sometimes adopt. Syncretic analysis is proposed as a technology for producing paradigms that are less tendentious than the individual perspectives from which they are constructed. Chapter 2 assesses the utility of the dialectical method as a means of societal system inquiry.

Part II concerns the problem of modeling societal systems. Chapter 3 attempts to show how the fundamental structures of societal systems are essentially responses to the behavioral predicates of the individuals involved. The need is to define the bases by which both ideological and non-ideological systems organize and maintain themselves. It further is argued how the deductive model components employed might be subjected to reality testing. Chapter 4 attempts to generate an array of ideal-type social referents that, as fully as possible, exhausts the real-world societal systems apparent to us from empirical (historical) study. These ideal-types provide the basic theoretical vehicles for societal system science and promote efficiency. What is necessary is to link these essentially qualitative ideal-types with quantitative implications. This is accomplished by the establishment of a behavioral matrix that sees societal transformation in terms of simple Markov processes and allows the technician to assume his proper role in studying societal phenomena.

In the book's last section, the author suggests that prophets (as opposed to economists or sociologists or anthropologists, who all have their own biased perspectives) are perhaps best suited to be entrusted with societal management. The section attempts to show how prophets might prepare themselves.

Swogger, G., Jr. Small group phenomena — A systems approach. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research*, 1975, 282-290.

This paper attempts to develop a heuristic theory of small groups. The development of small groups and the transactions of members are conceptualized in terms of information processing and systems thory. A theory of human communication which includes emotion and behavior is developed from information theory. The author points out that, in attempting to use such ideas in a systems approach to groups, it is necessary to move from the analysis of fragments of communication to larger patterns. In thinking of a group as a system, it can be seen that (1) to a significant degree, the components become a system via the development of a pattern of information processing; and (2) the degree of "systemness" is something to be investigated rather than assumed. It varies from one group to the next and in the same group over time.

As the author notes, an individual in isolation interacts with his physical environment, receiving information, acting on the environment in terms of his goal complex, modifying it on the basis of new information and feedback. In contact with other individuals, other possibilities exist: achieving one's goals through modifying the goal complex of others, modification of one's own goal complex through interaction with others, and the possibility of a system of shared goal complexes, with shared meanings and codes. It is this shared goal complex that makes a group of individuals a system. It further is suggested that routine, coordinated tasks require groups of essentially homogeneous individuals, whereas creative, complex tasks require essentially heterogeneous individuals.

Thayer, F. C. *An end to hierarchy! An end to competition!* New York: Franklin Watts, 1973.

In this book, the author proposes a third alternative to the current choices of unorganized anarchy or rigid bureaucracy. He advocates "a social process carefully designed to preserve the best of our past while casting aside the repression of hierarchy and the destructiveness of competition." Hierarchy and competition are the bases upon which contemporary capitalist democracies organize their governmental and corporate systems. Thayer calls for an organizational revolution that will eliminate both.

Democratic government is bureaucratic and thus hierarchical. In this hierarchy, says Thayer, individuals are instruments of the organization and become alienated by doing merely what they are told. The only way to self-actualize is to violate instructions --

an unacceptable condition. Hierarchy initially creates alienation, competition reinforces both, and then alienation reinforces both itself and hierarchy and competition. Consequently, competition provides no benefits, but instead is merely wasteful.

Thayer feels that we must remove the authority of individuals to make decisions by themselves. He calls for a new social order in which the organization will consist of innumerable small face-to-face groups characterized by "openness, trust, and intensive interpersonal relations." Optimum group size will be five. Decision-making will be by consensus. Decision processes will resemble ongoing sensitivity sessions; sexual overtones will be suppressed. Elected officials will act only as members of policy processes, and there will be an end to representative government and political parties. There will be a shift away from production and toward distribution. With hierarchy removed, income and employment will become separate, and salaries will equalize. Traditional concepts of promotion will disappear. There will be collective ownership, whereby individuals will not accumulate wealth and property.

Organizations that retain the traditional hierarchical structure will wither away, according to Thayer. The trends, he feels, are becoming apparent: first, there are the "transorganizational processes" (groups from different companies working together temporarily), which enable individuals to influence what goes on in organizations other than their own; second, "organizational development" (group actualization) is working within organizations to eliminate status differences between managers and employees.

Thayer, L. Informatics, ideology, and discombobulation: More on popular intellectual delusions. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research*, 1975, 539-545.

With more information available to more people than ever before in history, why is the quality of our lives increasingly questionable, and why is our utter survival in jeopardy? These and other questions may serve to reveal the underlying issues relating to information systems and the quality of life: (1) If more - or better - information is made available to people, will they make "better" decisions (or judgments or policies, etc.)? (2) If more information is made available to more people, will that enhance the quality of life? (3) If, by newer and more powerful networking technologies, more and more people are thereby empowered to "communicate" with more and more people, will this contribute to the achievement of a more humane existence for more people on earth?

The author of this paper contends that we need to answer these questions in order to do the right thing for mankind and to give us wisdom in the design of social systems. We are plagued by a number of popular misconceptions about the communication process: (1) that information or knowledge can be conveyed by any medium; (2) that a sophisticated information system can compensate for the inadequacies of its intended users; (3) that all truths are relative; and (4) that we should assume endless "progress" and achieve some ultimate state of maximum capacity of our information systems. The ultimate test of the efficacy or human value of any system designed to serve the long-range interests and ends of mankind, says the author, is not how well it serves the worst of us, or even the "average" of us, but how well it serves the best of us.

Toronto, R. S. A general systems model for the analysis of organizational change. *Behavioral Science*, 1975, 20, 145-156.

In this article, a model of organizations is developed using the concepts of general systems theory (GST). The model provides a set of logical assertions about causality in organizations and a framework for the detection and analysis of organizational change. Four major propositions derive directly from the model: (1) the level proposition, (2) the constraint proposition, (3) the permanent change proposition, and (4) the predominance proposition. The propositions give rise to specific organizational hypotheses.

Two major limitations of systemic hypothesis testing of organizational change are discussed. First, dynamic production organizations cannot tolerate experimental controls, making the question of causation more difficult than in traditional designs. Second, testing hypotheses stemming from a general systems model, the basis of which is holistic reasoning, requires the investigator to take an almost clinical approach in his interpretation. This renders his conclusions vulnerable to judgmental error and experimenter bias.

Three hypotheses are tested using the methodological orientation of GST -- holistic reasoning -- to demonstrate three systemic methods of research: (1) The method of weak causal inference makes an assertion of causality from trends in a set of data to a series of antecedent events. (2) The method of strong causal inference compares different kinds of data from different kinds of systems and infers causality to the change interventions. (3) The method of parallel trends compares indices, infers a causal relationship between their trends, and infers causality to antecedent events.

van Gigch, J. D. *Applied general systems theory*. New York: Harper & Row, 1974.

This book is an attempt to espouse and clarify the concepts of general systems theory (GST) in an applied organizational context. As the author points out, "system" in this sense refers not to data processing or information systems but to the set of systems of "organized complexity" and to one of its subsets — the organizations in which man lives, works, and plays. While the problems discussed are those faced by all types of organizations, large and small, public or private, social and/or political, they are not those normally treated in books on management principles, organization theory, or decision analysis. The issues are of a more general and pervasive nature. They underlie the philosophy of organizations and may even constitute their raison d'être.

Chapter 1 provides an introduction to and examples of the systems approach. "System" is defined and the distinction made between systems improvement and systems design; particular emphasis is placed on the traditional shortcomings of systems improvement fostered by "closed-systems" thinking. A methodology for systems design is proposed and related to the perspective of the manager. Finally, an example of the application of the approach to the criminal justice system is described.

Chapter 2 describes the major aspects of applied GST and outlines the main properties of systems and system domains. A comparison is made between the assumptions underlying both the analytical-mechanistic and systems approaches and the inadequacy of the former for treating problems in the biological, behavioral, and social domains emphasized.

Chapter 3 concerns the crucial role of decision-making in the systems design process. The general decision-making process is described, and issues are raised concerning the search for alternatives and programmed versus non-programmed decisions.

Chapter 4 discusses the importance of understanding the various aspects of goals, priorities, and tradeoffs. In addition to definitional distinctions and examples of the aforementioned terms, the author points out the fallacy of the classic profit maximization goal of the firm and discusses the difficulties of defining goals for public enterprises.

Chapter 5 explores certain aspects of value theory and the "morality of systems". Costs and utility as measures of value are discussed, as are the ethics involved in causing change, determining

goals, etc. The morality of systems is analyzed in terms not of judging individual actions but of the effects of system design on those individuals.

Chapter 6 is an initial discussion of the "what" and "why" of quantification and measurement. Problems of semantics, specification, standards, accuracy, and control are described.

Chapter 7 deals with problems of measurement in the social sciences. The role of measurement in "hard" and "soft" systems is discussed, and the forms of measurement admissible in the various sciences are explored.

Chapter 8 focuses on the problems of measuring such things as gross national product, productivity, poverty, and crime and delinquency. Social indicators and social accounts are introduced as evidence of new efforts to measure the performance of social systems.

Chapter 9 is a description of six types of decision models.

Chapters 10 and 11 deal with optimization and suboptimization respectively. The point is made that optimization should be viewed as embodying the formulation of the whole system rather than merely input-output conversion. Suboptimization represents a middle ground between our inability to define adequately the complexity of many systems on the one hand and incrementalism, satisficing, and partial solutions on the other. The issue is how to find the "best" suboptimization.

Chapter 12 is an attempt to come to grips with complexity — what it is and how to cope with it. Decomposable, nearly decomposable, and non-decomposable systems are described.

Chapter 13 concerns implementation. Problems confronting change agents — particularly the inevitable confrontations between scientist and manager — are explored.

Chapter 14 discusses the importance and dimensions of consensus and expertise in facilitating change implementation. Methods and models for obtaining agreement are presented.

Chapter 15 addresses the criticality of control — the regulation of the system once implemented. The control cycle is described and the concepts of feedback and centralization versus decentralization elaborated.

Chapter 16 is a discussion of program planning and budgeting, specifically the planning, programming, and budgeting system (PPBS). The philosophical orientation is that budgets should be viewed as plans rather than as control, management, or performance tools.

Finally, Chapter 17 is an appraisal of the success of the systems approach to date, in light of existing orientations, methodological capabilities, and resource constraints.

van Gigch, J. P. Information processing rates as measures of stress and complexity in work systems. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research*, 1975, 317-323.

In this paper, a general system model of production systems is proposed in which total system complexity can be categorized according to whether it can be identified with the main components of the production systems: (1) the manpower or individuals who perform work; (2) the tasks to be carried out; (3) the organization which determines the conditions and standards by which the work is performed; (4) the productive system which is considered the integrating link between individuals, tasks, and the organization. Attributes and parameters for four different categories of complexities (objective complexity, subjective complexity, environmental complexity, and systemic complexity) are shown to lead to appropriate yardsticks for measurement.

Information processing rates which measure the entropy content of work and the information handling capacity of the operators are suggested as providing at least partial measures of the objective complexity of work. Information processing rates also appear suitable for assessing the subjective complexity of work, inasmuch as they can reflect changes caused by conditions of stress in workers. The author observes that mechanization tends to increase mental demands through increases in work flow rates. Automation affects the entropy content displayed in each sequence as well as the repetition rates of the work sequences and thus have a double-barrel effect on information processing rates.

van Gigch, J. P. & Nowakowska, M. A formalized approach to planning and freedom. General Systems Research: A Science, a Methodology, a Technology. *Proceedings of the 1979 North American Meeting of the Society for General Systems Research,* 1979, 30-34.

This paper is an extension of earlier work by the authors concerning the possibilities of planning for freedom. Freedom is conceptualized as the state of a freedom function deriving from conditions prevailing in a planning system. These conditions are the result of the actions of planners formalized as action functions resulting in various states of monopolization. Action functions are subject to objective functions spelling the planner's goals. In turn, how planners decide on goals depends on their world-views or the assumptions and values which they and their clients hold.

The authors attempt to present a Formal Theory of Freedom (FTF). They discuss (1) freedom functions (assumptions, conditions, opportunities/barriers), (2) objective functions (binding constraints over the space of feasible solutions), (3) assumptions (rationality, values), (4) action functions (assignments of power -- equality-inequality -- and positions -- participation-alienation), (5) conditions prevailing in the system (equality, participation expertise, technology, change, responsiveness, conflict, control, optimality, and morality), and (6) opportunities (which enhance freedom) and barriers (which hinder it).

Weick, K. E. *The Social Psychology of Organizing.* Reading M. A.: Addison-Wesley, 1969.

The author's stated purpose is to help the reader learn about organizations, rather than what they are. He defers defining organization, maintaining that organizational change occurs so rapidly that such definitions are easily outdated. Rather than assuming complexity and the total difference of the organization from smaller groups, the reader is asked to assume the existence of processes that create, perpetuate, and dissolve social collectivities. These processes constitute organizing and their execution is the organization.

The book's first chapter describes organizing -- alliance formation, splitting into factions, and leader selection. Barnard's idea of the upward delegation of authority by subordinates is underscored, as is the suggestion that group associations form more around primitive individual considerations (emotion) than around abstract intellectual considerations.

Chapter 2 highlights some of the problems of contemporary organization theory, such as the methodological shortcomings of case studies and field experiments. Such methods tend to focus on the unusual and irregular, rather than the routine; they concentrate on short, rather than long, time spans; and in defining the problem at hand, they tend to reinforce managerial perspectives.

Chapter 3 delineates seven changes needed in existing organization theory: (1) Processes involved in organizing must continually be reaccomplished. (2) Control is a prominent process within organizations, but it is accomplished by relationships, not by people. (3) Goal consensus is not a precondition of order and regularity. (4) Triads are the basic unit of analysis in organization theory. (5) Attentional processes are a crucial determinant of human organizing. (6) Organizations continue to exist only to the degree that they are able to maintain a balance between flexibility and stability. (7) Organizing is directed toward removing equivocality from the informational environment.

Subsequent discussion is devoted to elaboration of these points. The author concludes by suggesting a number of practical considerations for future thinking about organizations and organizing: (1) Don't panic in the face of disorder. (2) You never do one thing all at once. (3) Chaotic action is preferable to orderly inaction. (4) The most important decisions are often the least apparent. (5) You should coordinate processes rather than groups.

Weinberg, G. M. *An introduction to general systems thinking*. New York: Wiley, 1975.

This book is an introduction to general systems concepts intended for three different audiences: the general systems theorist, the specialist, and the general reader. The book begins by stating the problem area addressed by general systems thinking: those systems too complex to be treated by traditional reductionist scientific methods and too organized to be treated by statistical methods. Chapter 2, in turn, defines the general systems approach to organized complexity, focusing on the concept of analogy; the author suggests that analogy, used properly, that is to say not merely to simplify but to develop precise, explicit, predictive models, is the basic tool of the general systems approach.

In Chapter 3, titled "System and Illusion", the author introduces the main theme of the book: the role of the observer. A system is defined as a set of objects, the relationships between the objects and between their attributes, and the relationships between the objects, attributes and relationships, and the observer. There is no way to eliminate the observer.

The next two chapters deal with one of two main approaches to studying systems: the black box approach. Two major points are made. The first has to do with the scope and grain of observation; these must be decided. But, because we are finite beings, scope and grain must be limited for all observers. This, unhappily, leads to the phenomenon of complementarity. Any two observers, observing the same thing, are bound to differ to some degree. Secondly, the technique of decomposition is limited in its usefulness, simply because all complex systems cannot be decomposed adequately.

Chapter 6 deals with the other approach to studying systems: the structural white box approach, the most interesting example being simulation, of which Weinberg discusses strengths and shortcomings.

In the final chapter, the author previews the major areas of general systems theory not covered in this book but for which future books are promised. This book attempts to deal with the first of three questions which, the author says, govern general systems thinking: "Why do I see what I see?" Two questions remain: "Why do things stay the same?" and "Why do things change?"

Wenninger, E. P. Entropy, equilibrium, and organizations: Problems of conceptualization. *Organization & Administrative Sciences*, 1975, 6, 23-31.

This article addresses the appropriateness of two general systems concepts — entropy and equilibrium — for the study of social systems. Social systems, such as organizations, are characterized by a greater degree of functional autonomy — i.e., of independent action among elements, components, or members — than are natural or artificial systems.

The author concludes that organizations are sustained by communicative processes and the transmission of information. He is forced to reject the concept of entropy as a useful metaphor because of the lack of definitional precision and rigor. Similarly, he rejects the concepts of equilibrium and disequilibrium. Few organications reach true equilibrium states. The alternative concept of steady state, based on the dynamics of open systems, is felt to be more useful and applicable to the study of organizations. An organization in an equilibrium state can be regarded as a closed system with maximum entropy and minimum free energy. No energy is needed for its maintenance, nor can energy be obtained from it. Work can only be obtained from a system that is open and in a steady state — a system tending toward equilibrium but never reaching it. An open system maintains a steady state as it takes in energy-rich and information-rich material whose contents are transformed into work.

In human organizations, what are needed are inputs of members rich in energy and/or information but organizationally inert in the sense that they will neither push the system toward equilibrium nor cause it to disintegrate.

Wenninger, E. P. Systemic stress, group functioning, and individual mental health. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research,* 1975, 383-388.

While social systems are becoming more planned, more "intentional", the human components are less willing to accept roles as system components on the basis of custom or tradition or social pressure. Increased rationalization of the social order has its impacts at the individual as well as the collective level. Individuals have increased awareness of themselves as entities with legitimate needs and with rights to have those needs met independent of system needs. They also are becoming less able to cope with the intense information processing demands of our increasingly organized urban systems.

In this paper, problems of coupling of components at several levels are explored. Hypotheses are suggested which, once tested, may move general systems theorists further towards a theory of intentional systems. The author refers to three alternative design options for organizations: (1) reduce individual functional autonomy and increase tightness of coupling; this tends to threaten adaptability and stability; (2) permit individual functional autonomy only in consonance with functioning of larger system; this tends to be infeasible in human systems; (3) differentiate functional autonomy so that autonomy in one sector does not interfere with the functional activities needed to perform in another sector. An hypothesis worthy of further investigation is that systems function most effectively under tight coupling of components and relatively high degrees of functional autonomy; but functional autonomy tends to generate pressures which, over time, loosen the degree of coupling, permitting more and more components to engage in activities counter-productive to principal system functions. The system deteriorates, resulting in a strain toward tighter coupling, and the cycle repeats.

Wickenden, T. H., II. Informational requirements of social choice mechanisms. The General Systems Paradigm: Science of Change and Change of Science. *Proceedings of the Annual North American Meeting of the Society for General Systems Research*, 1977, 211-218.

This paper describes an application of information theory to problems of social choice. Social choices are defined in terms of the transmission of information between parts of a social system and are shown to be problematic whenever an interconnected environment makes the outcome of an action taken by one individual or group contingent upon the action taken by others. Using game theory to represent contingent environments, the informational requirements of social choice mechanisms are examined as problems of regulation and problems of control. Solutions to these problems are generated by extending the Law of Requisite Transmission to encompass complex variables describing strategies, outcomes, and preferences.

The author stresses that the findings presented should be construed with regard to internal social control through collective social choice mechanisms. He observes that (1) the information required for a desired degree of social control may not be available, and (2) far more information is transmitted within a social system today than is required for optimal social control.

Wilbanks, T. J. Distance, diversity, and stability. Systems Thinking and the Quality of Life. *Proceedings of the 1975 Annual North American Meeting of the Society for General Systems Research*, 1975, 607-614.

Ecologists hypothesize that a more diverse system is a more stable one. The topic of this paper is the relationship between the shrinking of space — an effect of modern transportation and communication technology — and cultural stability or instability. In seeking the diversity-stability hypothesis of ecology with cultural systems and geographic theory about diffusion processes; (2) briefly considers whether or not the framework is consistent with the evidence; and (3) considers the overall implications of this analysis.

The paper suggests that the diverstiy-stability hypothesis may apply to lack of interaction between locations within the system. Space-shrinking encourages interaction, therefore tending to reduce diversity, and thus can cause a cultural system to become less stable. This speculative line of reasoning seems both true and untrue, partly because the diversity-stability relationship is complex; but, to the extent that it is true, it suggests a need for the preservation of cultural variety as a contribution to cultural stability.

Zeleny, M. Organization as an organism. The General Systems Paradigm: Science of Change and Change of Science. *Proceedings of the Annual North American Meeting of the Society for General Systems Research*, 1977, 262-170.

An organization can be viewed as the kind of order achieved by arranging the relations between the parts according to a preconceived plan. Such a view implies a deliberate coordination effort on the part of man, a process of organization design. Although this statement is obviously inadequate for characterizing biological and other natural systems, the traditional approach to dealing with social systems and institutions places major reliance on the processes of optimization, prescription, design, and arrangement. This paper points out that social organizations actually are a complex mix of both spontaneous and artificial (man-designed) processes of interaction. Much too little effort to date has been expended toward understanding the spontaneous aspects of human institutions.

A simulation analogy of a simple process of component interaction is presented. It views the manager as the catalyst rather than the designer of an organization. The resulting organism, though the result of human action, thus has not been created by men deliberately arranging the elements in a preconceived pattern.

Zwick, M. Closed systems also show equifinality. Systems Science and Science. *Proceedings of the 24th Annual North American Meeting of the Society for General Systems Research*, 1980, 205-207.

This paper addresses a possible source of confusion, which appears often in the systems literature, of "closed" systems. Specifically, the literature commonly states that "open" systems exhibit the property of equifinality, wherein a particular final state of the system may be reached via different routes from different initial states; this stands in contrast to "closed" systems, where different initial states always result in correspondingly different final states.

The author points out that much confusion is created in translating the thermodynamic concepts of isolated (exchanging neither matter nor energy with their environments), closed (exchanging energy but not matter), and open (exchanging both matter and energy) systems into dynamic systems terms. He contends that the distinction commonly drawn between open and closed systems is incorrect, unless one arbitrarily chooses to describe the former thermodynamically and the latter dynamically. Further, the property of equifinality concerns only the possibility of arriving at a final state from different initial states. It does not represent the essence of the value of the openness concept for explaining phenomena of living systems.

II. ORGANIZATIONAL BEHAVIOR, EFFECTIVENESS & DEVELOPMENT

Adams, J. S. The structure and dynamics of behavior in organizational boundary roles. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational pyschology.* Chicago: Rand McNally, 1976.

The need for effective organizational boundary functions increases as the turbulence of an organization's environment increases. At present, turbulence is high and will increase, probably exponentially, in the future. Attention to boundary functions and to behavior in boundary roles is, therefore, indicated.

Presented in this chapter are: (1) a discussion of organizational boundary functions and of boundary role behavior; (2) a structural model of organizational boundary systems: (3) a discussion of important variables of which boundary role behavior is a function; (4) a limited discussion of experiments and untested hypotheses relating to these variables; and (5) an analysis of the dynamic interactions among the variables. The chapter concludes with a brief statement on the conceptual status of behavioral disciplines in the larger scheme of things.

Alderfer, C. P. An organizational syndrome. *Administrative Science Quarterly,* 1968, 12, 440-460.

In this study the concept of organizational climate was operationally defined as a series of relationships between need satisfactions and organization variables. The needs studied include: pay, respect from superiors, and use skills and abilities; the organization variables are job complexity and seniority. A field study was carried out over a period of three months in the largest divison of a manufacturing organization. Measurements were taken on needs (pay, respect from superiors, and skills) and organizational variables (job complexity and seniority). Approximately 300 randomly selected employees were asked to complete either an interview or a questionnaire.

The results of correlations and regression analyses performed on the data were: (1) Satisfaction with respect from superiors decreased as job complexity increased and as seniority increased. (2) Satisfaction with use of skills and abilities increased as job complexity increased. (3) Compared with employees holding analogous but narrowly delimited jobs, the employees holding enlarged jobs showed less satisfaction with respect from superiors and more satisfaction with opportunities to use their skills and abilities. Two explanations are offered for the decay in superior-to-subordinate relationships. First, the more complex jobs required more interpersonal competence of both superior and subordinate and,

Alderfer, C. P. Change processes in organizations. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology.* Chicago: Rand McNally, 1976.

Social technology is more advanced than theory building for applying behavioral science to organizations. In this chapter, boundary permeability and relationship mutuality, two concepts from open systems theory, are formulated to explain steady and changing states of individuals, groups, and organizations. Each level of human unit is examined from both internal and external perspectives; several cross-level hypotheses are proposed. Optimal boundary permeability occurs when mutual relationships are established among subsystems and between the system and its environment. Interpersonal and intergroup mutuality tend to be positively associated. Planned change programs in organizations are analyzed according to this "boundary-relationship" perspective. Organizations change in order to satisfy human needs more fully. Therefore, change programs introduced by applied behavioral scientists are fueled by the energy of human needs, but they vary according to the level of human unit they take as change target. The chapter closes by proposing a series of conceptually based guidelines for applying behavioral science to organizations.

Alderfer, C. P. & Brown, L. D. *Learning from changing: An application of open systems theory to organizational diagnosis and change.* Yale University: Department of Administrative Sciences, 1973. AD771-423.

This study reports on a four-year organizational diagnosis and change program. A theory of organizational research methods with application to both basic research and diagnosis is presented, and three methodological studies employing the theory are discussed. Three diagnostic chapters reveal the investigators' initial clinical impressions, the effects of the system on the individuals, and the effects of the system on the key group. A theory of consultation is delineated, and examples from this entire study are used to make its meaning operational. Survey feedback was employed as a link between diagnosis and action, and the impact of the intervention was evaluated. Other developmental interventions are described which include the establishment of internal change agents, the alteration of socialization practices, and the change of governance procedures in the institution.

Evaluation of the project proceeds in two streams: (1) an assessment committee from the organization reviewed the consultation activities and prepared a report for the system; and (2) a repeated and brief questionnaire compared the state of the system after intervention with that during diagnosis. The final chapter assesses the broad contributions and limitations of the study.

in the particular company studied, this job demand was not being adequately met. Second, rapid company growth and technological change provided continuing source of career anxiety and thus put additional strains on superior-to-subordinate relationships. It is suggested that this climate is neither unique to the particular organization, nor general, but rather reflects some of the consequences of rapid change, and as such, contains implications for planning both organizational and technological innovations.

Alderfer, C. P. *Human needs and organizational development.* Yale University: School of Organization and Management, 1975. ADA017-407.

This final report reviews and summarizes the research produced during a project conducted for the Office of Naval Research. The foci of this research were on human needs in organizational settings and the theory and methods of organizational devleopment. Research emphasis was placed on the latter. Eight technical reports emanating from this study are summarized.

TR-1 deals with change processes in organizations. The report is a systems theory-oriented literature review aimed at identifying key variables that explain stability and change in human systems. TR-2 presents a new social technology for the conduct of survey feedback. The peer-group - intergroup model developed herein departs from the traditional family group model by recognizing that system-wide dynamics influence and are influenced by the relations among groups as well as within groups. TR-3 is a critical analysis of problems which have arisen in the practice of OD because of the misunderstandings in transferring learning from laboratory education to organizational change. TR-4 describes the use of practices derived from change process theory to construct a relatively unique experimental social psychology laboratory which permitted experimental testing of hypotheses drived from ERG need theory. TR-5 provides an in-depth case study of organizational change conducted in a boarding school, emphasizing the value of confronting the tensions between research and action within a single investigation. TR-6 presents evidence that clients may transfer their attitudes from a previous to a subsequent intervention effort -- the HEWEGA effect. TR-7 provides a theoretical framework for organizational diagnosis by relating change process theory to events that occur at each phase of the diagnostic process. Finally, TR-8 describes how an intergroup communications group was designed in accord with principles derived from change process theory and the key events which occurred during the life of the group.

Aldrich, H. & Herker, D. Boundary spanning roles and organizational structure. *Academy of Management Review*, 1977, 2, 217-230.

This paper examines the creation, elaboration and functions of boundary spanning roles, with attention to environmental and technological sources of variation in their structure. In the open systems framework used, the interaction between an organization and its environment, and so the existence of boundaries, are taken as givens. What remains problematic, however, is the boundary spanning activity. An examination is made of the functions served by boundary roles, the generation of boundary units and roles relating to organizations and their environments, and the environmental and organizational sources of variation in the structure of boundary roles. While existing literature is used in the arguments presented, the discussion is largely speculative.

The picture of boundary spanning roles portrayed in this article has two implications for the study of formal organizations. First, this view of organization-environment interaction is in contrast to current literature which sees organizations responding as "wholes" to environmental influence. In this study boundary spanning roles are seen as the critical link between environmental characteristics and organizational structure. Because the organization faces multiple environments, it can have a variety of boundary roles of units with different structural characteristics. Second, it suggests the need for further empirical studies of changes in boundary spanners' performance and roles under different environmental conditions and over time.

Alexander, E. R. The design of alternatives in organizational contexts: A pilot study. *Administrative Science Quarterly*, 1979, 24, 382-404.

A review of decision research suggests that the design stage is a neglected aspect of the decision-making process. This study develops a conceptual model for analyzing the design of alternatives in organizations, and applies it in three case studies. The decision process is modelled as a sequence of three stages: (1) perception of the need for a decision and goal articulation; (2) development of alternatives; and (3) choice and implementation of the preferred action.

The model has two basic dimensions which may affect the range and quality of options generated in the design process. One is the mix and type of creativity and search; the other is the degree and type of closure to other phases of decision-making. Comparative analysis of the cases offers qualified support for the hypotheses and clear evidence that the impact of alternatives design on decision outcomes warrants greater attention to this stage of the decision-making process.

Argyris, C. *Understanding organizational behavior.* Homewood, IL: The Dorsey Press, Inc., 1960.

This book focuses on the diagnosis of organizational behavior. It begins with an exposition of the theoretical framework at work in this analysis, and then considers the various elements of organizational behavior through an examination of empirical research. A model of organizational behavior is presented through a series of propositions regarding task (work) specialization, chain of command, unity of direction, span of control, and rationality. The model conceptualizes the organization as a grand strategy which individuals create to achieve objectives that require the effort of many. Guideposts to research methodology in this framework are discussed.

The remainder of the book deals with the diagnostic procedures and data analysis appropriate to research on organizational behavior. The semistructured research interview is discussed in detail as the model best suited for the particular types of problems studied and the models reported in this book. Models for analyzing the data gathered from interviews are reviewed and exemplified in transcripts from actual programs conducted in various organizations. Four examples are given of the usefulness of the framework in organizational research. The first is an example of deepening our understanding of the organization; the other three are of concrete predictions about future human behavior in the organization.

Argyris, C. *Organization and innovation.* Homewood, IL: Richard D. Irwin, Inc. 1965.

This book has three principal objectives: (1) To present the preliminary findings of studies on the influence of varying degrees of interpersonal competence among top managers on an organization's innovativeness, risk-taking and problem-solving effectiveness -- as perceived by the participants. (2) To present a new system of categories which can be used to observe variables related to interpersonal competence and with which useful predictions can be made and tested. (3) To develop a model, based on the three studies and a review of the literature, which relates the degree of interpersonal competence with innovation. The hypothesis tested in this framework is that the degree of interpersonal competence observed in the organizations studied is low enough to be a major cause of the deterioration of innovation in organization.

Several research and development companies were selected for observation. Based on an open systems model of the organization, a model of R&D deterioration was developed as follows: An input of

relatively low interpersonal competence (with high technical competence) leads to participants experiencing low feelings of essentiality and success on the interpersonal level. This results in low problem-solving effectiveness on technical issues that involve the participant's self-esteem or organizational security. As problem-solving effectiveness decreases, the need for people, resources and time increases as do the researcher's frustration and rigidity towards change. The feedback loop between management and researchers carries dissatisfaction, low morale, and concern over increased costs. Intergroup conflict and competition result, and with it the practice of hiding bad news from the management. The increasing mistrust and lack of communication leads to a feedback activity that supports and reinforces a relatively low interpersonal competence. The loop is closed, and self-maintaining system becomes slowly less effective and innovative.

The objective of this book is not aimed at solving the problem of innovation deterioration in R&D companies. Rather, it offers a conceptual framework, grounded in systems theory, and a series of propositions as means of understanding the dynamic at work in such organizations. Suggestions are made for both further research and change programs which offer potential amelioration of this problem.

Argyris, C. *Management and organizational development.* New York: McGraw-Hill, Inc., 1971.

This book focuses on the human resources of an organization. It asks how a quality of life can be created and maintained within an organization which allows the participants to become more efficient decision-makers. The book describes the journey of three organizations from XA toward YB. XA stands for Theory X, Pattern A — a denotation given by McGregor to a set of assumptions management has about its people (X), and by the author to a set of behavioral patterns associated with Theory X (A). YB is its antithesis. Theory X denotes a set of assumptions by management that people cannot be trusted, and prefer to be controlled by, and to be dependent upon, their management for all actions. Pattern A represents the interpersonal behavior, group dynamics and organizational norms associated with Theory X. Theory Y denotes a set of management assumptions about man as an active contributor to his and to the organization's well-being. Pattern B represents the interpersonal, group and organizational dynamics associated with this view of man. This book, in emphasizing the difficulty of the path from XA to YB, offers the professional consultant suggestions on how to deal with some of the problems and frustrations that will be encountered.

Argyris, C. *Intervention theory and method: A behavioral science view.* Reading, MA: Addison-Wesley Publishing Company, 1973.

This book represents the author's first attempt to construct a theoretical framework for consulting, which he names "intervention". The three primary tasks of any intervention activity are: free choice, valid and useful information, and internal commitment. Change is not a primary task. The ultimate goal of intervention is the facilitation of competent, effective system functioning. The six criteria by which attainment of this can be assessed are: (1) awareness of relevent information, (2) understanding by the relevant parts, (3) manipulability, (4) realistic cost, (5) leading to a solution that prevents recurrence of the problem without deteriorating, and (6) preferably increasing the problem-solving, decision-making and implementing processes. In order to achieve these criteria, it is necessary to develop certain minimal conditions among individuals (e.g., self-acceptance, trust, etc.), about valid information, among groups, and of system norms that support these activities. Inquiry is made into the probabilities that client systems will tend to manifest these conditions; they seem to be low. To make matters more difficult, the very research and diagnostic methods used by the interventionist may also inhibit his effectiveness. Conditions under which interventionists will probably work in human systems are examined, along with the conditions that tend to lead to ineffective intervention activity.

The remainder of the book focuses on the practical concerns of choosing a client system and the diagnostic methods most appropriate to a particular type of organization. This book deals primarily with the initial phases of intervention: the theory and method issues. A later volume will examine the later phases, including evaluation.

Arroba, T. Y. Decision-making style as a function of occupational group, decision content and perceived importance. *Journal of Occupational Psychology,* 1978, 51, 219-226.

This study investigates group decision-making style in situ in order to determine some of the factors which influence differential decision-making behavior in different situations. This approach differs from the widely held view of decision-making style as analogous to a personality variable which is consistent over different types of decisions. Rather, relevant determining factors are believed to be the occupation of the decision maker, the content area of the decision, and its subjectively perceived importance. The relationships between these and decision-making style are discussed.

Thirty-five managers and 29 manual workers were asked to list 16 decisions which they had already made and to rate these for perceived degree of importance. The content of the decision, work-related or personal, was noted. In subsequent interviews, details were obtained on the decision-making behavior used in 523 decisions, which were assigned to a style category: 'no thought', 'complaint', 'logical', 'emotional', 'intuitive', or 'hesitant'. Analysis of the four-way contingency table showed that occupational group, content of the decision and perceived importance were each independently associated with decision-making style. Occupational group was also related to the content of the decisions listed, and with use of the 'no thought' and 'logical' styles; content of the decision was related to use of the 'logical' and 'emotional' styles; and perceived importance was associated with use of the 'emotional', 'intuitive', 'no thought', and 'logical' styles.

Baldridge, J. V. & Burnham, R. A. Organizational innovation: Individual, organizational, and environmental impacts. *Administrative Science Quarterly*, 1975, 20, 165-176.

Research on the diffusion of innovation and organizational change has too often focused on the wrong clusters of variables. A more productive analysis of the change process would shift focus from individualistic variables to roles, organizational structure, and environmental factors. The results of two research projects on organizational change are presented.

The first study examined 20 randomly selected schools in 7 districts in the San Francisco Bay Area. The second, a year later, focused on a random sample of 264 school districts in Illinois. The dependent variable in both studies was innovation; the independent variables, organizational size and complexity and environmental variability. Correlations were calculated among the variables. Results support the theoretical argument. The findings indicate: (1) Individual characteristics (e.g., sex, age, personal attitudes) do not seem to be important determinants of innovative behavior among people in complex organizations. However, administrative positions and roles do seem to have an impact on the involvement of an individual in the innovation process. (2) Structural characteristics of the organization (e.g., size and complexity) strongly affect the organization's innovative behavior. (3) Environmental input from the community and other organizations is a major determinant of an organization's innovative behavior.

Barrow, J. C. The variables of leadership: A review and conceptual framework. *Academy of Management Review*, 1977, 2, 231-251.

The primary objective of this article is to develop an empirically-based conceptual framework of leadership by reviewing much of the existing literature, identifying variables involved in a leadership situation, categorizing the variables via factor analytic techniques, and structuring the resulting factors into a framework which exhibits both the factors and their potential interrelationships. A review is made of empirical studies of leadership which have been classified into four primary orientations: leader behavior investigations, leadership effectiveness theories, situational and reciprocal causation investigations, and normative leadership approaches.

A leadership effectiveness framework is constructed as a result of a factor analysis of the variables identified in the reviewed studies. This model is trichotomous, interrelating three sets of variables: leader characteristic factors, leader behavior factors, and environmental factors. It is argued that such a framework provides a partial mechanism for overcoming the four problem areas that currently plague leadership research. (1) It delineates numerous environmental influences which impact on leadership effectiveness. (2) It identifies numerous leader characteristics. (3) It conceptualizes leadership effectiveness as a function of complex interactions rather than as linear relationships. (4) It serves to integrate the findings of research to date, providing a conceptualized summary of the factors to be identified in a study of leadership. Future planned development of this framework is described.

Bartee, W. M. & Cheyunski, F. A methodology for process-oriented organizational diagnosis. *The Journal of Applied Behavioral Science*, 1977, 13, 53-68.

This paper presents a specific methodology for organizational diagnosis, which in order to be successful, requires that an interventionist as a third-party facilitator attend to many very specific (though sometimes subtle) process aspects. The traditional techniques used for organizational diagnosis -- questionnaires, interviews, and participant observation -- are criticized as being content-influential. The process-oriented methodology presented involves the interventionist's interaction with the client in designing groups that represent four different consitituencies of a particular organization. These constituencies are: resource-providers, technology-developers, direct-service providers, and service-acquirers. The initial diagnosis and the initial intervention are achieved by conducting a problem diagnosis workshop. Some pragmatic aspects concerning an effective diagnostic intervention learned through extensive research experience are reported herein.

Bass, B. M. A systems survey research feedback for management and organizational development. *The Journal of Applied Behavioral Science*, 1976, 12, 214-229.

This paper represents an approach to research in social psychology where subjects gain practical on-the-job self-knowledge directed toward change, and the researcher gains new understanding leading to model building and theory development of the factors that describe supervisory behavior in various situations. This approach is known as survey feedback. A questionnaire completed by a manager and his immediate subordinates generates scores on organizational, group, task, personal and interpersonal factors; management styles; and outputs of effectiveness and satisfaction. After the raw data from a particular workgroup or system are analyzed, the manager obtains a computerized printout called a PROFILE of the discrepancies between his subordinates and himself as well as normative data to help him plan change. This constitutes the feedback phase of the OD intervention. Initial follow-up suggests that the PROFILE procedure is seen to promote change particularly in situations where subordinates had no decision-making input and perceived conditions as disorderly and poorly managed. Correlational analyses of past data suggest that authoritative managerial direction is more frequent when situations are regular, clear and structured; but such direction is perceived to be more effective under reverse conditions. Manipulative bosses are downgraded, while consultative superiors are favored.

Bass, B. M., Farrow, D. L., Valenzi, E. R. & Solomon, R. J. Management styles associated with organizational, task, personal, and interpersonal contingencies. *Journal of Applied Psychology*, 1975, 60, 720-729.

Prior studies with subordinates and managers from public and private agencies resulted in the development of a 31-scale Profile questionnaire conceptualized in a systems framework of input, transform, and output variables. In this study, the Profile was completed by 78 managers and 407 of their subordinates. Convergent and concurrent validity studies generally supported the validity of the scales.

Five management styles measures were found to be conceptually but not empirically, independent. The five management styles -- direction, negotiation, consultation, participation, and delegation -- differentially correlated with organizational, task, intrapersonal and interpersonal variables, as well as with measures of work-unit effectiveness and satisfaction. Results of a stepwise regression analysis showed that direction was most likely to appear with structure and clarity, negotiation with short-term objectives and authoritarian subordinates, consultation with long-term objectives and intragroup harmony, participation with clarity and warmth, and delegation with warmth and lack of routine tasks.

Beckhard, R. *Organization development: Strategies and models.* Reading, MA: Addison-Wesley Publishing Co., 1969.

This book provides a relatively systematic description of the state-of-the-art in organization development, and sets up some criteria upon which an OD practitioner can make decisions on the planning and conduct of OD programs and activities. Chapter 1 introduces the bakcground and causes for the increased concern with organization development. Changes in the social and business environment as well as changes in values are placing demands on the organization to adapt and remain flexible. Chapter 2 defines organization development as an effort which is planned, organization-wide and managed from the top aimed at increasing organizational effectiveness and health through plnaned interventions in the organization's processes, using behavioral science knowledge. This phenomonen is then compared to management development, training, and operations research.

Chapter 3 reviews and describes the types of strategies, tactics, and activities that are used in organization development efforts. These include strategies aimed at team development, maximizing intergroup relationships, and facilitating goal-setting and planning activities. Chapters 4 through 8 cite actual cases of organization-wide planned change efforts. Chapter 9 goes on to analyze the strategies used in each of these cases in order to determine the conditions and characteristics of successful and unsuccessful OD efforts. Chapter 10 is devoted to the actual managing of OD efforts, including the use of outside sources. The final chapter looks ahead at the major influences in the field of OD in the next decade.

Beehr, T. A. Hierarchical cluster analysis of the Profile of Organizational Characteristics. *Journal of Applied Psychology*, 1977, 62, 120-123.

Likert's Profile of Organizational Characteristics has been used frequently in organizational development efforts. The purpose of this study is to determine whether the theoretical dimensions of this instrument could be replicated empirically by hierarchical cluster analysis. The survey was administered to 592 salaried employees of a Canadian continuous process plant. The hierarchical cluster analysis solution at the step most closely resembling the theoretical dimensions of the instrument contained clusters resembling the instrument's dimensions of leadership, communication, and control. The instrument's decision-making dimension was divided into two clusters; the clusters representing the instrument's dimensions of motivation, interaction-influence, and goal-setting were not present. Suggestions are offered for further development of the instrument.

Beer, M. The technology of organization development. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.

This chapter presents a framework for conceptualizing and evaluating the growing social technology of organization change and development (OD). The historical foundations for OD are discussed briefly. The many techniques and methods of OD are described within an organizing framework and evaluated in terms of current research and theory. The first type of technique discussed is structured and unstructured laboratory training. The reasons for its success and failure are offered, and its role in OD is placed in perspective. Diagnostic methods, including survey feedback, interview feedback, confrontation meetings, and others, are also discussed. Process interventions, including team building, meeting processing, intergroup meetings, counseling, task forces, and interpersonal peacemaking are described, and relevant research and theory provided. Structural interventions and inventions, such as job enrichment, matrix structures, the Scanlon Plan, and Human Asset Accounting are described and evaluated. Finally, the problem of integrating techniques into an overall OD strategy is addressed. Pre-programmed strategies, such as Grid OD, are contrasted with more organic consultant-centered strategies in this regard.

Benne, K. D. & Birnbaus, M. Principles of changing. In Bennis, W. G., Benne, D. K. & Chin, R. (eds.). *The planning of change*. (2nd Ed.). New York: Holt, Rinehart & Winston, Inc., 1969.

This article supports the contention that change in an institution or organization can be planned. It is argued that although most people are unaware of the factors that trigger processes of change in their work situation, members and leaders of organizations cannot evade responsibility for attempting to extend their awareness and knowledge of what determines change. Under more planful and rational control, organizational members can gain the power to bring about the processes of change.

Several principles of strategy for effecting institutional change are formulated. (1) To change a subsystem or any part of a subsystem, relevant aspects of the environment must also be changed. (2) To change behavior on any one level of a hierarchical organization, it is necessary to achieve complementary and reinforcing changes in organization levels above and below that level. (3) The place to begin change is at those points in the system where some stress and strain exist. Stress may give rise to dissatisfaciton with the status quo and thus become a motivating factor for change in the

system. (4) In diagnosing the possibility of change in a given institution, it is always necessary to assess the degree of stress and strain at points where change is sought. One should ordinarily avoid beginning change at the point of greatest stress. (5) If throughgoing changes in a hierarchical structure are desirable or necessary, change should ordinarily start with the policy-making body. (6) Both the formal and the informal organization of an institution must be considered in planning any process of change. (7) The effectiveness of a planned change is often directly related to the degree to which members at all levels of an institutional hierarchy take part in the fact-finding and the diagnosing of needed changes and in the formulating and reality-testing of goals and programs of change.

Bennis, W. G. Theory and method in applying behavioral science to planned organizational change. *Journal of Applied Behavioral Science*, 1965, 1, 337-360.

This paper is concerned with the strategic, methodological, and conceptual issues brought about by the emergence of the action role of the behavioral scientist. Three assumptions underlie the discussion: (1) the proportion of contemporary change that is planned or that issues from deliberate innovation is much higher than in former times; (2) man's wisdom and mundane behavior are somewhat short of perfection insofar as they regulate the fate and selective adaptation of complex human organization; and (3) behavioral scientists in increasing numbers are called upon to influence organizational functioning and effectiveness.

Planned change is introduced as a linkage between theory and practice, knowledge and action. It is compared with Operations Research -- another type of deliberate change. Eight traditional change programs are discussed and shown to suffer from four types of bias: rationalistic (no implementation of program), technocratic (no spirit of collaboration), individualistic (no organization strategy), and insight (no manipulability). A principal shortcoming of many of the traditional change programs is their lack of a systems approach. Alternative change agents/programs are discussed which overcome these problems.

Bennis, W. G. Changing organizations. In Bennis, W. G., Benne, D. K. & Chin, R. (Eds.) *The planning of change.* (2nd Ed.). New York: Holt, Rinehart & Winston, 1969.

The author's look into the future of organizational change reveals that there will be new shapes, patterns, and models emerging in the conduct of the corporation and of managerial practices in general. The next 25 to 50 years should witness the end of bureaucracy as it is now known and the rise of new social systems better suited to 20th century demands of industrialization.

Reasons for these foreseen changes are discussed and related to current literature. The article concludes with a forecast of organizations for the future, based on changes in six dimensions of the organization. (1) The environment: interdependence rather than competition, turbulence rather than steadiness, and large-scale rather than small-scale enterprises. (2) Population characteristics: increased education and job mobility. (3) Work values: greater intellectual commitment, autonomy, and "other-directedness". (4) Tasks and goals: more technical and complicated tasks requiring more intellect than muscle. Goals requiring more collaboration of specialists. (5) Organization: a more "temporary" social structure. In general, adaptive, problem-solving, temporary systems of diverse specialists, linked together by coordinating and task-evaluating specialists in an organic flux will be the organizational form that will gradually replace bureaucracy. This can be called an organic-adaptive structure.

Bennis, W. G. *Organization development: Its nature, origins, and prospects.* New York: Addison-Wesley Publishing Co., 1969.

This book is designed as a primer on organization development. It rests on three basic propositions: (1) An evolutionary hypothesis that every age develops an organizational form most appropriate to it and that certain changes taking place in the culture necessitate parallel changes within the organization. (2) The only viable way to change organizations is to change their culture, that is, to change the systems within which people work and live. Changing only individuals simply will not work. (3) A new social awareness is required by people in organizations to accompany the prevailing self-awareness that typically exists.

Chapter 1 attempts a definition of organization development. Essentially, it is conceived of as an educational strategy employing the widest possible means of experience-based behavior in order to achieve more and better organizational choices in a highly turbulent world. Chapter 2 focuses on the conditions which lead to the inevitability of organization development: rapid and unexpected change, growth in size, increasing diversity, change in managerial behavior, and the like. Chapters 3 and 4 are designed as question-and-answer dialogues which confront the common questions asked about organization development. Chapter 5 evaluates sensitivity training and laboratory training as possible OD strategies, emphasizing the problems associated with both. Chapter 6 poses several research questions which require further attention.

Bennis, W. G. Theory and method in applying behavioral science to planned organizational change. In Bennis, W. G., Benne, D. K. & Chin, R. (Eds.). *The planning of change*.(2nd Ed.). New York: Holt, Rinehart & Winston, Inc., 1969.

This paper is concerned with the strategic, methodological and conceptual issues brought about by the emergence of the action role of the behavioral scientist. Three assumptions underly this study: (1) the proportion of contemporary change that is planned or that issues from deliberate innovations is much higher than in former times; (2) man's wisdom and mundane behavior are somewhat short of perfection insofar as they regulate the fate and selective adaptation of complex human organization; and (3) behavioral scientists in increasing numbers are called upon to influence organizational functioning and effectiveness.

Some generalizations about planned change are presented. (1) The number of planned change programs aimed at less bureaucratic, more participative open-system and adaptive structures will increase in the future. (2) A good deal is known about the adoption and acceptance criteria for planned change programs; however, (3) very little is known about implementation — a process which includes the creation of understanding and commitment toward a particular change and devices whereby it can become integral to the system's operations. Four elements are necessary for successful implementation: (1) the control system must understand the changes and their consequences and have influence in developing and controlling the form of the change; (2) the change effort should be perceived as being self-motivated and voluntary; (3) the change program must include emotional value as well as cognitive (informational) elements for successful implementation; and (4) the change agent should be conscious of reducing the resistance to change.

Bernardin, H. J. & Alvares, K. M. The effects of organizational level on perceptions of role conflict resolution strategy. *Organizational Behavior and Human Performance*, 1975, 14, 1-9.

The purpose of this study is to examine perceptions of forcing, compromise, and confrontation on behavioral strategies of the first-line supervisor in role conflict situations. It is predicted that perceptions of these behaviors will differ as a function of organizational level. This difference could be used to explain the discrepant ratings of first-line supervisory effectiveness from levels above and below him.

One hundred and twenty-nine employees of a large manufacturing company participated in the study. Each subject was given a folder containing four descriptions of conflict situations, each followed by a description of three behavioral strategies for dealing with the conflict. Participants were asked to rate each description on a seven-point scale from extremely ineffective to extremely effective in terms of that particular conflict. Correlational analyses were used to compare the individuals' ratings. The results of this study indicate that perceptions of role conflict resolution strategies are a function of organizational level and conflict type. These findings point out the need to investigate the relationship between important behaviors elicited by a leader and perceptions of those behaviors from positions above and below him. It is believed that rather than studying hypothetical constructs (e.g., consideration and structure) to explain leader behavior, consideration of behaviors in situations characteristic of the samples involved will result in more useful and generalizable information.

Blake, R. R., Mouton, J. S., Barnes, L. B. & Greiner, L. E. Breakthrough in organizational development. *Harvard Business Review*, 1964, 42, 37-59.

This article describes how behavioral science concepts of team learning form a link between individual learning and total organization development. The link is important because it suggests some answers to a long-standing problem in industry: how to test and demonstrate the large-scale usefulness of human relations research and teaching. In the process, the article also describes a rather new approach to management development and, more broadly, to organizational development.

The first part of the article deals with the way a Grid Program should work. A detailed description is given of the six-phase program typifying the organizational development program based on a Managerial Grid approach. The first two phases stress management development, so that the last four phases can help managers work toward the 9,9 goals of organization development. The second section of the article describes the way the Grid Program did work, through a presentation of the early findings and conclusions of a research study which evaluated the Sigma plant's program in organization development. The article concludes with the management implications of this approach to organization development.

Bonoma, T. V. Conflict, cooperation and trust in three power systems. *Behavioral Science,* 1976, 21, 499-514.

The variables of power, conflict, cooperation and trust have traditionally been explored in a context-irrelevant fashion as general theoretical explanations for many social phenomena at the levels of organisms, groups, organizations, societies and even supranational systems. This paper questions the assumed high cross-system applicability of these concepts by outlining three different prototypical power systems which seem to find frequent expression in everyday life: (1) the unilateral power system, in which a strong source imposes influence on a weak target; (2) the mixed power system, in which partially equivalent interactants bargain to aggreement or deadlock; and (3) the bilateral power system, in which interactants are in unit relation and formulate joining policy programs. Power, conflict, cooperation and trust are all found to require substantially different definition and treatment when considered in one as opposed to another of these prototypical systems.

A context sensitive approach to conflict research is recommended, in which concepts are articulated with specific regard for the interactional system in which they will be applied. A preliminary effort is made to outline the nature of the variables in each system. The dual issue of bias toward context-irrelevant theory coupled with unrepresentative empirical forays are suggested as potentially debilitating problems for every subdiscipline concerned with social inquiry.

Bourgeois, L. J., III, McAllister, D. W., & Mitchell, T. R. The effects of different organizational environments upon decisions about organizational structure. *Academy of Management Journal,* 1978, 2, 508-514.

This paper reviews three studies designed to test the following hypotheses: (1) managers who encounter turbulent and threatening business environments will react by "pulling in the reins"; (2) stable and supportive environment will result in a manager's "loosening up" into a more organic style; and (3) given a stable environment which subsequently becomes turbulent, decision makers will tend to shift from an organic to a mechanistic structure, and vice-versa.

All three studies used a fairly similar paradigm. An exercise was designed in which scenarios of two organizational environments, one stable and one turbulent, were presented to the subjects. The subjects were instructed to assume the role of the president of a newly-created, autonomous product division of a large firm, to assess the division's environment and to organize his/her division for action by making some decisions about the organization's structure. All three studies used the same stimulus material; however, the nature of the decision task and the sample population varied between studies. The findings from the three studies supported the first two hypotheses, but not the third. Implications of this study for contingency theorists are discussed.

Bowers, D. G. *Perspectives in organizational development.* University of Michigan: Institute for Social Research, 1970. AD711-312.

This report reviews aspects of change practice with major theoretical implications and formulates a series of researchable questions. Areas of discussion include: the development criteria for organizational effectiveness; the role of diagnosis in organizational development; and the role of client system's needs. Approaches to OD in the affect area are discussed in detail, including sensitivity training, and techniques based on learning theory.

Bowers, D. G. *Development techniques and organizational change: An overview of results from the Michigan Inter-Company Longitudinal Study*. University of Michigan: Institute for Social Research, 1971. AD731-667.

Data collected by use of the Survey of Organizations questionnaire from more than 1,000 respondents in 23 organizations participating in the Inter-Company Longitudinal Study are analyzed in terms of the organizational development treatments which intervened between pre-and post-measures. Four "experimental" treatments (Survey Feedback, Interpersonal Process Consultation, Task Process Consultation, and Laboratory Training) and two "control" treatments (Data Handback and No Treatment) are compared to determine their comparative associations with improved organizational functioning. The results indicate that Survey Feedback was associated with a significant frequency of improvement, that Interpersonal Process Consultation was associated with questionable improvement, that Task Process Consultation was associated with little or no change, and that Laboratory Training was associated with significant deterioration in organizational functioning.

Bowers, D. G. *Development techniques and organizational climate: An evaluation of the comparative importance of two potential forces for organizational change*. University of Michigan: Institute for Social Research, 1971. AD731-666.

This technical report explores two issues related to development techniques and organizational climate: (1) Do treatments (i.e., OD activities) produce organizational change? If so, what are their comparative magnitudes and directions? and (2) Is change in organizational climate itself an effect of treatment, an independent, additional cause of behavior change in work groups, a conditioner of change success, or a coincidental variable? The focus of the research reported here was on the work group, consisting of the superior and his immediate subordinates. The data for this report were drawn from 15 organizations in 6 companies, and the basic data units are 888 work groups, representing many different kinds of functions and industries. A series of correlation studies between organizational climate changes, change treatments, and supervisor and subordinate measures were used to assess the value of four development techniques. Survey Feedback and Interpersonal Process Consultations emerge as beneficial treatments; Laboratory Training and Task Process Consultation as non-beneficial strategies.

Bowers, D. G., Franklin, J. L., Pecorella, P. A. *A taxonomy of intervention: The science of organizational development.* Michigan University, 1973. AD762-085.

A theory of organizational development is presented which takes into account the nature of problematic behaviors, precursors to the problematic behaviors, and impingement modes. This theory is based on the general systems view of the organization. In this framework, organizational change, or development, to be successful, must be systematic in nature. Organizational development is a state in which additional or alternative inputs are provided to alter the throughput process in such a way as to generate additional outputs per unit of input. Effective leadership (managerial and peer), communications, decision-making, and intervention strategies are evaluated in this framework. From the theoretical discussion a taxonomy of interventions, classified by impingement mode, is developed.

Bowers, D. G. & Seashore, S. E. Predicting organizational effectiveness with a four-factor theory of leadership. *Administrative Science Quarterly,* 1966, 11, 238-263.

This paper presents a review of the conceptual structure resulting from several programs of research in leadership practices, and a reconceptualization that attempts to take into consideration all of these earlier findings. In order to assess the usefulness of this reconceptualization, it is applied to leadership and effectiveness data from a recent study. Recent research in the area of leadership points to the existence of four basic dimensions of leadership: support, interaction facilitation, goal emphasis, and work facilitation. This conceptualization is based on the data collected from the Ohio State Leadership Studies, the Early Survey Research Center Studies (University of Michigan), studies at the Research Center for Group Dynamics and the research of Katz and Kahn (1951), Likert (1961), and others.

A recent study of 40 agencies of one of the leading life insurance companies is used to evaluate this conceptual model. It focuses on the impact of both supervisory and peer leadership upon outcomes of satisfaction and factorial performance measures. Data was collected from 20 index measurements obtained through questionnaires and 7 factorial measures of agency performance obtained from company records. Correlational analyses were conducted among all relevant variables. The results support the utility of this conceptual model. It appears that leadership's relation to organizational outcomes may best be studied when both leadership and effectiveness are considered multidimensional.

Browning, L. D. Diagnosing teams in organization settings. *Group and Organization Studies*, 1977, 2, 187-197.

This paper provides examples of actual work teams encountered in organizations and suggests ways to view teams by diagnosing why they exist in organizations originally and what impact differences in membership have on their functioning. The exemplar work groups include: Production team, Problem-conflict group, Staff meeting, Budget-approval panel, Peer-managers group, Clerical pool, and the Complaint-review group. Eight motivations for group formation are described, providing distinctions between groups as they exist in organizations. Six aspects of group membership are described, facilitating a view of the work group from the inside. Emphasis is placed on the OD consultant's awareness of these dimensions of the work group.

Campbell, J. P. Contributions research can make in understanding organizational effectiveness. In Spray, S. L. (Ed.). *Organizational effectiveness*. Kent, OH: Kent State University Press, 1976.

A systematic analysis of conceptual and measurement developments in the area of organizational performance is presented. The analysis is based on the contention that organizational effectiveness is a construct having no direct operational definition, but which constitutes a model or theory of what an effective organization is. The functions of such a model would be to identify the kinds of variables to be measured and to specify the interrelationship between these components of effectiveness.

The literature contains two general perspectives as to what constitutes organizational effectiveness: the goal-centered view (the organization is in the hands of a rational set of decision-makers who have in mind a set of goals which they would like to pursue) and the natural systems view (the organization adopts the overall goal of maintaining its viability or existence without depleting its resources). Other models of effectiveness do exist which are not as widely supported. No judgments are made about the relative efficacy of these models.

Several lessons that can be learned from previous research are discussed. First, it is probably counterproductive to follow the multivariate approach idea in the development of effectiveness measures; it is not physically or economically possible to conduct such a study in ways that will yield significant results. Second, there is no utility in searching for objective measures of organizational effectiveness. Third, it is probably a mistake to concentrate on attempts to develop results-oriented measures; it is too difficult to tease out those variables which control the terminal outcomes of organizational

functioning. Fourth, a large number of the variables studied (e.g., satisfaction, morale, climate) are perceptions of individuals; yet, most organizations are so complex that averaging over everybody in the class covers up so many individual differences that it renders the indicators useless. The type of research activities which seem to offer the most potential are: (1) recovery of operative goals and criteria; (2) direct judgment, (3) indirect judgment, (4) critical incident methodology; (5) theory capturing, and (6) non-judgmental research, such as simulations. The study of organizational effectiveness needs an increased emphasis on so-called "criterion-capturing" research, followed by a much greater emphasis use of simulations and case studies.

Campbell, J. P., Bownas, D. A., Peterson, N. G., & Dunnette, M. D. *The measurement of organizational effectiveness: A review of relevant research and opinion.* (TR 75-1). Minneapolis, MN: Personnel Decisions, Inc., 1975. AD786-462.

This technical report represents a compilation and distillation of literature dealing with organizational effectiveness. The principal topic addressed is defining organizational effectiveness. While no succinct definition is provided, two principal constructs of organizational effectiveness are recognized: goal-centered and natural systems. Existing theory, research and practice surrounding these constructs is evaluated and current measurement techniques are catalogued along with summaries of various theories and models. Alternative methodological approaches and manifest characteristics of organizations in terms of effectiveness are considered. A compilation of independent, dependent, and intervening variables is presented. Suggestions are offered for future research in the Navy setting in the area of organizational effectiveness.

Campbell, J. P., Dunnette, M. D., Lawler, E. E., III, & Weick, K. E., Jr. Environmental variation and managerial effectiveness. In Campbell, J. P. (Ed.). *Managerial behavior, performance, and effectiveness.* New York: McGraw-Hill Book Company, 1970.

This article attempts to identify some of the conceptual difficulties inherent in investigating situational effects, review research dealing with taxonomic efforts, and review the empirical evidence on situational effects. On a conceptual level, there is a polyglot of variables that can be subsumed under the rubric the "situation". These have been grouped under the following four headings:

(1) structural properties, (2) environmental characteristics, (3) organizational climate, and (4) formal role characteristics. The relationship of a situational variable to managerial performance may be conceptualized as an experimental main effect, a predictor (in a correlational sense), a moderator, or some combination of these. Research studies have tended to focus on only one of the three at any one time. There are also serious problems regarding the level of explanation associated with the relationship between a situational variable and managerial performance.

Most of the taxonomic research has centered around dimensions of organizational climate. Four factors appear common to them: (1) autonomy, (2) structure, (3) general reward level, and (4) warmth and support. Further research should build on these efforts and attempt to determine the nature of the factor structure in different settings and its interaction with individual differences. At the empirical level, it appears that research has not progressed very far. One of the most important findings to emerge is the importance of the initial job assigned to an individual. In sum, the "situation" has been shown to encompass an exceedingly complex set of variables, especially when their dynamic and interactive properties are considered. While not much research has been forthcoming, there is considerable promise for the future.

Champion, J. T. *Behavioral science technology and organizational effectiveness: An example and a normative prescription.* (Report No. AU-AFIT-SL-1-73) The Air Force Institute of Technology, School of Systems and Logistics, 1973. AD759-156.

The trend toward an increased application of behavioral science technology in business, industry and government is spurred by an expanding consciousness of the need for social and personal responsibility on a number of dimensions, among them the creation of opportunities for individuals to strive for human dignity in their working environments. Before adopting any specific technique or program, however, managers should carefully evaluate and compare their own objectives, values and assumptions about the nature of man with those of the specific program under consideration. The central hypothesis of this article is: The greater the degree of incongruence between the objectives, values and assumptions of the leaders in a given organization and those of the behavioral scientists and their technology, the greater is the probability that the program objectives will not be achieved and that adverse consequences will be incurred.

To illustrate the importance of careful program evaluation, a review of the literature and an evaluation of the effectiveness and problems of sensitivity training comprise the body of this discussion. The article concludes with the prescription that the failure to face squarely the value issues of behavioral technology may result in the degradation of an organization's ability to survive, thereby defeating the purpose for which the particular program was instituted in the first place.

Chin, R. The utility of system models and development models for practitioners. In Bennis, W. G., Benne, D. K. & Chin, R. (Eds.). *The planning of change*. (2nd Ed.). New York: Holt, Rinehart & Winston, Inc., 1969.

The purpose of this paper is to present concepts relevant to, and the benefits to be gained from using, a systems and a development model in thinking about human events. Both approaches are compared as to their assumptions about and approaches to five organizational variables: (1) content (stability, change); (2) causation (source of change, causal force); (3) goals (direction, set by); (4) intervention (confronting symptoms, goal of intervening); and (5) change agent (place, role).

The discussion of this paper centers on the utility of models for the analysis of change and of changing human processes. Because the practitioner needs to know how to change the system, rather than to predict what would happen if a new variable were introduced, he needs a "theory of changing" the system. A theory of changing requires the selection, or construction, of thought-models appropriate to their intended purpose. The systems and development models offer such frameworks. There are, however, some limitations to the utility of models. First, models are abstractions from the concreteness of events, and at times the fit between the model and the actual thought and diagnostic processes of the change-agent are not close. Second, there are modes of diagnosing by intervening which do not fall neatly into models. Considering the advantages and limitations of models, the author concludes that some elements from both the systems models and the developmental models should be united into a model for practitioners, using a format of the intersystem model which includes the change-agent and his relationships as part of the problem to be solved.

Cohen, S. L., et al. *Results of an organizational diagnostic survey of an Army field facility work environment.* Alexandria, VA: U. S. Army Research Institute for the Behavioral and Social Sciences, (Technical Paper 272). 1976. ADA020-934.

This study is based on the contention that the aim of organizational effectiveness research is to increase human performance effectiveness in an organization and to improve teamwork and job satisfaction, by developing diagnostic instruments to identify problem areas, intervening with organizational development techniques to correct problems, and finally evaluating the intervention results in terms of productivity and job satisfaction. A diagnostic Work Environment Questionnaire (WEQ) was developed and validated over a 3-year period at an Army field installation. It elicited from both supervisors and subordinates their attitudes and perceptions of their job duties, training, performance standards and consequences, organizational supervision, work group, job importance, and feedback. Data from a 1972 pretest and 1973 survey supplementing the 1974 WEQ survey are reported.

Seven major organizational problem areas were identified in both 1973 and 1974: peer group norms which failed to encourage good performance, insufficient performance feedback, the need for training in supervisory techniques, role ambiguity and conflict, inadequate intergroup communication patterns, lack of clear performance-reward relationships, and ambiguous performance evaluation standards. A program of active intervention has been designed and implemented to reduce these problems. A resurvey has indicated that the intervention did successfully decrease certain problems and increase job satisfaction and performance.

Cohen, S. L. & Turney, J. R. Intervening at the bottom: Organizational development with enlisted personnel in an Army work-setting. *Personnel Psychology*, 1978, 31, 715-730.

If organizational development technology is expected to have an effect on soldier perceptions, attitudes and performance, it must be assured that OD interventions adequately penetrate to their level. This may not be likely to occur in a multi-layered Army organization. This study examines the effects of a series of OD techniques in an Army organization where penetration was assured by dealing directly with the troops at the lowest levels.

The site for this study was an Army communications processing facility. The focus was on enlisted soldiers at the lowest levels of the organization who were most directly responsible for the final

production outputs. This site permitted a focus on work groups with clearly delineated task requirements, having the traditional hierarchical structure characterizing all Army units. The results of this study show that a series of OD techniques introduced into an Army orgnaization at the lowest structural level can yield significant positive changes in soldier job satisfaction and performance. The impact was the product of an effort incorporating three OD techniques: survey feedback, management training, and job enrichment. An analysis of variance done on the level of satisfaction and performance of a control group vs. several experimental groups showed significant changes between these groups from pre- to post-tests. The results of this study are not believed to be conclusive. Many research quesitons are surfaced which need to be addressed.

Comrey, A. L., Pfiffner, J. M., & High, W. S. *Factors influencing organizational effectiveness.* University of Southern California, 1964. AD042-272.

The problem addressed in this research project is that of determining some of the factors which are related to criteria of organizational effectiveness. The research was carried out in three main stages: (a) development of hypotheses and instruments for measuring variables related to OE; (b) administration of these instruments in a series of organizations; and (c) correlation of variables with the measures of OE. The research methodology is discussed in detail, along with the criterion problems. Critical incident analysis was found to have several advantages for this type of research.

The results of all studies which met specified criteria of statistical significance are discussed in detail. The variables concerned are presented as groups of questionnaire items for which validity evidence is given. The dimensions are divided into supervisor-self, situational, and supervisor evaluations. The interrelationships among dimensions are presented. During the course of the project, the dimensions were subjected to iterative item analysis procedures, and correlations computed for the surviving ones for three different samples. The implications of this research for management are discussed.

Connolly, T., Conlon, E. J. & Deutsch, S. J. *Organizational effectiveness: A multiple-constituency approach.* Academy of Management Review, 1980, 5, 211-217.

This article is based on the authors' contention that current approaches to organizational effectiveness are conceptually conflicting and empirically arid. Researchers appear handicapped by a desire to produce a single effectiveness statement about any given organization. The authors of this paper attempt to define a broad perspective of organizational effectiveness that encompasses rather than conflicts with existing perspectives. The proposed perspective does not attempt to prescribe research directions or methodology. Rather, it attempts to define areas of convergent theorizing and rich empirical domains.

This proposed approach is named a "multiple-constituency" approach. It explicitly assumes that an organization's different constituencies will form different assessments of its effectiveness. The approach treats organizations as systems generating different constituencies, each biased toward the assessment of organizational activities in terms of its own exchanges within the loop. In this way, it is an alternative to the arid debate between the "organizational goals" theorists and the "systems" theorists as to which theory possesses the key to the effectiveness question. In essence, the authors argue that neither theory does, and that the problem is primarily an artifact of a single, generally unstated assumption made by both: That a single statement about OE is to be sought. No such assumption is, in their view, necessary or desirable. Rather, goal and systems theories should be treated as special cases of the general, multiple-constituency approach. On the grounds of conceptual clarity and empirical promise, then, the multiple-constituency approach appears to provide a more fruitful formulation of the effectiveness problem.

Connor, P. E. & Becker, B. W. Values and the organization: Suggestions for research. *Academy of Management Journal*, 1975, 18, 550-561.

Despite long interest in human values, few investigators have focused on values and organizational process. Questions regarding how values relate to reward structure, upward mobility, goal commitment, and control remain largely unresolved. This article attempts not to answer these questions, but to pose them as a series of hypotheses to be tested. It is a call for further research in this area.

The problem facing the researcher in the area of values and the organization is two-fold. First, there is a need for researchers to settle upon a commonly accepted operational definition of a value.

Researchers must realize that values cannot fruitfully be operationalized as attitudes, or goals, or objectives; they are fundamental to, but not identical with, these processes. Second, there is a need to explore the relationships among various organizational processes and the values of the organizational actors.

The paradigm offered for such research is that of the general systems model of organization. It brings to the fore several classes of questions which yet remain unanswered: (1) the relationship between values and organizational context, e.g., hierarchy and technology; (2) the relationship between values and organizational processes, e.g., conflict, communication and cooperation; (3) the relationship between values and managerial action, e.g., leadership, control and goals; and (4) the relationship between values and organizational performance, e.g., output quality, organizational climate and adaptability. Research into these areas is very important for a more complete understanding of the underlying processes in organizational functioning.

Cowsert, G. T. *Organizational environment and preferences for leadership and power in the officer corps.* (Masters thesis) Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1974. ADA043-748.

This study analyzes the relationship between the endorsement of values judged to characterize the Army organizational environment and the preferences expressed for leadership and power options by officers in supervisory settings. The subjects were 99 active Army majors and lieutenant colonels in a resident Command General Staff College class at Fort Leavenworth. Operational definitions limit leadership to actions designed to gain the willing cooperation of one's subordinates, and power, conversely, to actions that can force the subordinates' compliance in spite of their opposition. The organizational environment is defined in terms of structure, authority, regulations, and leadership training and shown to be typical of closed organizational systems.

A questionnaire was developed that assessed one's preference for leaderhsip or power on one part, and one's endorsement of organizational values on another. The hypothesized negative relationship between preferences for leadership and endorsement of these organizational values was shown to exist. The main conclusions are that few officers realize the military environment may be inhibiting their use of leadership, that the environment does not reward leadership as defined herein, and therefore does not encourage its development outside the classroom, and that leadership doctrine is in conflict with the environment.

Crocket, W. J. Introducing change to a complex organization. In Hacon, R. (Ed.). *Personal and organizational effectiveness.* New York: McGraw-Hill, 1972.

This article describes two major change efforts in the Department of State during the author's five years' service as a manager in that agency. The article is autobiographical in style, and discusses these change efforts through the personal perspective of the author. The motivation for such change dates back to the early 1960s when the Department's reputation for operational effectiveness in policy and administration was at a low point with both the Congress and the Executive Branch.

The first attempts at change were in the form of directives issued from above. Several failures convinced the members of the Department that the authoritarian method of changing operational responsibilities and systems in the organization was not the most effective, due to its inability to ensure people's acceptance of change and enthusiastic and effective accomplishment of tasks. In response to this dilemna, a new approach to organizational change was developed, named "Action Program of Organizational Development" (ACORD). The implementation of this program is discussed in detail. The principal changes involved: an elimination of many hierarchical levels with the organization, an intensive management training program, numerous "team building" sessions, and the establishment of internal change agents or consulting teams. These changes were short-lived, however. Upon the author's retirement, a new administrator assumed control who, disapproving of the new structure, terminated the ACORD program. Lessons learned during the ACORD period are discussed with implications for other organizations.

Cunningham, J. B. Approaches to the evaluation of organizational effectiveness. *Academy of Management Review*, 1977, 2, 463-474.

Several alternative strategies are presented for assessing organizational effectiveness: (1) the Rational Goal Model, which focuses on the organization's ability to achieve its goals; (2) the Systems Resource Model, which defines effectiveness as the degree to which the subsystems are in harmony and are coordinated to work together; (3) the Managerial Process Model, which evaluates effectiveness by the ability to perform effectively certain managerial functions, such as decision-making and planning; (4) the Organizational Development Model, which sees effectiveness in terms of the organization's problem-solving and renewal capabilities; (5) the Bargaining Model, which conceives of organizational effectiveness in terms of exchanges and transactions of individuals and groups pursuing a diversity of goals; (6) the Structural Functional Model, which attempts to

understand organizational effectiveness through the structural patterns developed by the organization to maintain itself and grow; and (7) the Functional Model, in which effectiveness is determined by the social consequences of its activities.

The strengths and weaknesses of each model are discussed. It is concluded that the applicability and relevance of each approach depends on the particular organizational problem that has to be resolved. No one model can provide the decision-maker with information about every aspect of organizational behavior.

Cunningham, J. B. A systems-resource approach for evaluating organizational effectiveness. *Human Relations*, 1978, 31, 631-656.

The purpose of this study is to illustrate how open systems theory can be applied in the evaluation of organizational effectiveness. Specifically, concepts of open systems theory, drawn from the works of Katz and Kahn (1966) and Yuchtman and Seashore (1967), are used to develop a systems-resource model of organizational effectiveness.

The major thesis of this model is that all organizations, in order to survive, must be able to fulfill certain basic needs. These needs relate to: (1) the organization's ability to search out and respond to the properties of the external environment; (2) the organization's ability to use its resources to produce outputs and to maintain and restore the system; and (3) the organization's ability to bargain and optimize its use of resources in an environment with a number of decision-makers, each with different objectives.

Seven local government organizations are evaluated in terms of these effectiveness criteria. Data collection entailed (1) use of a panel of experts to predict problems and events occurring within each organization's external environment; (2) a computer simulation which predicted the possible environments; (3) an accounting of the resources available to each local government department; and (4) a gaming simulation experiment which measured the decision-maker's efficiency and bargaining capability. Results are given for subsystem efficiency and bargaining capability of each organization. Conclusions about the relative efficiency of these seven organizations and their subsystems are discussed.

Dabis, T. R. V. & Luthans, F. Leadership reexamined: A behavioral approach. *Academy of Management Review*, 1979, 4, 237-248.

Leadership is examined in this study from a behavioral perspective. Though a large assortment of different theoretical frameworks have been developed to identify component elements of leadership, the fundamental problem of operationalizing leadership still has not been solved. This paper outlines some of the reasons for this failure. It argues the need (as Argyris and Dubin have done) to focus leadership research on observable behavior rather than on questionnaire responses reflecting perceptions of behavior and vague inner states. The primary problem with leadership research heretofore is that it largely builds on normative preconceptions about leadership and provides no prediction and control of performance behavior.

A behavioral model of leadership is presented that examines both the macro and micro contingencies affecting leader-subordinate behavior. An expanded functional analysis that includes both overt and covert contingencies is presented. This approach stresses the need to reduce all major forms of influence impacting on the leader and subordinates to manageable behavioral contingencies. These contingencies can be identified through a proposed S-O-B-C (S - antecedent stimulus; O - organism's covert processes, B - behavior; C - consequence) functional analysis. Specific guidelines for a behavioral approach to the study and practice of leadership are provided.

Davis, S. M. Two models of organization: Unity of command versus balance of power. *Sloan Management Review*, 1974, 16, 29-40.

Business enterprises usually are organized either by function, product, or area; and the benefits of each are considered mutually exclusive. The traditional basis of each form is the pyramid, with one hierarchy of power and a unity of command. To derive simultaneously the benefits of two or all three structural bases, however, a dualistic or pluralistic model, involving a balance of interest and a sharing of power, is required. The grid structure represents such a model. This article describes how and why business management adheres to the pyramid model in principle, while in reality it behaves according to a balance of power model.

The principles of unity of command and balance of power imply very different things for the organization. The centralized staff functions chaaracteristic of the unity of command design serve to equate the manager's authority and responsibility. The grid structure illustrates explicitly that in most cases more responsibility than

authority is delegated. The other principal difference between the two designs is in the management of conflict. While a pyramidal-based organization acknowledges and attempts to resolve conflict among members, the source of the conflict is ascribed to human rather than structural foibles. The grid structure, being a greater conflict generator than the pyramidal form, puts a heavier burden on behavioral mechanisms for achieving coordination. It demonstrates that structure itself is a major contributor to organizational conflict. A manager's responsibility is to manage the inevitable conflict, not to try to resolve it. It is further emphasized that a better correlation between administrative theory and practice would reduce the gap between management's preference for the unity of command and the business environment's requirement for interdependence and shared power.

Derr, C. B. *Major causes of organizational conflict: Diagnosis for action.* Monterey Naval Postgraduate School, 1975. ADA013-472.

The emphasis of this article is on the major areas of dispute that occur within career-oriented organizations. Six causes of organizational conflict are delineated: individual stress, role conflict, power struggles, differentiation, interdependence, and external pressures. Implications for managing these conflicts using collaboration, bargaining, and power plays are pointed out. A conflict management paradigm indicating which mode of conflict management works best for which cause is presented. An extensive bibliography of conflict management literature is provided at the conclusion of the report.

Dieterly, D. L. & Schneider, B. The effect of organizational environment on perceived power and climate: A laboratory study. *Organizational Behavior and Human Performance,* 1974, 11, 316-337.

Subject perceptions of their own power and organizational climate were investigated as a function of three characteristics of the organizational work environment. The dimensions of power used as dependent variables in this study were: referent power, expert power, legitimate power, coercive power, and reward power. The four aspects of climate used as dependent variables included: individual autonomy, position structure, reward orientation, and consideration and support. The independent variable, work environment, was divided into three aspects: level of formal position, degree of participation in decision making, and philosophy of the organization toward customers. The 2 x 2 x 3 (level of participation, stockholder or customer orientation, and position level, respectively) design (N=20) was carried out in a laboratory setting.

The results indicate that climate and power perceptions were not strongly related to each other. Level of participation appeared to be the main contributor to self-perceived power both as a main effect and in interaction with stockholder/customer orientation and position level. Stockholder/customer orientation was the main contributor to climate perceptions, generally in interaction with one or the other environmental variables but also as a main effect. Participative decision-making results in decreased self-perceived power for occupants of higher positions. A customer orientation combined with participative decision-making leads to positive climate perceptions. The study, although highly controlled, yielded some results which are related to other research of this type.

DiMarco, N. & Norton, S. Life style, organization structure, congruity and job satisfaction. *Personnel Psychology*, 1974, 27, 581-591.

This study is concerned with predicting job satisfaction from the congruity between the employee's life style and his perception of the organizational structure. Three dimensions of life style were identified: formalistic (control through rules), sociocentric (interpersonal interaction), and personalistic (personal experience). Paralleling these were three dimensions of organizational structure: bureaucratic (authority according to position in hierarchy), collaborative (authority in norms of work group), and coordinative (self-direction). It is hypothesized that if tension results from life style-organization structure incongruity, such tension could affect the individual's satisfaction with the job itself. This study, therefore, tests the hypothesis that life style-organization structure congruity explains variance in job satisfaction.

The subjects for this study were 78 staff employees drawn from six large manufacturing organizations. Three measures were used: The Life Style Questionnaire, the Organization Structure Questionnaire, and the Job Reaction Survey. Multiple regression analyses were performed on the data. The findings indicate that job satisfaction decreases as the bureacraticness of the organization increases. Job satisfaction was also found to be positively related to Personalistic-Coordinative congruence. It appears, therefore, that organizations pursuing the goal of job satisfaction should focus on developing environments with a low bureaucratic orientation. In addition, an attempt should be made to either select or develop, through training, individuals high in personalistic orientation and to provide an environment high in coordinative characteristics.

Donaldson, L. Woodward, technology, organizational structure and performance: A critique of the universal generalization. *The Journal of Management Studies*, 1976, 13, 255-273.

This paper critically reviews the controversy over the relationship between technology, organizational structure and performance which was stimulated by the work of Woodward. A discussion is presented of the Woodward approach and the debate between it and the Aston approach. The most recent replication of the Woodward study, by Zwerman, is offered as a refutation of many of Woodward's conclusions.

This review of the current literature shows that out of the results which Woodward originally found, none of the trivariate relationships between structure, technology and performance have been confirmed by the sole attempt at replication to date, that of Zwerman. Of the bivariate relationships which Woodward found, none have been confirmed by three major studies (Zwerman; Hickson, et. al.; and Child and Mansfield). The conclusion is that the universal generalizations about technology, structure and performance proported by Woodward have not been substantiated by empirical evidence. Though the validity of the Zwerman replication study is open to debate, the authors interpret it as evidence for disconfirming the core aspects of Woodward's thesis.

Dossett, D. L., Latham, G. P. & Mitchell, T. R. Effects of assigned versus participatively set goals, knowledge of results, and individual differences on employee behavior when goal difficulty is held constant. *Journal of Applied Psychology*, 1979, 64, 291-298.

Female clerical personnel (N=60) were randomly assigned to participative, assigned, and "do best" goal conditions on a clerical test. Specific goals led to higher performance than did the "do best" goals. With goal difficulty held constant, there was no significant difference between the assigned and participative conditions on performance or goal acceptance. Goal attainment, however, was higher in the assigned condition than it was in the participative condition. No main or interaction effects were found for knowledge of results (KR) or for individual difference measures with performace or goal acceptance. However, high self-esteem individuals who received KR attained their goals more often than did individuals with low self-esteem when the goals were participatively set.

A second study was conducted with employees from the same sample in a performance-appraisal setting over an eight-month time period. Assigned goals resulted in higher performance and greater goal acceptance than did participatively set goals. There was a positive linear relationship between goal difficulty and performance in the participative condition only.

Downey, H. K., Kellriegal, D., & Slocum, J. W., Jr. Congruence between individual needs, organizational climate, job satisfaction, and performance. *Academy of Management Journal*, 1975, 18, 149-155.

The purpose of this paper is to test the proposition that organizational climate interacts with individual personality in influencing job satisfaction and performance. Ninety-two managers from one industrial firm were used as subjects for this study. Climate and performance measures were taken by the Job Performance Index, Job Description Index, Bernreuter Personality Inventory, and six factor-analyzed scales of organizational climate. A multivariate design was used to test the hypothesis, which included eight independent factors (six climate and two personality) and six dependent variables (five job satisfaction and one performance). The NYBMUL Analysis of Variance program was used to calculate the F-ratios to test the congruency argument concerning each dependent variable.

The results of this study suggest that congruency is a salient concept; job satisfaction is a function of the interaction between the personality characteristics of the individual and the perceived environment (organizational climate). The congruency notion holds true to a lesser degree for a manager's job performance. Suggestions for future research are offered.

Drexler, J. A., Jr. Organizational climate: Its homogeneity within organizations. *Journal of Applied Psychology*, 1977, 62, 38-42.

Climate as an organizational attribute was examined to determine whether it has organization-specific variance. Additionally, the relative strength of organizational versus subunit (departmental) effects were tested. The measure of climate, descriptive of organizational conditions and procedures, was a composite of the climate indices in the Survey of Organizations. The data were obtained from 1,256 groups representing 6,996 individuals in 21 organizations. F-tests were conducted on the climate data from each organization.

A main effect of organization was found, which explained 42.2% of the variation. Tests using more homogeneous subsamples resulted in similar findings and ruled out a selection-effect interpretation. Subunit effects were also found, but were much weaker than the organizational effects. The conclusions drawn from these results are meant to encourage researchers to consider organizational climate as an organizational attribute.

Duncan, R. B. Multiple decision-making structures in adapting to environmental uncertainty: The impact on organizational effectiveness. *Personnel Psychology*, 1973, 26, 273-291.

A great deal of discussion in organizational theory has emphasized that organizations need to adapt to their environment in order to remain viable social systems. One of the central issues in this adaptation process is coping with the uncertainty in the organization's environment. The research presented here provides an initial test of some components of the model by identifying the processes by which organizations adapt to their environment and the relationship between these adaption processes and organizational effectiveness.

Twenty-two decision units were studied in three manufacturing organizations and three research and development organizations. Uncertainty was measured by a 12-item Likert-type scale, and perceived influence over the environment by a 4-item Likert-type scale. The data was evaluated in terms of profile analyses and analyses of variance. The results indicated that there was a high correlation of the differences between a decision unit's routine and non-routine decision profiles and the decision unit's effectiveness. As perceived uncertainty increased and perceived influence over the environment decreased, there were high correlations between the two profile difference measures and the dimensions of decision effectiveness. This research confirms the contingency theory of organization, indicating that different types of organizational structures (i.e., in decision-making) are appropriate for different types of situations. This research further demonstrates that the same decision unit implements different organizational structures -- these different structures being related, particularly under conditions of high uncertainty, to the decision unit's effectiveness.

Duncan, R. What is the right organizational structure? Decision tree analysis provides the answer. *Organizational Dynamics*, 1979, Winter, 59-80.

This article discusses the purposes of organizational structure and presents a decision tree analysis approach to help managers pick the right organizational structure for their situation. Organizational structure has two objectives: (1) it facilitates the flow of information within the organization in order to reduce the uncertainty in decision-making; and (2) it facilitates effective coordination and integration across different organizational levels. There are many possible, viable, organizational designs, depending on the environment and objectives characterizing the organization. Decision tree analysis is described as one method for choosing the appropriate structure.

The advantages to managers in using the design decision tree are as follows: (1) It provides a broad framework for identifying the key factors a manager should think about in considering an organizational design. (2) It forces the manager to diagnose the decision environment. (3) It causes managers to consider the degree of interdependence among segments of the organization. (4) It points out what can be done to meet the need for information through the use of lateral relations. The successful implementation of this method for managers is cited.

Dunn, W. N. & Swierczek, F. W. Planning organizational change: Toward a grounded theory. *The Journal of Applied Behavioral Science*, 1977, 13, 135-156.

Distinctions between "logico-deductive" and "grounded" theory capture a range of critical problems facing practitioners of planned organizational change. The development and application of grounded theories is likely to improve the quality of findings obtained from given change efforts. Among available research strategies, retrospective case analysis -- together with procedures for the continuous coding and comparison of case materials -- appears to have considerable potential as a method for generating grounded theories of planned change.

In this paper, retrospective case analysis is applied to a sample of 67 successful and unsuccessful change efforts. Results of bivariate analysis suggest that only 3 out of 11 leading hypotheses about conditions of successful change efforts (i.e., those involving collaborative modes of interventions, participative change-agent orientations, and strategies emphasizing high levels of participation) are weakly to moderately supported by available evidence. While findings must be approached cautiously, the further development and application of retrospective case analysis is likely to contribute to grounded theory and, thus, to the alleviation of present gaps between theory and practice.

England, G. W., Agarsal, N. C., Rydel, N. L., and Olsen, K. A. *Personal value systems and their relationship to adminstrative behavior simulations and perceptions of organ[illegible]onal effectiveness of Naval officers.* (Report No. [illegible]). University of Minnesota, 1972. AD735-948.

This study is a part of a research program aimed at describing and measuring the personal value systems of Naval officers and their relevance to behavior. Responses of 258 Naval officers to a Personal Values Questionnaire, a Job Incidents Questionnaire and an Organizational Effectiveness Questionnaire were utilized. The principal methodology finding of this study is that meaningful relationships between personal values and reported behavior are found only when value groups are formed through a combination of conceptual distinctions made from theory (primary orientation and operative value notions) and empirical distinctions (hierarchical cluster analysis methods).

Other findings of the study show that there are at least two groups of Naval officers who differ markedly in their personal value systems. One of these groups places high value on "military concepts" and the other group on "individualistic concepts". The same two groups of Naval officers seem to differ significantly in their reported behavior as measured by responses to the Job Incidents Questionnaire and unit effectiveness measures. No significant differences were found, however, among various value groups of Naval officers in the evaluation of the overall effectiveness of their own individual units.

England, G. W., Olsen, K. A., Agarwla, N. C. & Rydel, N. L. *Administrative behavior simulations and perceptions of organizational effectiveness of Naval officers.* University of Minnesota, 1971. AD729-114.

This study is part of a research program aimed at the description, measurement, and understanding of the personal value systems of Naval officers and their relevance to behavior. The reported behavior of 276 Naval officers in several areas, including problem-solving and perceptions of organizational effectiveness and its achievement by a work unit, is described. To the extent that actual behavior might be inferred from reported behavior, this group of Naval officers would be expected to make few unwarranted assumptions in making decisions, to take action rather than to procrastinate, to withhold delegation of complete responsibility, and to be lenient with respect to disciplinary action. In addition, an open style of communication was noted, with officers requesting information and explaining the reasons for actions to subordinates. Perceptions of overall work effectiveness of the officers' present units were not

related to problem-solving styles. Officers also tended to view the importance of various characteristics to work effectiveness of a unit similarly, even though they were members of very different types of units and their perceptions of the overall effectiveness of these units varied. Finally, homogeneous groups of Naval officers were identified and described on the basis of: (1) ratings of the importance of 15 variables to the work effectiveness of a unit; and (2) in-basket scores.

Evan, W. M. Hierarchy, alienation, commitment, and organizational effectiveness. *Human Relations*, 1977, 30, 77-94.

Four dimensions of organizational hierarchy are identified: inequality of skills and knowledge, inequality of rewards, inequality of authority, and inequality of information distribution. The prevailing, but largely untested, hypothesis that hierarchical structure is postively related to organizational effectiveness is challenged. An alternative hypothesis -- that they are negatively related -- is offered in its place. This latter hypothesis is linked to a causal model interrelating hierarchical structure with work alienation, organizational commitment, and organizational effectiveness. This hypothesis is then used to assess the literature on industrial democracy.

"Shop-floor democracy" is studied as an example of destratification with respect to all four dimensions of hierarchy. It is one viable method for increasing participation, and thereby reducing worker alienation. In view of the trend towards rationalization in organizations, a destratification-rationalization hypothesis is formulated. It states that as the positive slope of the relationship between these two clusters of variables increases, organizational effectiveness increases and work alienation decreases. Although the model and empirical studies presented here deal exclusively with industrial organizations, there is no intrinsic reason why this model is not generalizable to all non-industrial organizations as well. In fact, it could be highly applicable to the military organization, due to the hierarchical nature of its structure.

Etzioni, A. *A comparative analysis of complex organizations.* NY: The Free Press, 1975.

This book contributes to the formulation of models for the comparative study of organizational types. The basis for comparison chosen for this study is the nature of compliance in the organization. Compliance is defined as a relationship consisting of the power employed by superiors to control subordinates and the orientation of the subordinates to this power. The notion of compliance combines the structural and motivational aspects of organizations: structural because it speaks of the kinds and distribution of power; motivational because it is concerned with the differential commitment of actors to organizations.

Compliance is shown to be related to many other organizational variables. Organizations which differ in their compliance structure tend to differ also in the goals they pursue, the location and power of their elites; the communications and socialization employed to attain consensus; in recruitment, scope and pervasiveness, and in the way in which they allocate tasks and power over time. Compliance is therefore taken as the core variable of organizational analysis; all other variables are related to it.

Part One of this book introduces the concepts and classification scheme. The interrelationships of power, involvement and compliance are defined and are used as a basis for comparison/classification of various kinds of organizations. Part Two relates this comparative base to a number of variables considered central to organizational analysis: organizational goals, the distribution of power, consensus, the influence of the social environment, and cohesion. The emphasis in Part Three switches from the compliance of lower participants to that of the higher participants. The many dimensions of charisma and charismatic power in the compliance structure are discussed. The final section is devoted to the development of compliance structures over time and the suggested lines for the development of a study of compliance. The authors caution that no attempt is made in this book to test propositions. Rather than being a validation study, this work represents an exploratory attempt to construct one segment of a new theory. Propositions invalidated by available data are not included; however, no new data are presented to support the propositions presented.

Farace, R. V. & McDonald, D. New directions in the study of organizational communication. *Personnel Psychology*, 1974, 27, 1-15.

Although the study of human communication process in organizations has progressed considerably in the past two decades -- with important developments in predictively fruitful concepts and useful methods -- much of the work remains isolated and unintegrated. The purpose of this paper is to describe important concepts for analyzing communication processes in organizations, and to point out some of the methodological developments related to these concepts. The essential concepts related to organizational communication are studied in three dimensions: structure, function and system level.

The structure of organizational communication is defined in terms of the message exchange patterns among organizational members, rather than on alternative bases for defining structure, such as authority or power. Research in this area has developed along three traditions: (1) the study of artificially constructed networks operated in experimental laboratory settings, (2) the application of sociometry to communication relationships, and (3) the study of the movement of messages in organizations.

The function dimension of communication focuses on the actual messages which move in an organization. Most of the research in this area to date is reflective of a message-centered approach. There are several problems with this approach, however, and the authors recommend an alternative suggested by Katz and Kahn (1966). This approach involves investigation of the effects of communication in terms of particular members of the organization.

Most of the research on organizational communication is at the level of the individual. Typically, individual differences in communicative and other behaviors have been examined apart from consideration of the larger setting, which provides constraints and context within which individual behaviors can often be best interpreted. The authors propose that this tradition should be broken, and that research should now focus on the dyad -- the simplest interpersonal system. Such research would encompass an additional set of concepts not found when studying individuals in isolation.

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

This article describes a study designed to determine the ways in which performance affects leader behavior. Two hundred management students role played the "Change of Work Procedure" case -- a technique which has been used extensively for research purposes in the past. Factor analysis was used on the leadership data supporting Bowers and Seashore's (1966) four-factor theory. Experimental and control group performance was compared using t-tests.

The findings of this study show that past performance affects most aspects of leader behavior, especially his support, interaction facilitation, and goal emphasis. Also, high past performance and the resulting leader behavior are associated with greater subordinate influence in decision-making, greater group cohesiveness, and higher satisfaction. No clear relationships were found between past performance, associated leader behavior and estimates of subsequent change in group performance. The results of this study are believed to be generalizable to "real world" leadership situations. This contention is supported by a longitudinal study conducted by Farris (1969).

Fiedler, F. E. & Leister, A. F. Leader intelligence and task performance: A test of a multiple screen model. *Organizational Behavior and Human Performance*, 1977, 20, 1-14.

This paper proposes a model to explain the generally low and inconsistent correlations between leader intelligence and task performance. It postulates a series of screens of variable permeability which the leader's intellectual output must traverse before task performance can be affected. A screen is defined as a variable which can partly or completely block the leader's intelligence from contributing to the performance of the task. The model posits that a high correlation between leader intelligence and task performance depends on the permeability of the various screens. Four screen varaibles studied in this research are: leader motivation, leader experience, leader-boss relations, and leader-group relations.

This model was tested in a field study of an entire Army division. The sample included 158 Army infantry squad leaders, who were measured on each of the four screen variables and intelligence. Correlational analyses were conducted on the data collected from the measurement tests. The results support the hypothesis; all but one correlation was significant. The exception was the leader-group relations index based on group members' perception. The status of this measure as a screen variable is thus in doubt. This study is only partial validation of the model; it is highly likely that there are other screen variables which were not identified or tested in this research.

Fisher, C. D. Transmission of positive and negative feedback to subordinates: A laboratory investigation. *Journal of Applied Psychology*, 1979, 64, 533-540.

This study was designed to verify empirically that superiors are often unwilling to give feedback, positive or negative, to their subordinates. Confirming evidence is cited from a review of the relevant literature, and numerous exemplar cases in which feedback was withheld, delayed or distorted. The partial reason for this is that superiors anticipate that giving negative feedback will be unpleasant because receiving it is unpleasant for the recipient.

A laboratory study was undertaken to discover if and when delay and upward distortion of feedback occurred. It was expected that feedback to moderately low performers would be delayed longer and distorted upward more than would feedback to moderately high performers. Further, superiors of moderately low performers were expected to anticipate a less pleasant reaction to feedback by their subordinates and to believe that their subordinates liked them less than superiors of moderately high performers. A 2 x 2 design was used with the factors of feedback versus no feedback and moderately high versus moderately low subordinate performance. One hundred and sixty-eight students served as superiors of a subordinate who was a confederate. Subjects monitored and rated their subordinate's performance, giving feedback at a time of their own choosing. All hypotheses were supported with the exception of the delay hypothesis. The results are discussed in terms of their implication for performance appraisal in organizations.

Ford, J. D. & Slocum, J. W., Jr. Size, technology, environment, and the structure of organizations. *Academy of Management Review*, 1977, 2, 561-575.

A review of the literature on the relationships of size, technology, and environment to organization structure points out areas of agreement and disagreement as well as research needs. A review of structure identifies its major elements as complexity, formalization, centralization and administrative intensity. The relationship of these elements to technology is discussed in terms of the literature. Two principal issues emerge: First, there is no unanimity that technology affects organizational structure, and second, there is little consistency in the measurement of technology.

A review of the relationship between size and structure points out three major issues: First, size may not be the only factor that influences administrative intensity; second, there is no consensus

as to how size should be measured; and third, the relationship between size and structure is not clear -- while some argue for its causal nature, others have found no such relationship or argue for its being a consequence. Finally, the literature dealing with the relationship between environment and structure is reviewed. Four issues emerge here: First, very few studies thoroughly discuss or make explicit the term "environment"; second, most researchers, in treating the environment as a cause of organization uncertainty, preclude the possibility of viewing particular environmental characteristics as dependent variables and thus subject to manipulation by the organization; third, the impact of environmental uncertainty on internal operations of the organization is likely to be confined to managers at the institutional level or in boundary spanning positions; and fourth, a problem remains as to how environments become known to managers. Future research needs and directions are offered in the following areas: measurement, unit/level of analysis and the nature of variable's independence and dominance.

Forehand, G. A. & Gilmer, B. H. Environmental variation in studies of organizational behavior. *Psychological Bulletin*, 1964. 62, 361-382.

This article explores the possibility of incorporating environmental variation into research designs. There have been a number of attempts to operationalize the concept of organizational climate in studies of organizational behavior. These provide a variety of methods for assessing environmental variation and yield data relevant to hypotheses regarding the interaction of persons and environments. Methods for observing climate variation include field studies, assessments of participant's perceptions, observations of objective indices and experimental control of organizational variables. Conditions seem to affect behavior by determining stimuli, restraining freedom of response, and rewarding and punishing behavior. Illustrative of the organizational properties meriting further study are size, structure, systems complexity, leadership pattern, and goal directions. A selected, but extensive, bibliography indicates how studies of organizations make possible the variation of both person and climate variables.

Franklin, J. L. *Characteristics of successful and unsuccessful organizations.* University of Michigan, Institute for Social Research, 1974. AD087-097.

Several characteristics of organizations, their environments, and development efforts are evaluated to determine their association with successful and unsuccessful change in 25 organizations. Four groups of characteristics differentiating between successful and unsuccessful change efforts indicate: (1) commitment to and use of survey feedback and interpersonal process consultation interventions are associated most closely with success in OD efforts while an emphasis on sensitivity training is most closely associated with unsuccessful organizations; (2) organizations that are more stable and staid are less likely to be successful in their OD efforts than are those which are expanding and open to change; (3) internal resource persons who are less carefully selected, receive change-agent training previous to the OD effort, and do not possess assessment-prescriptive skills are found in the unsuccessful organizations; and (4) more specific interests and greater commitment to the OD efforts are associated with successful change.

Franklin, J. L. & Wessner, E. S. *The Army as a functioning organization: A diagnosis.* University of Michigan, Institute for Social Research, 1975.

The Survey of Organizations questionnaire was used in this study to diagnose the current state of functioning of the Army organization. The purpose of this survey-based diagnosis is to attempt, by sifting and analyzing tabulated data, to arrive at an understanding of the manner in which the various functional parts of the organization fit together, work, and contribute to its strengths and problems. Three conditions in the organization serve as foci for this diagnosis: climate, supervisory leadership and peer leadership. It is shown that if these conditions are positive, the groups function well, and members are satisfied with various aspects of their work lives and are productive. Negative conditions results in groups which function poorly.

The study used an Army sample of about 2500 respondents, selected in such a fashion as to include organizational units at least three hierarchical levels tall. The factors of climate, supervisory leadership, peer leadership, group process and satisfaction were measured and compared across the following variables: geographical location, pay grades, functional units, and Army vs. navy. Analyses of Army organizational functioning in each of these areas are offered.

Freeland, J. R. & Stabell, C. B. Allocation of managerial effort: An investigation of the relationship between decision strategies, environment, and performance. *Behavioral Science*, 1978, 23, 234-255.

The work presented in this paper concerns the decision-making process in complex organizational systems. The structure and relationship between decision environment, manager, and decision strategies are modeled in stochastic terms, and the resulting performance is studied using Monte Carlo simulation. The basic analytical framework, initially developed by Radner and Rothschild, focuses on a manager responsible for n activities. At the beginning of each time period, the manager must decide how to allocate his time among competing activities. If at time t the manager devotes all effort to activity i, its performance will improve or remain unchanged according to a stochastic rule. Likewise, if no time is allocated to an activity, its performance deteriorates or remains unchanged. Different decision strategies are investigated including putting out fires, adaptive random selection, and constant proportions. The goal is to gain insights which are useful in both describing and prescribing managerial behavior in organizations. Limitations of the model and future work are discussed.

French, W. L. & Bell, C. H., Jr. *Organization development: Behavioral science interventions for organization improvement.* Englewood Cliffs, NJ: Prentice-Hall, Inc., 1973.

This book is an attempt to summarize the state-of-the-art in organization development theory and practice. The review is guided by the belief that it is possible for the people within an organization collaboratively to manage the culture of that organization in such a way that the goals and purposes of the organization are attained at the same time that human values of individuals within the organization are furthered. In this framework, organization development is the emerging applied behavioral science discipline that seeks to improve organizations through planned, systematic, long-range efforts focused on the organization's culture and its human and social processes. The goal of organization development is to make the organization more effective, more viable, and better able to achieve both the goals of the organization as an entity and the goals of the individuals within the organization.

Part I introduces the field of organization development by citing five illustrative examples of OD efforts in various types of organizations which map out the history of OD theory and practice. Part II focuses on specific issues confronting the discipline. The underlying assumptions and values about people and organizations are

discussed along with the relevant systems concepts providing the framework for organizational theory. A variety of interventions are evaluated (team, intergroup, total organization, and interpersonal) in terms of the types of techniques most successful in a particular case. State-of-the-art techniques, such as survey feedback, grid OD, RAT, etc., are discussed in detail. Recommendations for the future direction of organization development are offered.

Friedlander, F. & Brown, L. D. Research on organization development: A synthesis and some implications. In Burke, W. W. (Ed.). *Current issues and strategies in organization development.* New York: Human Sciences Press, 1977.

The main body of this article is a review of studies in OD, and is divided into two major categories. The first deals with techno-structural approaches to OD. Theories and interventions included in this category deal with the technology (e.g., task methods and processes) and structure (e.g., relationships, roles, arrangements) of an organization. OD strategies under this heading include sociotechnical systems perspectives, job design and enlargement, and job enrichment. Work done at the Tavistock Institute exemplifies such an approach. The second category is the human process approach to OD. Human process intervention focuses on the human participants and the organization processes (e.g., communication, problem-solving, decision-making) through which they accomplish their own and the organization's goals. Techniques characterizing this approach are: survey feedback, group development intervention, and intergroup relations development.

Based on this review, a definition of OD as a planned change effort where the intervention is at the individual and process levels or the technological and structural levels emerges. Excluded from this concept of OD are change efforts which deal with only one organizational component (i.e., individuals, technology, structure) to the exclusion of others. It is concluded that in general, human-processual approaches have a number of positive effects on the attitudes of those involved. However, there is little evidence that organizational processes actually change, or that effectiveness is increased by such techniques. Of the techno-structural approaches, sociotechnical systems has the clearest effect on performance, while all three methods tend to increase work satisfaction. It is believed that increased integration of the two approaches will increase the capacity of OD to influence organizational effectiveness toward both human fulfillment and task accomplishment. However, OD still lacks a framework to encompass the various technologies, relationships and values characterizing organizations.

Friedman, Y. & Segev, E. The decision to decide. *The Journal of Management Studies*, 1977, 14, 159-168.

This paper suggests a strategy for the optimal allocation of top management time in the decision-making process. It is based on the view that decision-making is not only an essential activity of managers, but is synonymous with managing. A quantitative model is described which indicates the possiblity of budgeting top management's time. A decision rule for selection among decision problems is presented along with the time expected to be devoted to the decision process. Different management styles are expressed by the set of decision problems management decides to face. The importance of the expected decision-making process time as a criterion for choosing among decision problems is emphasized in this model. Top management must be aware that the size of the potential outcome may mask or exaggerate the relative contribution to the organization of facing a specific decision problem (i. e., relative to the amount of time spent on making the decision). Moreover, each decision-making process cannot be optimized independently; top management has to allocate time to each one while knowing that other potential decision problems compete for the same time.

The application of this decision rule to real life situations is discussed. The most important requirement of the model is data. The input values can either be estimated by the managers on the basis of past data and forecasts, or (less ideally) by subjective evaluation of top management based on past experience, "feel", and expectations. The important element is that decision-making be rationalized and systematized wherever possible.

Frohman, M. A. *An empirical study of a model and strategies for planned organizational change*. University of Michigan: Institute for Social Research, 1970. AD713-231.

A model is developed in this study outlining the three stages through which a planned social change will move: unfreezing a system, moving a system, and refreezing a system to insure a stabilized change. There are two interrelated thrusts in this study. One deals with the nature of "unfreezing", and the second with "freezing". Since both areas are relatively unresearched, this study examines the two areas individually as well as their interrelationships. A review of the literature on the first and final stages of organization development is presented. A model paralleling the Lewinian model is developed which poses several hypotheses about the relationship between tension, search, integration and change. The hypotheses are tested in a study of the sales organization of a firm producing and marketing consumer goods. The organization was divided into four parts: each participated in a survey and feedback, but was assigned a different intensity of consultation. Fourteen job-related dependent variables developed from research and theory were used. The results from the study are discussed in detail, along with implications for OD practice and research.

Frohman, M. A., Sashkin, M. & Kavanagh, M. J. Action-research as applied to organization development. In Spray, S. L. (Ed.). *Organizational effectiveness*. Kent, OH: Kent State University Press, 1976.

A model of organization development, called action-research OD, is developed to correct the deficiencies characterizing current models of OD: nonsystematic approach, overemphasis on content, and lack of adaptive flexibility. This report is aimed not at a comparative analysis of the processes and outcomes of different OD approaches, but merely as an explanation of the action-research approach.

Action-research OD is a comparatively long process which requires a great deal of flexibility and willingness on the part of the participants. It can be divided into eight phases: scouting, entry, data collection, data feedback, diagnosis, action planning, action implementation, and evaluation. Each of these phases is discussed in detail. There are five processes or methods of operation basic to and continuous throughout the application of the action-research model. They are: client-consultant collaboration, client learning for internal resource development, monitoring and evaluation, interaction and link between research and action, and flexibility. Four case studies are presented which illustrate the processes of action-research OD.

Frost, P. J., Crandall, N. F., Mahoney, T. A. & Weitzel, W. F. *Organization size as an influence on organization behavior.* (Technical Report No. 7003). University of Minnesota: Industrial Relations Center, 1971. AD747-951.

The research reported here investigates the impact of company size and size of unit (department, division) within a company on each of 18 empirically developed dimensions of organizational behavior. The study included 283 units from 13 general business firms and 103 R&D units within an additional four companies. Three organizational dimensions were found to be related to size: Staffing (personnel flexibility among assignments, development for promotion within the organization); Delegation (work responsibilities delegated by supervisors); Results Emphasis (results, output and performance emphasized rather than procedures). The relationship between size and the effectiveness of a unit was examined. Size was found to have no direct relationship with effectiveness. It appears to act indirectly on effectiveness through its influence on organizational characteristics, such as delegation. Implications for managerial practice are discussed.

Gavin, J. F. Organizational climate as a function of personal and organizational variables. *Journal of Applied Psychology*, 1975, 60, 135-139.

This study examines the personal and organizational correlates of climate perceptions and assess how personal and organizational variables might interact in the determination of climate perceptions. Questionnaires were completed by 140 managerial-level employees in a medium-sized bank which measured (1) organizational climate factors: clarity and efficiency of structure, hindrance, rewards, esprit, managerial trust and consideration, and challenge and risk; and (2) four organizational variables: personnel composition, organization, task content, and physical environment. A clustering technique was employed to group participants based on their biographical data.

Based on the three biographical clusters and the three organizational clusters, a 3 x 3 multivariate analysis of variance with the six climate dimensions as dependent variables was conducted. The findings failed to support the expected interaction of personal and organizational measures, but did indicate that personal and organizational variables alone accounted for significant amounts of variance in climate perceptions.

Georgiou, P. The goal paradigm and notes towards a counter paradigm. *Administrative Science Quarterly*, 1973, 18, 291-309.

This paper suggests that the commitment to a goal paradigm which has characterized organization theory to date has retarded analysis by requiring the disassociation of conceptual scheme from incompatible research findings on organizations. Barnard's incentive system analysis is seen as providing the foundations of a counter paradigm, and suggestion are made for its development. Organizations are not viewed as analytically distinctive social units given meaning by their goals, but as arbitrary foci of interest -- marketplaces whose structures and processes are the outcomes of the complex accommodations made by actors in exchanging a variety of incentives and pursuing a diversity of goals.

Georgopoulos, B. S. & Tannenbaum, A. S. A study of organizational effectiveness. *American Sociological Review,* 1957, 22, 534-540.

The objective of this study is to examine and define the concept of organizational effectiveness and to investigate some of its operational aspects by developing and testing criteria in an industrial setting. The study was conducted on a retail merchandise delivery service. Data were collected through questionnaires on supervisory and non-supervisoy employees' judgments of various aspects of the organization's performance. Through rank-order correlations and F-tests, the criteria of flexibility, inter-group strain and productivity were compared with effectiveness. These criteria of effectiveness stem from a commonly accepted view of organizational requirements and are generally applicable across organizations. In this research study, organizational effectiveness was conceptualized as the extent to which an organization, as a social system, fulfills its objectives without incapacitating its means and resources and without placing unbearable strain upon its members. Research on OE requires, then, that an emphasis be placed on the means-ends dimension of organizations, and that these three criteria be taken into consideration. The conceptual and operational aspects of organizational effectiveness here are intended to fill the gap which has heretofore existed between the theoretical and empirical approaches to OE research.

Gerwin, D. & Tuggle, F. D. Modeling organizational decisions using the human problem solving paradign. *Academy of Management Review,* 1978, 3, 762-773.

The status of human problem solving theories of organizations is evaluated along philosophical, methodological and theoretical dimensions. The Human Problem Solving (HPS) Paradigm is built along three vertices: Vertex One represents theories of individual human problem solving; Vertex Two, the organizational applications of the paradigm; and Vertex Three, the application of problem solving concepts for design in organizations. It appears that at all three vertices, present research concentrates on problems of the routine or well-structure variety. HPS models of innovative decision-making are exceedingly rare.

The group of philosophical problems with the HPS model includes concerns that (1) they are only partial explanations of the phenomena of human behavior; (2) human behavior may not be as rule-like as the HPS model depicts it; (3) HPS models are at best misleading, for they divert attention from the value-laden part of the decision problems; and (4) HPS models ignore many important organizational

phenomena which they are unable to explain (i.e., intraorganizational conflict). Methodological problems question the ability of HPS modelers to gather enough of the right type of data to produce adequate models and to put them to a sufficiently rigorous test. It is beleived that the process of making unstructured, innovative organizational decisions is too complex to be accurately tracked. Theoretical problems with HPS models concern aggregation, generalizability, the perceptual process, and normativism. Due to the inductive nature of HPS models and the complexity of the process they reveal, there is no agreed-upon calculus for aggregating low-level HPS models into higher-level ones. Possible trends in future research and the positive implications of HPS for analyzing organizational decision-making are discussed.

Giblin, E. J. Organization development: Public sector theory and practice. *Public Personnel Management*, 1976, 5, 108-118.

This article poses a philosophy of organization development relevant to public organizations. The purpose of OD is to enlarge the capacity of the organization to perform its work more effectively. Three propositions are offered which describe OD efforts in the public sector and which have implications for the actions of OD consultants operating in similar types of organizations. (1) The low degree of organizational effectiveness in public organizations necessitates that the initial goals set for an OD effort be both modest and operationally oriented. (2) Where a fundamental change in organizational climate is not feasible in the short run, the OD effort may initially use existing bureaucratic structure, rules and accepted customs for achieving the desired (short-term) changes. (3) Given the complex and generally unfavorable environments for change in public organizations, an OD effort should concentrate on the local operating level, and take steps to assure that its influence penetrates the higher levels of the organization.

Several of the propositions offered represent deviations from generally accepted theory and practice. They are presented not to devalue current research, but to suggest alternatives that may be more applicable in severely ineffectual public organizations. Research is needed to operationalize and empirically test these propositions.

Gillespie, D. F. & Mileti, D. S. Technology and the study of organizations: An overview and appraisal. *Academy of Management Review*, 1977, 2, 7-16.

This article reviews major approaches to the concept of technology, appraises its conceptual and methodological problems, and proposes a heuristic scheme for guiding the analysis of technology. A review of the literature indicates that a major conceptual problem associated with the technology factor is its status as an independent variable. Restricting attention to this perspective reinforces the reification of the concept. While it is reasonable to treat technology as as an independent variable under some conditions, there are situations in which it could be viewed as a dependent variable. In the latter case, technology is a function of changes in the number or nature of the demands made upon the organization by some aspect of its environment.

Another problem in technology literature stems from the traditional conception of organizations as having holistic, all-encompassing technologies. The possibility that different levels or subsystems within an organization can have different degrees of technological complexity, and even different technologies, has been grossly neglected by social psychologists and structuralists alike. Some of these dilemmas can be reduced by the heuristic scheme suggested here. This framework encompasses variable theoretical statuses, different levels of analysis, application to both product and service type organizations, and a means of clearly identifying technological efforts. No details are given of the model.

Gillett, R. Collective indecision. *Behavioral Science*, 1977, 22, 383-390.

A desirable property of a collective choice procedure in human groups is that its outcome should be clear-cut. The plurality and Condorcet procedures are investigated under a variety of conditions to determine their susceptibility to indecisiveness. Both plurality indecision and Condorcet indecision can attain a large likelihood of occurrence when group size is small. However, both likelihoods, but especially the latter's, prove highly volatile in the presence of minor variations in group size when group size is small. In general, the relative decisiveness of the two procedures fluctuates as a function of the pattern of the group's preference probabilities. An exception is groups of four and six members where plurality indecision is always less likely than Condorcet indecision. When it is required that the plurality winner receive more than 50 percent of the votes, the probability of Condorcet indecision is always less than or equal to the probability of plurality indecision, irrespective of the pattern of the group's preference probabilities.

Glisson, C. A. Dependence of technological routinization on structural variables in human service organizations. *Administrative Science Quarterly*, 1978, 23, 384-395.

Writers have traditionally conceptualized structure as dependent on technology. In this study, the adequacy of that conceptualization for human service delivery systems is questioned, and a theoretical basis is provided for considering the effect of implemented organizational structure on technological routinization. Review of the structure-technology literature points out the relative contributions and inadequacies of earlier models proposed by Woodward (1965), Khandwalla (1974), Perrow (1967), Hunt (1970) and others. An alternative model is hypothesized, which specifies technological routinization in a dependent relationship with structure.

Thirty human service organizations participated in this study. By way of questionnaires answered by staff personnel, measurements were made on four dimensions: participation in decision making and hierarchy of authority (centralization) and division of labor and procedural specification (formalization). A path analysis of the hypothesized model, based on OLS regression, shows the interrelationship of the structural dimensions with routinization as the dependent variable. It is noted that the directions of causality among the variables have not been empirically established by this research effort, but they do provide tentative support for a model of human service organizations which conceptualizes technological routinization by workers as dependent on certain dimensions of organizational structure.

Golembiewski, R. T. *Renewing organizations: The laboratory approach to planned change*. Illinois: F. E. Peacock Publishers, Inc., 1972.

This book is concerned with history's challenge to man and his institutions, and the way in which both will adapt or change in response. Such changes occur in either of two ways: revolution or renewal. It is the thesis of this book that a renewal effort must be seriously undertaken to change organizations before one resorts to revolution. A theoretical basis and practical guide to effective organization renewal is offered. Through its emphasis on a technology for renewal and change, this book attempts to enlarge the manageable and meaningful choices open to individuals and organizations in dealing with their freedom while minimizing the future shock inherent in the effort.

Four themes characterize this volume: (1) Laboratory Approach as a Genus — a way of learning which is at once convenient and potent.

The laboratory approach involves a "learning how to learn", and attempts to induce changes with regard to the learning process itself and to communicate a particular method of learning and inquiry. (2) Organization Development as Value-Loaded. OD efforts must be critically judged in terms of two kinds of moral frameworks: the internal values related to organizational processes that inhere in the OD practitioner's theoretical framework and the external values that relate to organizational purposes. OD practitioners are seen as carriers of humane values and likewise, OD applications carry moral implications because they relate to the quality of life. (3) OD is characterized by focus, locus, and designs. OD programs focus on one or a variety of diagnosed problems, which have a locus at one or more levels of social organizations. Also, OD programs rely on a broad range of laboratory learning designs or interventions, intended to cope with various diagnosed problems, typically at several levels of organization. (4) The basic OD bias: group-oriented strategies. Changes in group level phenomena such as social norms and values are seen as the primary motivators of organizational change, via their influence on the behavior of individuals. While there are other approaches to change, that of the group-oriented strategy is believed to have a variety of general advantages for many OD purposes. These are discussed and applications given.

Goodman, P. & Pennings, J. *Toward a framework of organizational effectiveness*. Pittsburgh, PA: Carnegie-Mellon University, 1976. ADA029-327.

This report summarizes five original essays on organizational effectiveness presented at an OE workshop at Carnegie-Mellon University in June 1976. The first paper, by J. P. Campbell, entitled "The Structure of Organizational Effectiveness" is a major review of different effectiveness frameworks, with emphasis on the goal and systems approaches. A strategy for OE research is presented. The second paper, "On the Effectiveness of Studies of Effectiveness", by Richard Scott examines the concept of goals and its relationship to organizational effectiveness criteria. Scott argues that research should center on a more limited set of criteria, and should avoid general models to explain effectiveness. M. Hannan and J. Freeman's article, "Obstacles to the Comparative Study of Organizational Effectiveness" deals with some of the methodological issues in studying OE. The problem of nonspecificity of goals as well and of weighting multiple goals and short-versus long-term payoffs are discussed. The concept of organizational survival as an alternative approach to OE is presented. The fourth essay, "Toward a Framework of Organizational Effectiveness", by J. Pennings and P. Goodman, elaborates on the nature of complex organizations and the concept of organizational effectiveness in an open systems theoretical framework. The final paper by K. Weick, "On Re-Punctuating the Problem of Organizational Effectiveness", explores eight sets of conditions which are associated with effectiveness. The basic focus of this paper is on adaptability rather than on goal attainment as a measure of effectiveness.

Cowler, D. & Legge, K. Participation in context: Towards a synthesis of the theory and practice of organizational change. Part II. *The Journal of Management Studies*, 1979, 16, 139-170.

This paper is a reformulation of the "paradox of change". This notion states that to be effective, the design of a change program can only take place when the power systems, modes of behavior, etc., of the organization are fully understood; and these cannot be properly understood until some processes of change have been introduced and the reactions observed. In order to resolve this paradox, the emphasis must turn from a concern with prediction to a concern with evaluation. The paradox of change results from treating organizational change in terms of the dominant scientific paradigm, i.e., positivism plus prediction.

An attempt is made to synthesize the theory and practice of planned organizational change within the theoretical framework provided by contextualism. Contextualism is operationalized in terms of three facets of contingency theory: the "as is", "should be" and "as if" propositions. The paper discusses in depth the role/characteristics of change agents and the contextual determinants to planned organizational change. The authors conclude that the paradox of change cannot be completely avoided, especially when the theories and activities of change rest on formal "as is" type models.

Green, S. G. & Nebeker, D. M. The effects of situational factors and leadership style on leader behavior. *Organizational Behavior and Human Performance*, 1977, 19, 368-377.

Simulated leadership situations were employed to test Fiedler's (1972) hypothesis that relationship-motivated (High Leader's Esteem for the Least Preferred Co-Worker (LPC) score) and task-motivated (low LPC) persons differ in their responses to favorable and unfavorable leadership situations. Approximately 200 male subjects from the University of Washington undergraduate psychology pool served as subjects for this simulation. The subjects responded to simulated, pre-recorded situations which varied in their degree of situational favorableness.

As predicted, when the situation was unfavorable the relationship-motivated leaders behaved in a more interpersonally-oriented and less task-oriented manner than did the task-motivated leaders. When the situation was favorable, the task-motivated leaders emphasized interpersonal behavior more and task behavior less than the relationship-motivated leaders. Leader LPC by situation interactions indicates that both leader personality and the situation are important determinants in leader behavior and that LPC and situational favorability may be helpful in understanding this interaction.

Greller, M. M. Evaluation of feedback sources as a function of role and organizational level. *Journal of Applied Psychology*, 1980, 65, 24-27.

This study examines the degree to which supervisors recognize the value subordinates attach to different sources of feedback. Supervisors (N=26) and subordinates (N=63) in a metropolitan transit authority were asked to rate the usefulness of six sources of feedback for the subordinates' job. These included: formal rewards, information assignments, supervisors' comments about subordinates' performance, co-workers opinions, comparisons individuals make of their own work to that of others, and task feedback. Ratings were made using a 7-point scale ranging from completely useless to extremely useful. The research was structured in a 2 x 3 x 6 analysis of variance. The three factors included: role (subordinate and supervisor), job in question (repairman, foreman, or first level manager) and source of feedback. Results indicate that the value of the source of feedback did not vary as a function of rank in the organization, but supervisors consistently underestimated the importance subordinates attach to feedback from the task, comparisons to the work of others, and co-worker's comments. They overestimated the importance of formal rewards, informal assignments, and comments from the supervisor.

Greller, M. M. & Herold, D. M. Sources of feedback: A preliminary investigation. *Organizational Behavior and Human Performance*, 1975, 13, 244-256.

This research used a deductive strategy to assess the importance of five different potential sources of job performance information. The worker is viewed as an information receiver in an environment capable of providing a variety of information from different sources. Given this view of the worker as a feedback perceiver, it becomes necessary to posit and investigate some of the possible sources of feedback information. Five were selected for consideration here: the formal organization, supervisor, co-workers, the task, and one's own self. These sources were evaluated as to their informativeness about job requirements (referent) and the extent to which they were met (feedback).

Questionnaires were collected from 150 evening-class students in an urban community college. They were asked to rate each of these five sources of information in each of the two capacities. Several analyses of variance were conducted on the data in order to determine the value of these sources of feedback. Findings indicate that there is a greater reliance on intrinsic sources (sources psychologically "closer" to the individual) than on more external sources for feedback information, this reliance being reduced for referent information. These findings are discussed in terms of job description items which indicate that various characteristics of the external sources are associated with a reduced reliance on intrinsic sources. Implications for future research are discussed.

Griffin, R. W. Task design determinants of effective leader behavior. *Academy of Management Review*, 1979, 4, 215-224.

The theoretical and empirical research literature on task design and path-goal theory of leadership is reviewed. It is suggested that task design and individual variables interact to form a construct called individual-task congruence. A model is then developed which depicts leader behavior as a moderating variable between individual-task congruence and satisfaction and performance.

In theoretical terms, this model is a modification of the path-goal theory of leadership. While traditional path-goal theory stresses that appropriate leader behavior is contingent, in part, on the structure of the task being performed, the primary thrust of job design research has been to demonstrate that individual characteristics moderate the relationship between job and outcome variables. Therefore, this model can be viewed as an attempted integration of job design literature and the path-goal theory of leadership.

The practical significance of the model is its implications for organizational change. A task design change effort offers the opportunity, and may even require, that other organizational changes be initiated. Specifically, if the relationship between the task and the incumbent is changed, it may be necessary for the leader to alter his behavior in order to be more consistent with subordinate needs and expectations. Other implications of this model are discussed.

Grimes, A. K. Authority, power, influence and social control: A theoretical synthesis. *Academy of Management Review*, 1978, 3, 724-735.

This article reevaluates the concept of power and analyzes its implications for authority and leadership in an organization. Power is conceptualized as influence and social control, the former reducing and latter reinforcing authority. Authority and power are viewed in this framework as end points on a single continuum. What legitimizes authority is the promotion or pursuit of collective goals associated with group consensus. The polar opposite, power, is pursuit of individual or particularistic goals associated with group compliance. In terms of influence and social control, the two concepts are the inverse of each other: authorities are the initiators of social control and the recipients of influence; partisans, the initiators of influence and the target of social control. The implications of this view of power for understanding authority and leadership are then examined.

Hanser, L. M. & Muchinsky, P. M. Work as an information environment. *Organizational Behavior and Human Performance*, 1978, 21, 47-60.

This study examines the nature of work information environments regarding source, types and reliability of information received and the relation of these factors to job satisfaction. A primary purpose of this research is to confirm and extend previous work done on the nature of sources of information in a work environment (i.e., Greller & Herold, 1975).

Questionnaires were distributed to 387 faculty members at a large midwestern university concerning the informativeness of five sources of information in providing referent and appraisal information. These sources included: the formal organization, supervisor, co-workers, the task itself, and personal thoughts and feelings. While important distinctions related to theoretical issues existed, both statistical (F-test) and graphic results were highly similar to previous reserach on this topic, thus validating these as sources of information. Also, factor analysis of these items along with the Job Descriptive Index scale scores indicated that participants were able to make meaningful distinctions between job satisfaction and the work information environment as constructs. The possible value of the concept of work as an information environment as an aid to the understanding of job enrichment and participative management programs is suggested as a concern for future research.

Harrell, T. & Alpert B. The need for autonomy among managers. *Academy of Management Review*, 1979, 4, 259-267.

This article focuses on the need for autonomy in business managers, especially as it relates to MBAs. If it was possible to identify n Aut, MBAs could make judicious job choices, and companies could select MBAs with high n Aut for jobs that demand independence of operation. Autonomy is defined in comparison with related needs, and is related to various managerial situations which allow it to be realized or which frustrate it. The individual's needs are then related to the organizational possibilities of better management, by an appropriate fit, taking into account the force of the need.

The results of this investigation are that autonomy may be one important variable among many, such as n Pow and n Ach, to be considered by both the MBA (or other prospective management) candidate and the organization seeking to hire a manager. For the prospective manager, it is the personal n Aut that affects his or her performance. For the organization, it is the candidate's relative level of need when compared with the amount of autonomy necessary to get a job done (or the amount that can be permitted). Size of the organization is the most obvious variable controlling the degree of autonomy possible to the manager. Another variable is the extent to which a job requires independent action. Implications of this phenomenon to managerial selection are presented.

Harrison, F. L. Decision-making in conditions of extreme uncertainty. *The Journal of Management Studies*, 1977, 14, 169-178.

This paper describes some observations on how companies handled decision-making under uncertainty made during a S.S.R.C.-sponsored research project on the influence of computer methods in planning and decision-making. The following observations were made: (1) Managers were consciously handling uncertainty by evaluating their major decisions in the light of several possible alternative forecasts. (2) Statistical decision theory was not used because, though in theory it was ideally suited for this situation, in practice management had the following objections to its use: (a) it assumed an accuracy of subjective probability estimates which were unrealistic in real life; (b) it required the use of artificial criteria of choice which were totally unacceptable to senior management; and (c) it oversimplified the decision-making process. (3) Management was using a systems analysis approach to decision-making, involving the use of decision trees to structure the decision. Thereafter, instead of carrying out a probabilistic analysis, a full evaluation to determine the quantitative and qualitative results would be carried out for each feasible path through the tree. This would be followed by an iterative elimination process. (4) Management also endeavored to cope with uncertainty by being more adaptive and flexible in their decision-making and by developing contingency strategies. Plans were not looked on as rigid blueprints, but more as loosely linked frameworks of decision trees with the actual path through the decision tree dependent on future events.

Hellriegel, D. & Slocum, J. W., Jr. Organizational climate: Measures, research and contingencies. *Academy of Management Journal*, 1974, 17, 255-280.

This article critically reviews the notion of organizational climate. The general strategy of the review is to utilize a contingency perspective within a systems frame of reference. The article begins with a brief description and analysis of the principal instruments which have been developed to measure organizational climate. A representative range of research studies which have made major use of the organizational climate construct are evaluated in tabular form. Attention is paid to researcher, measurement technique, type of sample, level or rigor and type of variable represented by climate (independent, dependent, intervening), as well as the overall results of the research.

Several general conclusions are drawn from this review. First, while on a conceptual level the organizational climate construct suggests considerable potential for understanding individual behavior in organizations, the movement from the conceptual to the measurement level has posed many yet unresolved problems. Second, most researchers have not specified the external environment impinging upon the subsystem, type of technology, or the interaction of these variables on the individual's perception of climate. For example, the climate in subsystems with simple and static environments may be different from that in subsystems with dynamic and complex environments; and the criteria for success operating in these two environments may be very different. Third, research should concentrate more on the causal links between climate and measures of job performance, turnover, etc. Finally, research must strive to achieve a higher degree of rigor if it is to yield useful results.

Herman, J. B. & Hulin, C. L. Studying organizational attitudes from individual and organizational frames of reference. *Organizational Behavior and Human Performance*, 1972, 8, 84-108.

Attitudinal data were gathered on 307 managerial personnel from a large midwestern manufacturing company. The respondents represented different functional divisions, levels in the hierarchy, and departments in the organization. Discriminant analyses were done for groups formed on the basis of these organizational structure variables and the individual difference characteristics of age, tenure, and years of education.

Group differences were highly significant for all analyses and multidimensional in all but one solution. The estimated power of the organizational structure groupings to account for individual attitude differences as .60, .43, .82, respectively. The power for the individual characteristic groupings ranged from .40 to .37. In addition to the apparent differences in the power of the structure versus individual characteristic solutions, the primary interpretation of group differences varied in the two sets of analyses. Groups formed on individual characteristics differed mainly in terms of job satisfaction. The differences between the organizational structure groups were more complex involving evaluations of line-staff relations, production management, and supportive services. Job satisfaction variables accounted for less of the between-group differences in the structure analyses.

Hersey, P. & Blanchard, K. H. Cultural changes: Their influence on organizational structure and management behavior. *Training and Development Journal*, 1970, 24, 2-3.

The purpose of this article is to suggest a re-evaluation of the role of management, given the cultural changes now affecting organizational structure. The view of a manager's role as one of planning, organizing, motivating and controlling was and may still be appropriate at the organizational levels comprised of unskilled/uneducated workers. However, with the increase in educated, highly skilled workers, this role has become too restrictive. The "Linking Pin" concept developed by Likert is offered as an alternative model of managerial behavior. Freed from the demands of constant control and supervision, the manager should now turn his attention from his role as supervisor to that of subordinate at the next higher level of organizational hierarchy. Increased awareness of the cultural changes by management could make organizational structures and management behavior more relevant to workers, thereby maximizing their productivity.

Hickson, D. J. A convergence in organization theory. *Administrative Science Quarterly*, 1966, 11, 224-237.

This review of the theories on the structure of organizations reveals that they repeatedly reduce to a single aspect of role expectations; namely, the degree of specificity (or precision) of role prescription, and its obverse, the range of ligitimate discretion. Three points emerge: First, a linear relationship between degree of role prescription and other behavior variables is almost universally taken for granted. Second, and most important, relatively little work is being done to devise measures of role prescription. Third, unless organizational scientists are more aware of their preoccupation with this single concept, the development of new ideas may be inhibited.

Hitt, J. A. & Morgan, C. P. Organizational climate as a predictor of organizational practices. *Psychological Reports*, 1977, 40, 1191-1199.

This study investigates the relationship between organizational climate and certain organizational practices. A study was conducted using 84 salaried employees of a large industrial organization. The Litwin and Stringer Improved Climate Questionnaire was used to measure perceptions of organizational climate dimensions, and scales from House and Rizzo's Organizational Practices Questionnaire were used to measure perceptions of certain organizational practices. The six organizational practices studied were: adaptability,

planning adequacy, work-flow coordination, conflict and inconsistency, decision delay, and distortion of information and suppression. Stepwise analysis regressions were used to determine whether the dimensions of climate were predictive of these six organizational practices.

The findings indicate that dimensions of organizational climate are predictive of the six organizational practices. For the three positive organizational practices of adaptability, planning adequacy, and work-flow coordination, reward was the most important climate dimension serving as a predictor. Reward, identity, structure and standards were predictive of conflict and inconsistency. Responsibility was not a predictor of any of the six organizational practices studied. It is concluded that reward may be the most important climate dimension for the six organizational practices.

House, R. J. & Mitchell, T. R. Path-goal theory of leadership. *Journal of Contemporary Business*, Aut, 1974, 81-97.

This article discusses an integrated body of conjecture by students of leadership, referred to as the "Path-Goal Theory of Leadership". According to this theory, leaders are effective because of their impact on subordinate's motivation, ability to perform effectively, and satisfaction. The theory derives its name from its major concern of how the leader influences the subordinates' perceptions of their work goals, personal goals, and paths to goal attainment. A leader's behavior is deemed motivating or satisfying to the degree that such behavior increases subordinate goal attainment and clarifies the paths to these goals.

The article begins with a discussion of expectancy theory -- the theoretical foundation of the path-goal approach. Several propositions are then stated concerning the nature of leadership behavior and the contingency factors which moderate the relationship between the leader's behavior and subordinate satisfaction. Empirical support for this theory is documented. The characteristics of leadership which have been tested and found to correlate with subordinate satisfaction and performance are: leader directiveness, supportive leadership, achievement-oriented leadership, and participative leadership. Suggestions for the direction of future research in leadership theory are discussed.

House, R. J. & Rizzo, J. R. Role conflict and ambiguity as critical variables in a model of organizational behavior. *Organizational Behavior and Human Performance*, 1972, 7, 467-505.

The purpose of this study is to report on the development and testing of a model of organizational behavior. The model describes relationships between formal and supportive organizational practices, leader behavior, role perceptions, satisfaction, and perceptions of organizational effectiveness. Measurements of management practices and leadership behavior were utilized as predictor variables. Role conflict and role ambiguity were treated as intervening variables. The dependent variables consisted of measures of perceived organizational effectiveness, employee satisfaction, anxiety, and propensity to leave the organization.

Questionnaires were completed by 9 vice-presidents and 56 quasi-professional and managerial employees selected by the vice-presidents. This measurement gave a characterization of the firm in theoretical terms. Inferences from this characterization were used to construct a model of behavior of the members of the organization. Using this model as a guide, four specific hypotheses were stated: (1) Supportive team-oriented employee-centered supervision and supportive employee-centered organizational practices will be correlated positively with employee satisfaction and negatively with perceptions of organizational problems, anxiety, and propensity to leave. (2) Formal organization practices and task oriented leadership will be negatively correlated with role conflict and role ambiguity. (3) Role conflict and ambiguity will in turn be correlated negatively with perceptions of organizational effectiveness and satisfaction and positively correlated to anxiety and member propensity to leave. (4) The independent variance in the role dimensions will account for a significant amount of the correlations between formalization practices and the dependent variables. The first three hypotheses were tested using Pearson product-moment correlations; the fourth by comparing the zero-order c rrelations with their own partial correlations holding each of the role dimensions constant. Findings showed that predictors tended to relate in expected directions to role measures and dependent variables. Role measure hypotheses were generally supported, and role ambiguity was a better predictor and intervening variable than role conflict.

Howat, G. & London, M. Attributions of conflict management strategies in supervisor-subordinate dyads. *Journal of Applied Psychology*, 1980, 65, 172-175.

This study examines the extent to which measures of conflict management and interpersonal relations are attributed to individuals who perceive conflict. Data were collected from one supervisor and one subordinate in 113 park and recreation agencies. Correlations between supervisors' ratings on one variable and subordinates' ratings on another were calculated. Regression analyses were also conducted, treating the ratings of conflict frequency as the independent variable and attributions of conflict management and interpersonal relations as the dependent variable.

The results support the hypothesis that perceived conflict frequency is associated with attributions of conflict. Supervisors and subordinates who perceived higher conflict frequency tended to be seen by each other as using force, a strategy indicative of conflict intention. Supervisors who perceived higher conflict frequency were viewed by their subordinates as likely to withdraw from conflict, whereas subordinates who perceived higher conflict freuqency were viewed by their supervisors as likely to avoid confrontation and compromise. Perceptions of conflict frequency were negatively correlated with ratings of the favorability of interpersonal relations. The need for further investigations of the relationship between the occurrence of conflict and conflict attributions is discussed.

Huber, G. P., Ullman, J. & Leifer, R. Optimum organization design: An analytic-adoptive approach. *Academy of Management Review*, 1979, 4, 567-578.

This article offers a formal approach to designing organizations, and reports in some detail on a case in which the approach was implemented on a large scale. The introductory section discusses the concept of "optimum organization design". It refers to the particular set of levels of structural and technological variables that, if established, would maximize achievement of the organization's goals. A review is made the various approaches to organizational design found in the literature. The major approaches reviewed are: classical management theory, open systems theory, contingency theory, organizational experimentation, team theory, and informational theory. A final approach -- the analytic-adoptive approach -- is described in detail and applied to a specific case. This approach includes

some aspects of open systems theory as well as the incorporation of knowledge from organizational members and from organizational experimentation. The essence of the approach is to (1) analyze the relationships between the levels of potentially controllable structural or technological variables and the levels to which certain organizational goals are achieved, and then (2) adopt those levels of the controllable structural or technological variables that maximize goal achievement. Several features of this approach are appealing to administrators and compatible with the values of many applied scientists; namely, performance orientation, hard data, minimal cross-organizational extrapolation, and minimal artistry.

Huse, E. F. & Bowditch, J. L. *Behavior in organizations: A systems approach to managing*. Reading, MA: Addison-Wesley Publishing Company, 1977.

This book, written in textbook format, is intended to develop an understanding of behavior in organizations. The organization is examined from three viewpoints: First, from a structural-design viewpoint; second, from a dynamic perspective focusing on what happens to information when it enters the organization; and third, from a human perspective, focusing on what people perceive, what they say, and how they operate in groups. The third perspective is the major focus of this text. The framework used to describe the operations of individuals, groups, and organizations is the systems approach.

Within the systems approach, the various characteristics of the organization are examined on the micro level. These include: motivation, perception and communication, group and intergroup activities, leadership, and management. A micro and macro look is also taken at the environment. The concept of organizational change and development is examined in terms of the human perspective, while organizational improvement is examined in terms of the structural-design perspective and the work-flow perspective. Advantages and disadvantages of each approach are evaluated.

Ilgen, D. R., Fisher, C. D., & Taylor, M. S. Consequences of individual feedback on behavior in organizations. *Journal of Applied Psychology*, 1979, 64, 349-371.

The literature on feedback was reviewed with respect to its effect on the behavior of individuals in performance-oriented organizations. Although contemporary views of individual behavior in organizations stress that feedback is necessary for effective role performance, little attention is given to the psychological processes affected by it. This review focuses on the multidimensional nature of feedback as a stimulus and addresses the process

by which feedback influences behavior. It attempts to delineate the nature of feedback more specifically than other process models and to integrate human performance and information processing research on feedback into a more general process orientation.

Each component of the feedback process is reviewed in detail. Emphasis is placed on those aspects of feedback that influence (a) the way it is perceived, (b) its acceptance by the recipient, and (c) the willingness of the recipient to respond to the feedback. Several implications arise from the review: (1) Two variables affecting the reception of feedback which have been heretofore ignored in research must be considered: the source (poser relationships, credibility, etc.) and the nature of the feedback message (misperception vs. non-acceptance). (2) Several instances are identified where increasing feedback frequency may not only fail to improve performance, but actually may be detrimental to it. (3) The need to take into account individual differences in reactions to feedback must be considered. The general conclusion is that it is very confusing to relate feedback directly to behavior. Rather, the effects of feedback can be better understood and predicted through an analysis of what occurs between the administration of the feedback and the subject's selection of a response.

Indik, B. P. The relationship between organization size and supervision ratio. *Administrative Science Quarterly*, 1964, 9, 301-312.

Parkinson's Law states that as the size of the organizational unit increases, the ratio of supervision will tend to increase. The research described here explores the empirical validity of this concept through an investigation of five different types of organizations. The alternative hypothesis guiding the investigation states that as the size of the organizational unit increases, the ratio of supervision will tend to decrease, as long as the complexity of the task of lower-level individuals does not increase.

Data were collected from literature on five types of organizations: (1) package delivery stations (N=32); (2) automobile dealerships (N=36); (3) Volunteer fire companies (N=12); (4) industrial labor unions (N=8); and (5) nonpartisan political organization chapters (N=28). The data were then plotted on semilogarithmic scales. In the five sets of organizations studied, the relationship between organization unit size and supervision ratio was logarithmic in form and negative in slope, thus providing support for the second hypothesis. Several reasons for this finding relevant to each type of organization are offered; however, no rationale has yet been experimentally proven.

Ivancevic, J. M. & Donnelly, J. H., Jr. Relation of organizational structure to job satisfaction, anxiety-stress, and performance. *Administrative Science Quarterly*, 1975, 20, 272-280.

This paper presents data about the relationships between organizational structure and the variables of job satisfaction, anxiety-stress, and performance. Five hypotheses regarding these relationships are formulated: They state, respectively, that if the organizational structure is flat, trade salesmen (1) will be more satisfied with respect to self-actualization, autonomy, opportunities for innovativeness, security, and social interaction; (2) will perceive less job-related anxiety-stress; (3) will be absent from their jobs less: (4) will perform better on such measures as efficiency rating and route coverage index; and (5) will show a more significant relationship between satisfaction and the effectiveness measures than will those in medium and tall organizational structures.

A study was conducted of 295 trade salesmen in three large national organizations to test these hypotheses. A Berry & Sadler ratio was used to derive the steepness ratio of organizational structure, and various widely accepted scales were used as measurements of the dependent variables. ANOVA and correlational tests were conducted on the data. The findings support a positive relationship between a flat organizational structure and salesmen's satisfaction relating to autonomy and self-actualization, anxiety-stress level, and performance. They failed to show significant differences on satisfaction facets such as opportunities for innovativeness, social interaction, security, pay and absenteeism. There were only moderate to low relationships between satisfaction and performance.

Jacobs, T. O. *Leadership and social exchange*. (HumRRO-PP-17-72). Alexandria, VA: Human Resources Research Organization, 1972.

This paper presents a definition of leadership in relation to power and authority and in terms of the impact of various types of influence attempts in formal organizations. The actions and the reactions of superordinates and subordinates occur in terms of cultural values, group norms, and social responses derived from the social learning processes. Leadership is a type of role behavior that is learned and executed better by some than by others. Social exchange theory seems to provide a useful framework for analysis of the impact of superordinate influence attempts.

James, L. R. & Jones, A. P. Organizational climate: A review of theory and research. *Psychological Bulletin*, 1974, 81, 1096-1110.

Previous organizational climate research, definitions, and measurement approaches are reviewed and differentiated into three categories: (1) a multiple measurement-organizational attribute approach, (2) a perceptual measurement-organizational attribute approach, and (3) a perceptual measurement-individual attribute approach. Similarities and differences between these approaches are discussed in an attempt to address a number of theoretical and psychometric concerns.

A major focus of this paper is the extent to which organizational climate duplicates other organizational and individual domains. Recommendations are made for future research which include a rationale for differentiating between organizational climate and psychological or individual climate and an emphasis upon the distinction between level of measurement and level of explanation as related to future definitions of climate.

James, L. R. & Jones, A. P. Organizational structure: A review of structural dimensions and their conceptual relationships with individual attitudes and behavior. *Organizational Behavior and Human Performance*, 1976, 16, 74-113.

This paper reviews aspects of organizational structure in terms of the conceptual relationships between organizational structure and individual attitudes and behavior. The review covers literature in four areas: (1) the rationale underlying the development of organizational structure; (2) the dimensions of organizational structure; (3) the interrelationships between these dimensions; and (4) the conceptual relationships between organizational structure and individual attitudes and behavior.

The major conclusions based upon this review relate to the need to identify the parsimonious constructors of organizational structure and to use more sophisticated integrating models in relating organizational structure to individual attitudes and behavior. The open systems model is discussed as one which emphasizes the dynamic nature of events, and hence, structure. In this framework, the dimensions of structure are considered on a subsystem level, rather than on a total organizational level. These dimensions are identified as: total organizational size, centralization of decision-making and authority, configuration, formalization, specialization, standardization, and interdependence of organizational components. A potential model is proposed for studying the relationship between organizational structure and individual attitudes and behavior. No empirical evidence is offered for the applicability of this model, but speculative attempts are made to demonstrate its usefulness.

Jaog, A. G. & Vroom, V. H. Hierarchical level and leadership style. *Organizational Behavior and Human Performance*, 1977, 18, 131-145.

This research investigates the relationship between the hierarchical level or managerial personnel and individual differences in their leadership styles, specifically the degree to which they are disposed to use participative, as opposed to autocratic, decision-making strategies. Data was collected from four consecutive levels in the organization: technical professionals (N=134), supervisors with managerial responsibility (N=105), section heads (N=72), and division heads (N=43).

Analysis of self-report data collected from these managers suggests a greater propensity for use of participative methods at higher organizational levels. Subordinate descriptions of their immediate superiors further support this relationship. However, members asked to describe this relationship reveal perceptions incongruent with the direction of effect implied by the between-level group differences. Reasons for this incongruity and its implications for the organization are discussed.

Jelinek, M. Technology, organizations and contingency. *Academy of Management Review*, 1977, 2, 17-26.

This article surveys relevant studies of technology, environment, and organizational contingency in order to construct a synthesis of theory and to suggest directions for further research. The basic configuration of the proposed model places environments, technology and infrastructure in interaction with one another and with organizational structure. The infrastructure takes its shape from the necessity of providing a dual fit, both with the core technology it buffers and with the external environment; but it, too, has its own technologies and environments. These technologies and their implied interdependencies must be chosen for this dual fit. The choice of the intervening technology implies choices in structure and management devices, constrained by the core technology and its interdependencies. The basic configuration (environment-infrastructure-technology) provides a frame or skeleton of increasing specificity and control, to be fleshed out with multiple intervening technologies meeting various aspects of the core technology's buffering needs. The components of this model and the interrelationship between its elements are discussed in detail.

Johannesson, R. E. Some problems in the measurement of organizational climate. *Organizational Behavior and Human Performance*, 1973, 10, 118-144.

This paper, through literature review and logical argument, questions the independence of climate factors from those identified in research on work attitudes. The arguments suggest that job satisfaction and perceptually measured organizational climate are, to a large degree, redundant. Specifically, it is hypothesized that climate factors can be readily accounted for by satisfaction factors which have had the benefit of a history of careful study and repeated investigation.

Two measures of job satisfaction and one measure of organizational climate were administered to a primary sample of 499 employees of two large manufacturing corporations. Each subject completed a booklet containing the 78-item SRA Employee Inventory, 90 perceptual organizational climate items, and the JDI measure of job satisfaction. The data were divided into three subsets, and a Cumulative Communality Cluster Analysis was performed on each measure. The results of this study tend to support the hypothesis. It is concluded that, on the whole, organizational climate as measured in this study failed to add new or different variance to commonly identified satisfaction factors. It is therefore suggested that alternative methods for assessing the quality of organizational environments be explored. Several alternatives are discussed.

Johnson, R. A., Kast, F. E. & Rosenzweig, J. E. *The theory and management of systems*. (2nd Ed.). New York: McGraw-Hill Book Company, 1967.

The primary objectives of this book are to provide a conceptual model for the systems concept, to suggest certain applications, and to explore some of the means of implementing this approach. It is written in textbook format; each chapter includes a number of case studies and concludes with a list of review questions. The book is divided into four parts.

Part 1 develops the theoretical framework for systems concepts and defines the relationship between them and the primary managerial functions (planning, organization, control, information and communication). The last chapter of this section draws together the ideas on the utilization of a systems approach in the four management functions to form an integrated systems concept for organizations. This discussion is the most vital section of the book. Part 2 presents four case studies in which systems concepts have been applied. They are: weapon and space systems, distribution systems, production systems, and data-processing systems. The first organization

is used to illustrate the program management concept; the second, the integration of the production and marketing functions into a single material-flow system; the third, a structured, closed-loop system where inputs are measurable and outputs are predictable; and the last, the use of integrated data processing and real-time processing as systems for managing information.

Part 3 is concerned with the implementation of the systems concept in the management process. Simulation is presented as a technique for implementing systems design, and network analysis is specifically discussed as a tool which helps managers to design better systems and to plan and control operations effectively and efficiently. Systems design is discussed as one of management's most vital functions. Part 4 discusses the implications of systems concepts for the future. It is proposed that organizations must utilize systems theory and concepts in the future to integrate their operations if they are to survive in a dynamic environment. Possible applications of the systems concepts in management, motivation and job satisfaction and organizational adaptation are discussed.

Kahn, R. Organizational development: Some problems and proposals. *The Journal of Applied Behavioral Science*, 1974, 10, 485-502.

An examination of the current body of OD literature reveals that much of its research is redundant and without refinement or validation, and that the term "organizational development" itself remains scientifically undefined and hence primarily a convenient label for a variety of activities. A further observation is that the OD literature as a whole is more autobiographical than organizational in focus and scope. Work toward resolution of these three problems, the author suggests, would help the practice of OD base itself on a more mature and usable set of principles and procedures for organizational change. The author also questions the adequacy and utility of the traditional dichotomy between organizational process and structure evident in the literature and discusses a reconceptualization of organizational structure that permits clarification of key issues in the practice and theory of organizational change.

Karasek, R. A., Jr. Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 1979, 24, 285-308.

A stress-management model of job strain is developed in this study which postulates that psychological strain results not from a single aspect of the work environment, but from the joint effects of the demands of a work situation and the range of decision-making freedom available to the worker facing those demands. The model was tested first with recent national survey data results from Sweden and the United States. Dependent variables were compared through regression analysis and three-dimensional diagrams. Another test was conducted with longitudinal data from the Swedish data, and similar statistical tests used.

The model appears to clarify earlier contradictory findings based on separate effects of job demands and job decision latitudes. The consistent finding is that the combination of low decision latitude and heavy job demands is associated with mental strain. This same combination is also associated with job dissatisfaction. In addition, the analysis of dissatisfaction reveals a complex interaction of decision latitude and job demand effects that easily could be overlooked in a conventional linear, unidimensional analysis. The major implication of this study is that redesigning work processes to allow increases in decision latitude for a broad range of workers could reduce mental strain, and do so without affecting the job demands that may plausibly be associated with organizational output levels.

Katz, D. & Kahn, R. L. *The social psychology of organizations*. New York: John Wiley & Sons, Inc., 1966.

This book proposes that the resolution of the theoretical difficulties rampant in organizational research can best be achieved by means of open systems theory. Open systems theory is believed to permit breadth without oversimplification. It emphasizes, through the basic assumption of entropy, the dependence of the organization upon its environment. The open system concepts of energic input and maintenance point to the motives and behavior of individuals who are the carriers of energic input for human organizations; the concept of output and its necessary absorption by the larger environment also links the micro- and macro-levels of discourse. For these reasons, it is seen as the most viable framework for the consideration of organizational behavior.

This book defines all of the concepts characterizing open systems theory and applies them to the various functions of organizations. Empirical research is cited to support the theoretical constructs developed in this study on the topics of: organizational structure and effectiveness, roles, power and authority, communication, policy formulation and decision-making, leadership, and change. The theoretical framework developed and applied in this volume has placed it as one of the cornerstones of thinking in organizational theory.

Kaufman, R. Organizational improvement: A review of models and an attempted synthesis. *Group and Organization Studies*, 1976, 1, 474-495.

Organization development and improvement models, like the people they intend to help, come in a bewildering array of sizes, shapes, types and intentions. Many have been developed; but few seem to do the job for which they were intended. This paper and the conceptual model it offers help to identify the major varieties of models and methods and to analyze the characteristics of some of the best understood and recognized among them. The author proposes that most models are only descriptive and fail to offer the predictive and control aspects considered central to success.

A predictive synthesis, termed "Transactional Life-Cycle Theory", is offered as an alternative model of organization development. It is a combination of existing models, including selected aspects of Hersey and Blanchard's Life-Cycle Theory, some role behavior aspects of Transactional Analysis and some aspects of Greenwald's Direct Decision Therapy. Some additional considerations of this model are presented, including one relating to sexism and sex-role stereotyping.

Keller, R. T. Role conflict and ambiguity: Correlates with job satisfaction and values. *Personnel Psychology*, 1975, 28, 57-64.

This research study was conducted to test some hypotheses generated from the Kahn, et. al. theory of role dynamics, and to extend and refine the relationships between role conflict, ambiguity, and job satisfaction by using a multi-dimensional conception of job satisfaction. The basic hypotheses state that role conflict and ambiguity will be negatively related to dimensions of job satisfaction, while personality-related values will be positively related to role conflict and ambiguity, as well as to the dimensions of job satisfaction.

Data were gathered from questionnaires distributed to 51 professional employees of an applied science department in a large government research and development organization. A correlational analysis was conducted between the role conflict and ambiguity scales and the five dimensions of job satisfaction. The results of this study tend to partially support the Kahn, et al. theory of role dynamics. The data indicated that role ambiguity was related to intrinsic sources of job satisfaction, while role conflict was related to extrinsic satisfaction sources. However, the second hypothesis is not supported by this study; values were found to be generally unrelated to role conflict and ambiguity as well as to job satisfaction. Implications for personnel practice are indicated.

Keller, R. T., Slocum, J. W., Jr. & Susman, G. I. Uncertainty and type of management system in continuous process organizations. *The Academy of Management Journal*, 1974, 17, 56-67.

This paper examines the thesis that environmental uncertainty affects the type of management system most appropriate to successful performance in continuous process technologies. The sample used in this study consisted of 44 plants using continuous process technologies. Data were collected by questionnaires and telephone interviews on organization size, capital intensity, location, and management style. Through factor analysis, the 22 resulting items measuring the management system were put into three clusters: impersonal hierarchy, group decision-making, and rules for decision-making. Other instruments were used to measure economic success and uncertainty.

The major result of this study was that an organic management system was found to be significantly more successful overall. However, there were important distinctions between autonomous and nonautonomous organizations. The implication is drawn that in small, nonautonomous organizations, an organic system will lead to economic success. Rather than a reliance on impersonality and a hierarchy of authority, management should encourage the development of face-to-face informal relationships. Other implications for organization theory, research, and managerial practice are discussed.

Kerr, S., Schriesheim, C. A., Murphy, C. J. & Stogdill, R. M. Toward a contingency theory of leadership based upon the consideration and initiating structure literature. *Organizational Behavior and Human Performance*, 1974, 12, 62-82.

The Ohio State Leadership Studies have been criticized on the grounds that they lack a conceptual base and fail to take situational variables into account. This article reviews the published literature on the leader behavior dimensions "Consideration" and "Initiating Structure" for the purpose of developing some situational propositions of leader effectiveness. Among the variables found by researchers to significantly moderate relationships between leader behavior predictors and satisfaction and performance criteria are: subordinate need for information, job level, subordinate expectations of leader behavior, perceived organizational independence, leader's similarity of attitudes and behavior to managerial style of higher management, leader upward influence, and task characteristics, including pressure and provision of intrinsic satisfaction.

The article concludes by presenting ten situational propositions, and linking them to form two general postulates of leadership effectiveness. (1) The more subordinates are dependent upon the leader for provision of valued or needed services, the higher the positive relationships between leader behavior measures and subordinate satisfaction and performance. (2) The more the leader is able to provide subordinates with valued, needed, and expected services, the higher the positive relationship between leader behavior measures and subordinate satisfaction and performance.

Khandwalla, P. N. Environment and its impact on the organization. *International Journal of Management and Organization*, 1972, 2, 297-313.

This paper sets forth several testable hypotheses relating properties of the environment to the responses of the organization. A review of the literature suggests that the three features perceived by researchers to be the most important environmental properties affecting the organization are uncertainty, hostility, and heterogeneity. The principal differences in the impact of these three environmental features on the organization are expressed in three hypotheses. (1) The response to uncertainty is a spectrum of complex uncertainty reduction, organizational differentiation, and organizational integration mechanisms. (2) The response to environmental hostility or malevolence is different -- primarily an attempt at organizational integration through the mechanisms of centralization and standardization, with possible reinforcement of goal congruence

and short time perspective. (3) The response to heterogeneity is similar, but more circumscribed -- primarily organizational differentiation and integration.

No empirical support is offered in this study. However, it is argued that if these speculations are borne out in research, organization theory would enjoy a stronger empirical base and would move towards a contingency explanation of organizational behavior in which the nature of the task would assume the same importance as the nature of the individual as an explanation of organizational functioning. Implications of this new direction in organization theory are discussed.

Khandwalla, P. N. The techno-economic ecology of corporate strategy. *The Journal of Management Studies*, 1976, 13, 62-75.

This study explores the notion of corporate strategy through a contingency framework. Corporate strategy is viewed as a set of guidelines or policy heuristics developed as a response to the contingencies faced by a firm. If the environment is rich in contingencies, as when it is dynamic, complex, and uncertain, the firm's corporate strategy is likely to be comprehensive or multi-faceted. If the environment is not rich in contingencies, as when the environment is stable or predictable, the strategy is likely to be quite limited in scope.

Data from a study conducted with 79 firms are consistent with this contingency view of corporate strategy. The sample for this study, while not random, was felt to be fairly representative of medium sized, non-diversified American manufacturing firms. The study reports questionnaire results from the presidents of these firms, rating the intensity of price competition in the industry, the intensity of competition in promotion and distribution, the intensity of competition in product quality and variety, and the importance of each of these to their firm's profitability. When the perceived importance of each of several activities was correlated with the perceived magnitudes of the different forms of competition and technological change experienced by the firm, it was found that (1) the associations between these techno-economic environmental variables and the importance of these activities are generally positive; (2) there are striking differences, as between the techno-economic variables, in their relationships with the importance of four areas of strategic import that are secured by classifying these activities by function. The observed relationships are explained in terms of contingencies that the techno-economic variables may create for the firm. Plans for further research are briefly outlined.

Kim, J. S. & Hamner, W. C. Effect of performance feedback and goal setting on productivity and satisfaction in an organizational setting. *Journal of Applied Psychology,* 1978, 61, 48-57.

This study investigates the comparable effects of performance feedback and goal setting on productivity and satisfaction. A quasi-experimental design was used to investigate the interaction of these variables in a large telephone company. Three experimental groups received either extrinsic feedback and intrinsic feedback alone, or extrinsic and intrinsic feedback with goal setting, while a fourth group received only goal setting instructions. The results show that it is possible for goal setting alone to enhance performance without a formal knowledge-of-results program. This yields external validity to Locke's theory of goal setting. However, results also show that when evaluative and non-evaluative feedback were added to a goal-setting program, performance was generally enhanced beyond that found in the goal-setting only group. Future research should look into the additive effect of goal setting with evaluative and descriptive knowledge-of-results on task performance.

Kimberly, J. R. & Nielsen, W. R. Organization development and change in organizational performance. *Administrative Science Quarterly,* 1975, 20, 191-206.

This study examines the impact of a planned change program on organizational performance using a model of causal linkages which appears to underlie the OD approach to organizational intervention. The study is based on the implementation of an OD program in an automotive division of a large, multiplant, multidivisional corporation. The program was carried out in seven phases: initial diagnosis, team skills training, data collection, data confrontation, action planning, team building, and intergroup building. Data was collected through questionnaires given periodically throughout the study; indices of organizational performance were compiled on a daily basis. These data met the qualifications for a modified time-series experiment design. Analyses performed on the data included t-tests, F-tests, and correlations.

The results presented suggest two important generalizations about organization development as an organizational change modality. First, they indicate (given the limits of this design) that OD can result in directed change. Second, they suggest some parameters within which OD may be expected to be effective and outside of which such expectations may be unwarranted. The determinants of an effective OD program include the expectations of the participants and the internal characteristics of the organization as much, if not more, than the particular strategy chosen. One shortcoming of this model is that it is based on a closed-system approach; this may prove of narrow use in future OD research. Other implications of this study for future research into planned change programs are discussed.

Kirchhoff, B. A. Organization effectiveness measurement and policy research. *Academy of Management Review*, 1977, 2, 347-355.

The theoretical and empirical research literature on organization effectiveness measurement reveals that empirical methodologies, developed primarily by psychologists and sociologists, do not adequately express the complexity of effectiveness measurement. This article suggests a more accurate methodology, cautions researchers about oversimplifying concepts of effectiveness, and offers directions for future research.

The two principal approaches to organization effectiveness measurement discussed are the goal approach models and the evaluative models. The goal approach models struggle with the identification of appropriate goals and multivariate methodology in an attempt to integrate multiple goals into an ultimate criterion that will be applicable to more than one organization or even within one organization. Evaluative models use evaluations of overall effectiveness that are operational over numerous organizations but lack the basic requirements of validity and reliability. The conclusion drawn from this review is that there is no ultimate criterion of effectiveness. Complex organizations pursue multiple goals. Real effectiveness, therefore, can only be measured relative to a particular set of derived or prescribed goals. Policy research is seen to have a contribution to make in ameliorating these problems in OE measurement. The published empirical research on business policy is devoid of reference to a theory of an ultimate criterion of effectiveness, and multiple goals are taken as an integral aspect of business organizations. While policy research does not hold all the answers, it does point out that the key to successful research is to avoid generalizing effectiveness from measurement of a single goal.

Knowles, M. C. Interdependence among organizational variables. *Human Relations*, 1975, 28, 431-450.

This study investigates the interrelationship among a variety of organizational variables. A matrix analysis was conducted in which 14 work organizations (sections) within a company were assessed on ten variables: production, quality, costs, job satisfaction of operatives, job satisfaction of supervisors, work anxiety, accidents, absence, labor turnover, and industrial unrest.

When the sections were ranked on the individual measures, wide and consistent differences were found between the sections; within the sections, the variables were clearly interrelated. This effect is named the interdependence phenomenon of organizational behavior. This property was most pronounced in one group of sections characterized by high performance achievement, favorable attitudes

and organizational stability, and in another group of sections characterized by low achievement, considerable dissatisfaction and organizational instability involving high levels of accidents, absence, labor turnover or industrial unrest. The data illustrated how processes operating within the functional and dysfunctional work organizations tended to be self-reinforcing and the situations self-perpetuating. The psychological impact of being a member of the different work organizations was marked, and the more dysfunctional the work organization, the more prevalent were the manifestations of withdrawal behavior.

Kochan, T. A., Cummings, L. L., & Huber, G. P. Operationalizing the concepts of goals and goal incompatibilities in organizational benavior research. *Human Relations*, 1976, 29, 527-544.

This paper demonstrates the theoretical relevance and validity of using utility models and scaling techniques as an approach to operationalizing the concepts of goals and goal incompatibilities. On the basis of a literature review, it was concluded that (1) the concepts of goals and goal incompatibilities play important, but controversial, roles in organizational behavior, and (2) there has been very little empirical research directed toward operationalizing these concepts.

This belief was tested with questionnaire data from municipal government officials in 380 cities, to test the propositions that (1) structural differentiation in organizations is associated with goal incompatibilities, and (2) goal incompatibilities are correlated with conflict in organizations. The results of the correlations and ANOVA computed on the data supported both propositions. Goals which were shared across units tended to be of moderate importance to organizational decision makers within these units, while disagreements regarding goals were found to focus on power preservation and procedures.

Kochen, M. & Deutsch, K. W. Delegation and control in organizations with varying degrees of decentralization. *Behavioral Science*, 1977, 22, 258-269.

The concepts of decentralization, delegation, control, participation, and responsibility are defined operationally for the analysis of hierarchically structured large organizations or service systems. These include hospitals, libraries, or governmental agencies, all of which involve the coordination of several resources or activities. Delegation of certain classes of decisions to a particular agent or echelon is translated into providing this agent with the means to make decisions at tolerable levels of error and delay. That is, the agent must have adequate communication

channels, memory facilities and other information processing capacities. The change in the utility of the decision performance of the organization after the delegation has been made is compared to the change in costs caused by providing or shifting the requisite facilities. The effects of a long-term increase in service loads upon the optimum levels of decentralization and delegation are examined.

Four general principles regarding delegation and control are proposed: (1) Communication channels should be two-way, to facilitate feedback, and short, to allow for immediate responses. (2) Communication channels, control units, processors, input-output terminals and memories should be protected against excessive cost of errors, abuses and overloading. (3) Wherever possible, decisions should be delegated downward to the lowest level where they can be adequately made, so as to increase participation. (4) Clients and third parties substantially affected by the outcome should be involved in the making of decisions.

Korb, L. J. The organizational and political problems of implementing change in governmental organizations. *Educational Technology*, 1978, 18, 45-49.

This article deals with the problem of producing and sustaining change within American governmental organizations. Its goal is to point out some perspectives which are often overlooked in implementing such change. The focus of the discussion is on the Marine Corps Recruit Training and Navy Helicopter Training programs.

The political decision-maker in any government organization is motivated by rational, organizational, and political factors. A Rational Model of behavior holds that behavior is motivated by a conscious calculation of advantages based on an explicit and internally consistent value system. An Organizational Model of Behavior sees motivation derived from a belief about what will be good for maintaining the essence of the organization, rather than the society at large. The decision-maker operating in a Political Model sees the need to consider who the players are, their stands, and their influence, before constructing a strategy to bring about a desired solution. This article proposes a fourth model which combines the perspectives of the three described above. Only with such a broad scope will the decision-makers be able to effect change in the American political system.

Kotter, J. P. Power, success and organizational effectiveness. *Organizational Dynamics*, 1978, 6, 27-40.

Power-oriented behavior describes behavior directed primarily at developing or using relationships in which other people are to some degree willing to defer to other's wishes. This article argues that the importance of power-oriented behavior to managerial career success varies depending on some factors that define the managerial jobs involved. The major defining factor is job-related dependence, which is in turn determined by organization size, environmental uncertainty, environmental dependencies, organizational goals, technology, formal structure, measurement systems, and reward systems.

The author attempts to show when and why power-oriented behavior promotes organizational health and effectiveness and when and why it does not. It appears that the relationship between power-oriented behavior and organizational effectiveness depends on at least three intervening variables: job-related dependence, managerial goals and values, and top management behavior. Emphasized is the importance of a technique called PDA (power/dependence analysis) as a means of identifying and mapping out the dependence inherent in a managerial job and the way the incumbent generates and uses power to cope with that dependence. It permits identification of what job dependencies should be and what kind of power-oriented behavior is needed from the point of view of organizational effectiveness.

LaFollette, W. R. & Sims, H. P., Jr. Is satisfaction redundant with organizational climate? *Organizational Behavior and Human Performance*, 1975, 13, 257-278.

This research investigates the question raised by Johannesson (1973) as to whether organizational climate is redundant with job satisfaction. The study was conducted at a major medical complex with a sample of 1161 employees. The categories and measurements used in the study were: (1) Organizational Climate - as measured by the Climate Questionnaire; (2) Organizational Practices - as measured by the Organizational Practices Questionnaire: (3) Job Satisfaction - as measured by the Job Descriptive Index; and (4) Job Performance Evaluation. The means, standard deviations, and split-half reliabilities were used in a series of Spearman-Brown correlations.

The results indicated that organizational climate and organization practices were found to be related to job satisfaction. However, climate and practices related to performance in a different

manner than the satisfaction/performance relationship, which did not tend to support the redundancy hypothesis. Johanesson's research methodology was evaluated, and the redundancy hypothesis was found to rest on judgmental assumptions, rather than causal or longitudinal analysis. In addition, other research was evaluated which tended to support the climate-causes satisfaction hypothesis as opposed to the redundancy hypothesis. The need for further longitudinal research to evaluate causality is emphasized.

Langford, W. D. *Organizational development: Environmental pressures, the military setting, and the ultimate test.* Master's Thesis. Monterey, CA: Naval Postgraduate School, 1978. ADA057-908.

This thesis provides a context for looking at OD in the military by analyzing the environmental pressures and the current OD effort in the three major services. To develop the proper climate to analyze the problem of OD in combat, three distinctly separate areas are researched: military sociology, military history, and organizational development. A review of the literature in each of these areas is presented. The author's conclusion is that any change program attempted in the military environment must address each of the variables uncovered by these three disciplines. An attempt is made, therefore, in this thesis to integrate these variables into a multi-faceted OD program.

The author identifies the likely benefits and potential dangers of using such a change approach in the combat setting, and makes recommendations on how to accomplish the goal of improving organization functioning using OD consultants.

Latham, G. P. & Saari, L. M. Importance of supportive behavior in goal setting. *Journal of Applied Psychology*, 1979, 4, 151-156.

This study empirically demonstrates the three key aspects of a System 4 (Likert, 1967) management theory: supportive relationships, participative decision-making, and goal setting. The importance of supportive behavior by an authority figure when setting goals was tested using a brainstorming task. Ninety college students were randomly assigned in a 2 x 3 design to a supportive or nonsupportive condition and to one of three goal-setting conditions (assigned, participative, and "do your best"). Goal difficulty was held constant between the assigned and the participative conditions.

Supportive behavior resulted in higher goals being set than nonsupportive behavior. Participately set goals led to better performance than assigned goals. Participation appears to be important in increasing the understanding of task requirements. The assumption that "the differences, if any, that exist between an industrial and a university setting are minimal", however, is questionable.

Lawler, E. E. III. Control systems in organizations. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.

The impact of control systems on the behavior of individuals in organizations is analyzed. A thermostat model of control is developed and related to the absence or presence of five behaviors: (1) resistance to control systems, (2) bureaucratic behavior, (3) falsifying control system data, (4) intrinsic motivation, and (5) extrinsic motivation. A review of the literature shows that how control systems are structured strongly influences whether these behaviors will be present in organizations. Particularly important in determining the impact of a control system seems to be its relationship to the organization's reward system. When extrinsic rewards are related to the control system measures, extrinsic motivation, falsification of data, resistance, and bureaucratic behavior are all present. The research also suggests that control systems which are effective in producing extrinsic motivation are often poor for the purposes of planning and coordination.

Lawler, E. E. III, Hall, D. T., and Oldham, G. R. Organizational climate: Relationship to organizational structure, process, and performance. *Organizational Behavior and Human Performance*, 1974, 11, 139-155.

The present study was designed to test the view that organization structure and process are related to organizational climate, which is in turn related to organizational performance and employee satisfaction. A questionnaire was administered to the Directors of Research in 117 R&D laboratories and to 291 scientists in a subsample of 21 of these organizations. Data were collected on (1) structural variables (span of control, size, levels, steepness, and hierarchy); (2) process variables (performance reviews, professional autonomy, assignment generality, collaboration support, budget account); performance (technical, administrative, and overall); and (3) organizational climate and need satisfaction. Correlational tests were conducted between the various sets of variables. Results show that several organizational process variables (but no structural variables) were significantly related to the climate of the organization as perceived by the scientists. Perceived climate in turn was shown to be significantly related to measures of organizational performance and to job satisfaction.

Lawrence, P. R. & Lorsch, J. W. Differentiation and integraiton in complex organizations. *Administrative Science Quarterly*, 1967, 12, 1-47.

A comparative study was made of six organizations operating in the chemical processing industry. The subsystems in each organization were differentiated in terms of formal structures, member's goal orientation, member's time orientations, and member's interpersonal orientations. This differentiation was related to the requirements of the particular subenvironment with which each subsystem dealt. A relationship was found between the extent to which the states of differentiation and integration in each organization met the requirements of the environment and the relative economic performance of the orgnaizations. Within each organization, the degree of differentiation of behavior and orientation between the various subsystems was found to be inversely related to the degree of integration obtained between these subsystems. Since this environment required that economically high performing organizations be both highly differentiated and well integrated, an investigation was also made into how effective organizations attained both of these antagonistic states.

This study demonstrates the feasibility and usefulness of simultaneously examining the differentiation and integration of major subsystems in complex organiztions. This has important implications for future research because it suggests the desirability of studying these phenomena under other environmental conditions to learn more about the relationship between organizational states and different environmental requirements.

Leifer, R. & Delbecq, A. Organizational/environmental interchange: A model of boundary spanning activity. *Academy of Management Review*, 1978, 3, 40-50.

A theoretical framework is developed for analyzing the determinants and functions of activity at the boundaries of organizations. Boundary spanning activity (BSA) is defined as the linkage between organizational behavior and its external environment. The framework developed is based on eighteen propositions relating the nature of BSA to their determining factors in the organization and the environment. The organizational characteristics posited as determinants of the BSA function include: structure (open vs. closed), goals (clear vs. unclear; varied vs. singular), and the need for information (regular vs. irregular; anticipated vs. unanticipated). The environmental factors include: perceived environmental uncertainty, environmental complexity, and availability of information.

The model developed to describe BSA focuses on the organizational/environmental information interchange process. Four implications for the study of organizations result from this model. First, it defines BSA as the mechanism by which an organization interacts with its task environment and through which information relevant to that environment enters the organization. Second, it suggests how individuals acting as boundary spanners function vis-a-vis the organization. Third, it focuses attention on the subsystem, rather than the organization as a whole, because each subsystem has its own structure, processes, and organizational/environmental transaction structure. Foruth, it suggests the need for further empirical research on BSA. The authors view their model as tentative, stimulating further theoretical and empirical work.

Likert, R. *The human organization: Its management and value.* New York: McGraw-Hill Book Company, 1967.

A new system of management is described, based on over twenty years of research in the Institute for Social Research of the University of Michigan. Through an extensive review of management systems in various organizations, four types of systems emerged: System 1: Exploitive-Authoritative; System 2: Benevolent-Authoritative; System 3: Consultative; and System 4: Participative. Empirical data shows that management systems approaching System 4 are more productive and have lower costs and more favorable attitudes than those approaching System 1. A science-based management, such as System 4, however, is appreciably more complex than other systems. The basic principles of System 4 management and their effects on performance are examined thoroughly. They include: (1) the use by the manager of the principle of supportive relationships, (2) his use of group decision making and group methods of supervision, and (3) his high performance goals for the organizations. The implementation of these principles and their relationship to organizational effectiveness is discussed. The remainder of the book is devoted to developing a plan for managers for improving fiscal management, human asset management, and coordination. Future trends in scientific management are discussed.

Lindell, M. D. & Drexler, J. A., Jr. Issues in using survey methods for measuring organizational change. *Academy of Management Review*, 1979, 4, 13-19.

Organizational development (OD) practitioners have become increasingly interested in the precise specification of what it is that changes as a result of their efforts. Investigators have begun to question the utility of survey methodology for investigating organizational change. This paper evaluates this method, and the theory of change types upon which it is based, as to its usefulness and feasibility.

The theory of change types presented distinguishes between three types of change: alpha change (behavioral change); beta change (response scale calibration); and gamma change (change in state). Psychometric principles and a contrived data set are used to explore these change types. The results of this study indicate that the theory's implications have been substantially overstated by its proponents. While experimental methods could be devised to test for the presence of one or another kind of change, testing for each type of change in individual organizational development efforts is not presently feasible. Current measurement technology does not provide the tools necessary to make such discriminations among types. It is concluded that using changes in judgmental measures as indicators of real organizational changes still appears to be the most reasonable assumption to make when using survey technology to assess organizational change.

Locke, E. A. The supervisor as "motivator": His influence on employee performance and satisfaction. In Bass, B. M., Cooper, R., and Haas, J. A. (Eds.) *Managing for accomplishment*. Lexington Books, D. C. Health & Company, 1970.

This article explores the scope of a supervisor's influence on an individual's job satisfaction and motivation to produce. An individual's degree of satisfaction with his job reflects the degree to which he believes explicitly or implicitly that it fulfills or allows the fulfillment of his job values. It follows that a supervisor can influence employee satisfaction by facilitating or blocking subordinate value attainment. The ways in which this influence can be exerted in task and non-task values are discussed.

It is hypothesized that there is no causal connection between satisfaction with the job or supervisor and productivity. Rather, the most direct motivational determinant of an individual's performance on the job is his specific performance goal or intention. If a supervisor is to influence the job performance of his subordinates, it follows that he must implicitly or explicitly influence the goals they set and/or their commitment to them. Four ways of doing this are discussed, including: instructions, participation, rewards and punishment, and example setting.

Lorsch, J. W. Environment, organization and the individual. In Negandhi, A. R., (Ed.). *Modern organization theory: Contextual, environmental, and socio-cultural variables.* Kent, OH: Kent State University Press, 1973.

This article examines the impact of differing market and technological conditions on organizational structures, interpersonal behavior, individual satisfaction in work, and related variables of organizational effectiveness. This focus on the relationship among organizational, individual, and environmental factors facilitates the bridging of the concerns of macro-organizational theorists with organizational and environmental variables and the focus of psychologists on the individual as the unit of analysis. Such a bridge requires a broader range of methodology and concepts than are presently characteristic of either side. This paper discloses the preliminary results of an attempt to develop a conceptual model of the organization-environment interface and a model of the individual to explain the impact of variations in environmental and organizational characteristics on the individual's desire to perform the work required of him by the organization.

The initial results indicate that what is related to effective unit performance and feelings of competence is a congruence not only between the organization and the environment, but also between these two sets of factors and the individual. This does not imply any simple unidirectional cause-and-effect relation, but rather the complex interaction of variables with several feedback loops. The relationships characterizing this interaction are discussed in detail. This study provides evidence for the validity and value of a contingency approach to the study of organizational phenomena.

Lorsch, J. W. Organization design: A situational perspective. *Organizational Dynamics*, Aut 1977, 2-14.

The approach to organizational design presented in this article is a conceptual framework, based on situational theory, intended to facilitate the understanding of the complex interrelationship among variables that affect the way people behave in an organization. Emphasized are: (1) the importance of the fit between task, people, and organization; and (2) the necessity of making the organization design consistent with top management's preferred style of leadership. The blueprint for organizational design is completely dependent on the contextual variables of the organization in question.

Several factors of organizational design are discussed. The first is the fit between the design structure, measurement and reward practices, the nature of the task to be done, and the psychological make-up of the workers. The second involves the differentiation between units. Any organizational design must permit differences between subunits so that the members of each unit can deal effectively with the specific nature of their part of the environment. The third factor relates to the inverse relationship between differentiation and integration. The more differentiation, the greater the difficulty in achieving integration; yet both are needed for effective goal achievement. The solutions posed are qualified and tentative.

Lorsch, J. W. & Lawrence, P. The diagnosis of organizational problems In Bennis, W. G. , Benne, D. K. & Chin, R. (Eds.). *The planning of change.* (2nd Ed.). New York: Holt, Rinehart & Winston, Inc., 1969.

This article discusses an approach to organizational change which puts considerable weight on the diagnosis of organizational problems prior to the change effort. Two aspects of diagnosis are identified: first, the question of what data is gathered, and second, the manner in which the data is interpreted and presented. difficulties associated with diagnosis are discussed.

An analytic scheme used by the authors in diagnosing organizational problems is discussed as an alternative approach to those currently used. The analytic scheme is called the Differentiation and Integration Model. The assumption underlying this scheme is that effective organizational performance is related to the presence of both the differentiation and integration that are required by the characteristics of their immediate environment. By extracting and analyzing data relative to these organizational processes, the types of problems which affect its efficiency and effectiveness can be isolated. If change is to occur, more emphasis must be placed on the diagnosis of organizational difficulties in this domain. Moreover, by emphasizing diagnosis and data feedback, the management group is left with a new set of tools which they can to apply to similar future problems. The importance of management's understanding and participation in the diagnostic and change processes is emphasized.

Lundberg, D. D. Hypothesis creation in organizational behavior research. *Academy of Management Review*, 1976, 1, 5-12.

This paper is concerned with the growing emphasis attributed to hypothesis testing as opposed to hypothesis generation in organizational behavior research. The major cause of this is believed to be related to the training given to researchers. Two factors are at the root of the inadequacy of this training: First, it is argued that the basic methods of research are being ignored, and the methods taught are probably obsolescent procedures. Also, some techniques which have led to progress are mistakenly being taken as kind of master key to all inquiry. Second, the literature tends to give young researchers a misleading view of research. Both the context and the logic which are by custom the proper format for reporting projects have little to do with the initation of research projects.

The author discusses how useful research ideas are discovered and the prerequisites for hypothesis creation. Suggested criteria for acting on new research ideas and questions are: extensity, professional encounter, mental experiments, and timing.

Luthans, F. *Organizational Behavior*. (2nd Ed.). New York: McGraw-Hill Book Company, 1977.

This book provides a conceptual framework for the study and understanding of organizational behavior through a blending of behavioral science and management. It is divided into five major parts. (1) Introductory framework. This section lays down a historical, behavioral science, management, and environmental foundation. A specific conceptual framework for organizational behavior is presented which incorporates both cognitive and behavioral concepts and perspectives. (2) Major structural process variables of formal organizations. This section discusses both classical and modern organizational theory and structure with specific attention to the management processes of decision-making, communcation, and control. (3) Psychological variables in human behavior. An examination of the psychological processes of perception, learning, motivation, and personality theory is presented. (4) Dynamics of organizational behavior. This section discusses groups and informal organizations, conflict, work motivation, and leadership and power. (5) Techniques and applications for human resource management. This last section evaluates the latest application techniques for selection, job design and appraisal, behavioral analysis and organization development.

Luthans, F. & Stewart, T. I. A general contingency theory of management. *Academy of Management Review*, 1977, 2, 181-195.

Recent formal recognition of situational influences on the management of complex organizations has led to an increasing number of contingency models, but a comprehensive and integrative theoretical framework for contingency management has been lacking. This article introduces a General Contingency Theory (GCT) of Management as an overall framework to integrate the diverse process, quantitative and behavioral approaches to management, to incorporate environmental factors, and to bridge the gap between management theory and practice.

The General Contingency model of the organization is a systems paradigm with three primary levels of organizational "building blocks". The primary system variables include environmental variables, resource variables and management variables. The secondary system variables are situation variables, organizational variables, and performance criteria variables. The tertiary system variables include the system performance variables. The relationship among these three levels is discussed in detail. The contingency approach to management and planned change is discussed in terms of the proposed model.

MacCrimmon, K. R. & Taylor, R. N. Decision-making and problem-solving. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.

The intent of this chapter is to consolidate evidence from a variety of disciplines into a more unified view of decision making. The central sections of the chapter examine strategies available to the decision maker in dealing with environments characterized by uncertainty, complexity, and conflict. The more than seventy strategies identified are presented within each section in an order which reflects the extent of required interaction with the environment (e.g., modifying perceptions requires minimal interaction, structural changes require a high amount of interaction). In addition to these three core sections, there are sections on types of decision problems and on the characteristics of decision makers which influence the use of the various strategies.

Organizing studies of decision-making and problem-solving in the form of strategies rather than by the traditional format should help in applying the existing knowledge and also in indicating major needs for future studies.

Mahoney, T. A. & Frost, P. J. The role of technology in models of organizational effectiveness. *Organizational Behavior and Human Performance*, 1974, 11, 122-138.

This article is based on the contention that research to date has not provided a conclusive picture of the role of technology in a model of organizational behavior. Traditional theory has emphasized technology only as a causal variable in the formulation of organizational structure and behavior. Two difficulties contribute to this inadequacy: (1) a problem in obtaining a satisfactory operational definition of technology; and (2) the difficulty in establishing the appropriate unit of analysis within which to study technology variance.

An operational definition of technology is developed and applied in this study, building from a typology of technologies proposed by J. D. Thompson. Analysis was conducted on 197 organization units (departments, divisions) from within a diverse sample of 17 business and industrial firms. The organization units were classified among three varieties of technology, specified as long-linked, mediating and intensive. Units were also described in terms of several dimensions of organizational behavior developed in earlier research. Direct and indirect relationships involving technology, 14 dimensions of organizational behavior, and organization unit effectiveness were investigated in several analyses. The findings from these analyses support the hypothesis that the criteria of effectiveness of an organization unit vary with the nature of the technology of the unit. The nature of intra-technology models of organizational effectiveness are generally supportive of the variation expected from the Thompson theoretical analysis. No direct technology-organizational effectiveness relationship was observed. The model of organizational effectiveness observed within each of the three technological categories are described and the implications of their differences and similarities are discussed.

Mahoney, T. A. & Frost, P. J. *The role of technology in models of organizational effectiveness.* (TR 7005) University of Minnesota: Industrial Relations Center, 1972. AD747-953.

Technology has been depicted, in recent years, as an important causal variable in some theoretical formulations of organizational structure and behavior. Much of the difficulty in studying technology can be traced to the problem of obtaining a satisfactory operational definition. A related problem is that of establishing the appropriate unit of analysis within which to study technology variance.

An operational definition of technology is developed and applied in this study, building from a typology of technologies proposed by J. D. Thompson. Analysis was conducted on 297 organization

units (department, divisions) from within a diverse sample of 17 business and industrial firms. The organization units were classified among three varieties of technology, specified as long-linked, mediating and intensive. The units were also described in terms of several dimensions of organizational behavior developed in earlier research. Direct and indirect relationships involving technology, 14 dimensions of organizational behavior, and organization unit effectiveness were evaluated in several analyses.

The findings from these analyses support the hypothesis that the criteria of effectiveness of an organization unit vary with the nature of the technology in that unit. The nature of the intra-technology models of organizational effectiveness are generally supportive of the variation expected from the Thompson theoretical analysis. No direct technology-OE relationship was observed. The models of OE observed within each of the three technology categories are described and the implication of their differences and similarities are discussed.

Mahoney, T. A., Frost, P., Crandall, N. F. & Weitzel, W. The conditioning influence of organization size upon managerial practice. *Organizational Behavior and Human Performance*, 1972, 8, 230-241.

The purpose of this study is to define those organizational variables which are related to organization size. The data analyzed were derived from earlier studies of organizational effectiveness criteria by Mahoney (1967) and Mahoney & Weitzel (1969). Eighteen dimensions of organizational characteristics were identified and related to management style within each definable unit. The results of this study show that only three dimensions were related to organization size: staffing, delegation, and results emphasis. Each of these dimensions concern interrelationships among members within the organization -- an element which would be sensitive to the number of individuals comprising the unit. It is further noted that unit size was more closely related to these characteristics than was organization size. This study provides support for the hypothesis that organization/unit size is a relevant variable in understanding organizational phenomena -- especially those concerned with managerial practices.

Mahoney, T. A., Weitzel, W. & Krefting, L. *Managing for effectiveness in research organizations*. (Technical Report 7000) University of Minnesota: Industrial Relations Center, 1970. AD718-820.

Managers apply implicitly held models of organizational effectiveness in the evaluation of subordinate organization units. Twenty-four variables have been identified as applicable in these models. This study of managers of research and development units has identified a model of organizational effectiveness underlying their evaluations of subordinate units. This model is compared with a related model identified in studies of managers in more general business settings, and several differences are discussed. The research and development managers place more emphasis on staff and organizational capacity and less emphasis upon productivity than do the general business managers. These differences probably underlie much of the misunderstanding between general business managers and research and development managers. It is argued that these differences tend to reflect differences in the technology and production cycle of the two settings rather than personal differences in the groups of managers.

Marks, M. Organizational adjustment to uncertainty. *The Journal of Management Studies*, 1977, 14, 1-7.

Emphasis has traditionally been placed on the way external pressures change an organization's objectives and operational practices. In this paper, different aspects of the adaptation process are examined, including the changes wrought in the firm's internal structure and organization. The main thesis is that the achievement of congruence between the external challenges and opportunities and the internal organization of the firm is one of the crucial factors in long-term survival. Planning, in its broadest sense, can make an important contribution to this adaptive process. The level tasked with this responsibility is top management.

A period of heightened uncertainty increases the need to plan. The rise in uncertainty and risk presents the organization with the need to resolve two paradoxes. First, the more difficult it is to forecast, the more important it is to plan. Second, the more difficult it is to plan, the less necessary are full-time professional planners. The solution lies in a reevaluation of the planning activities/structure by the organization. While there is no blueprint for the most successful planning system, there are three general themes which should be taken into consideration: (1) The planning system must be concerned with the development of strategy. (2) The development of strategy must be an interactive process in which most levels of management are aware of outside pressures, implications of alternative environmental changes, and the role they must play in coping with this change. (3) Planning must be designed so that it can be comfortably used by top management in the fulfillment of what is their major task.

Mawhinney, T. C. & Ford, J. D. The path goal theory of leader effectiveness: An operant interpretation. *Academy of Management Review*, 1977, 2, 398-411.

This article provides an operant interpretation of path goal theory by reviewing basic operant terms, concepts, principles, and laws and then comparing path goal and operant interpretations of path goal propositions and hypotheses. While the path goal motivation model focuses on what the subordinate is doing or will do in response to a particular situation as a function of his/her history in that situation, this alternative model focuses on what the leader should do in a given situation vis-a-vis his/her subordinates. The latter model is based on a correlation-based law of effect.

The applicability of operant conditioning terms to leader effectiveness is discussed in terms of their value as an alternative source of information about behavior and its determinants. The advantages of this approach over path-goal theory are discussed with suggestions for further research.

McConkie, M. L. A clarification of the goal setting and appraisal processes in MBO. *Academy of Management Review*, 1979, 4, 29-40.

Under the guise of Management by Objectives (MBO), the notions of goal setting and performance appraisal have assumed many different shapes and purposes. To help clarify much of the confusion surrounding MBO, this article synthesizes from the works of leading MBO experts the common elements of their respective descriptions and definitions of how goals should be set and how performance appraisals should be conducted under the MBO rubric.

A review of the literature confirms the diversity of opinion regarding MBO. However, a solid notion of what MBO is generally thought to be can be extracted from the commonalities in the research to date. With regard to goal setting, there is consensus regarding the importance of an organization adopting objectives which are specific, measurable, placed in a time framework, prioritized, and joined to an action plan. Also, most experts emphasize the criticality of subordinate involvement in goal setting to an integration of individual and organizational goals, as well as need for goal flexibility in facilitating organizational change. Regarding performance appraisal, it is generally agreed that appraisals be held periodically, and that they be conducted on the basis of objective performance standards which are mutually agreed upon by both superiors and subordinates. Such commonalities can serve to give a more general, widely applicable, definition of MBO.

McKelvey, B. Guidelines for the empirical classification of organizations. *Administrative Science Quarterly*, 1975 20, 509-525.

After a brief review of organizational classification, ıltivariate approaches toward the empirical identification of such classifications are discussed. Ten guidelines for conducting future multivariate classificatory studies are presented, supported by critiques of two published large-scale empirical studies. Taxonomic development is viewed as a critical element in the future health of organization science.

The ten guidelines are, briefly: (1) Define the broadest possible population of organizations or base it on a significant cultural unit. (2) Use a probability sampling plan without any stratification for selecting a sample of organizations. (3) Define as inclusive a population of organizational attributes as is possible. (4) Use a probability sampling plan for selecting a sample of organizational attributes. (5) Define the population of observers of organizational attributes to be as inclusive as possible. (6) Use a stratified probability sampling plan for selecting observers. (7) The sample of attributes must be no larger than the input capacity of the multivariate analysis program. (8) Each attribute must not be overrepresented in the input stream of the multivariate program and must be independently measured. (9) Criteria guiding unavoidable decisions in using multivariate analysis must be publicly described and consistently applied. (10) Classificatory breaks in ordering type concepts should come at points optimizing parsimony and intraclass homogeneity.

Melcher, A. J. (Ed.). *General systems and organization theory: Methodological aspects*. Kent, OH: Kent State University Center for Business and Economic Research, 1975.

This book concentrates on some of the methodological problems that must be solved if the promise of systems theory is to be realized. Three strands are developed. The first focuses on the concepts of systems theory. W. Buckley presents an introduction to the systems model through a careful definition of the component terms. E. Wenninger, R. Glassman, A. Kuhn, T. Condon, and T. Milburn discuss present usage of key systems concepts and propose more analytical definitions of these variables.

A second focus is on the methodology for analyzing the complex interdependent relationships among variables in a systems framework. D. Fry develops alternative modes that can be used in moving from static to dynamic analysis. S. McIntosh focuses upon conceptual and methodological problems in analyzing the equilibrium and stability interrelationships. This latter concern is further discussed by J. Wills.

The third set of essays evaluates the degree to which the present development of systems theory can be or is being applied to practical problems. D. Duncan develops the thesis that systems theory is useful for practical managers, and that academicians are falling behind practitioners in the development of systems concepts. E. Burack expresses the concern that directing energies toward revising systems concepts is a non-additive activity. D. Robey shows how a systems perspective can redress otherwise misleading analyses. R. Hough provides a framework for communicating the basic approach of using systems analysis on applied problems. A. Negandhi evaluates the utility of using selected systems concepts to develop a mid-range theory of organization that extends beyond the simplifying assumptions of traditional theory, yet is short of the goal of total systems theory of organizations. Finally, D. Fraley develops the need to relate systems theory to practice if further developments are to be made.

Mickelson, J. S. & Campbell, J. H. Information behavior: Groups with varying levels of interpersonal acquaintance. *Organizational Behavior and Human Performance*, 1975, 13, 193-205.

This study examines the information processing behavior of groups characterized by varying levels (or degrees) of cohesiveness. The study attempts to determine the extent to which the possession of information by group members about one another enhances the predictability of language patterns within the group system. The assumption is made that possession of information reduces entropy within groups and is a useful behavioral index of other characteristics of behavior systems. It is hypothesized, therefore, that as the cohesiveness of groups increases, their language behavior becomes more redundant, hence, relatively more efficient.

Groups of people were selected who could be compared on the basis of the relational density or cohesiveness (many reciprocal choices) in the groups. These groups then responded to partially mutilated, or deleted, texts. A determination was made as to whether groups with high relational density showed response patterns more similar, in terms of words chosen to reconstruct mutilated messages, than groups of lower relational density. Kendall Partial Correlations were used to calculate the relationship between RD and R (relational density/redundancy) against various variables. Results indicate that redundance increases with increasing cohesiveness so long as messages are consistent with the task environment where cohesiveness is developed. It is further concluded that language systems in a complex environment can be studied using this type of design.

Miller, D. Strategy, structure, and environment: Context influences upon some bivariate associations. *The Journal of Management Studies*, 1979, 16, 294-315.

In studying organizational adaptation most researchers have tended to draw sample-wide conclusions about the relationships among strategic, structural, and environmental variables. More often than not, the findings of different investigators are in conflict. Particular variables are said by some to covary positively, while different studies demonstrate a negative relationship. This paper attempts to show that the direction and significance of bivariate product-moment correlations may vary significantly, logically, and systematically according to the adaptive approach used by firms.

A sample of firms is segmented into four parts, which are internally homogeneous in the evolutionary patterns among environmental, organizational, and strategy-making variables. The findings from a correlational analysis of each sub-sample indicate how some common discrepancies in the literature show the promise of being resolved when the differences in the contexts of the bivariate relationships are examined. Thus, it is hazardous to focus on bivariate relationships in isolation. Researchers must also examine these relationships within carefully defined contexts. Only then will findings be sufficiently precise to be generalizable to a particular sub-group of organizations.

Miller, D. & Friesen, P. H. Strategy-making in context: Ten empirical archetypes. *The Journal of Management Studies*, 1977, 44, 253-280.

A more encompassing form of contingency theory is proposed to study organizations and their decision-making behavior. Instead of looking at bivariate relationships between environmental, organizational and decision-making style variables, it is suggested that researchers attempt to find a number of causal models which represent archetypal, or frequently occurring, relationships among a broad host of such variables. In this manner, relationships are qualified by their context, and a more complete picture of organizational functioning emerges. A methodology for isolating archetypes is presented which demonstrates that it is possible to expand the research scope of organizational studies without encountering unmanageable complexity. Such a methodology is based on a multivariate approach to organizational analysis. Some findings which portray strategy-making behavior under different environmental and organizational states are discussed.

Miller, J. A. *Structuring/destructuring: Leadership in open systems.* (TR-64) University of Rochester, Management Research Center, 1973.

A cybernetic open systems view of leadership and organizational effectiveness is presented. The opening discussion deals with the nature of organizational processes and their relationship to leadership acts. Processes are seen as constraints on the utilization of energy or information, modified by leadership acts. Leadership acts are constrained by existing processes, which represent the cumulative effects of previous leadership acts. The second section analyzes the transactional nature of the system-environment relationship. A complex adaptive system is seen to cope most effectively when its internal processes are structured so as to constitute an appropriate match with the nature of its environment. That match is acheived through leadership acts. The ability of a system to modify its processes without decreasing coping effectiveness depends on the existence of slack.

Observed leadership acts are classified as structuring or destructuring. Structuring acts constrain member autonomy, enhancing system stability; destructuring acts relax constraints, enhancing flexibility. Structuring and destructuring are mutually exclusive; both kinds of acts may be undertaken in a system by sequencing over time or in parallel subsystems, but never in the same subsystem at the same time. Leadership systems are repetitive patterns of similar acts made necessary by the inappropriateness of existing process structure. Inappropriately understructured processes give rise to directive styles, and inappropriately overstructured, to participative. The more appropriate the process/environment match, the less rigid and repetitive the styles.

Mitchell, T. R., Larson, J. R., Jr. & Green, S. G. Leader behavior, situational moderators, and group performance: An attributional analysis. *Organizational Behavior and Human Performance,* 1977, 18, 254-268.

The authors propose that many of the findings currently reported in the leadership literature are confounded by an attributional process. While much leadership research assumes that the elements associated with higher scores on leader behavior and/or situational dimensions lead to better group performance, these authors argue that the causality may actually be reversed. Specifically, it is hypothesized that perceptions of good group performance could lead to higher ratings on leader behavior and situational measures than would perceptions of poor group performance.

Three studies were conducted in which subjects were led to believe that a group either performed well or poorly, and then were asked to rate the leader on The Leader Behavior Description Questionnaire and some situational variables. Correlational analyses were conducted on the data from these questionnaires. Substantial support for the hypothesis was found for the situational factors while the leader behavior results were mixed, but generally supportive. The implications of these findings for leadership research are discussed.

Mobley, W. H., Griffeth, R. W., Hand, H. H. & Meglino, B. M. Review and conceptual analysis of the employee turnover process. *Psychological Bulletin,* 1979, 86, 493-522.

Research on employee turnover since the Porter and Steers analysis of the literature reveals that age, tenure, overall satisfaction, job content, intentions to remain on the job, and commitment are consistently and negatively related to turnover. Generally, however, less than 20% of the variance in turnover is explained. Lack of a clear conceptual model, failure to consider available job alternative, insufficient multivariate research, and infrequent longitudinal studies are identified as factors precluding a better understanding of the psychology of the employee turnover process.

The primary objective of this article is to clariy and integrate the concepts traditionally related to employee turnover and satisfaction into a general model of the individual employee turnover process. This conceptual model suggests a need to distinguish between satisfaction (present oriented) and attraction/ expected utility (future oriented) for both the present role and alternative roles. It also points out the need to consider nonwork values and nonwork consequences of turnover behavior as well as contractual constraints. The proposed model represents a potential mechanism for integrating aggregate-level research findings into an individual-level model of the turnover process.

Moch, M. K. & Morse, E. V. Size, centralization, and organizational adoption of innovations. *American Sociological Review*, 1977, 42, 716-725.

This study is concerned with the attributes of organizations likely to facilitate or inhibit the adoption of innovations. First, it offers an interpretation of the often-found relationship between size and adoption frequency. Second, it investigates relationships between structural attributes -- specialization, function of differentiation and centralization-adoption. Finally, it develops a model which

specifies interactions between these attributes and the type of innovation adopted. An interaction between size and centralization is also posited.

The model developed to analyze these relationships is tested using data gathered from a sample of US hospitals. The findings, on the whole, are consistent with the hypothesis that adoption of innovations compatible with the interests or perspectives of lower-level decision-makers occurs more frequently in large, specialized, functionally-differentiated and decentralized hospitals. Centralization and the interaction between size and centralization do not appear to affect adoption of innovations which are not compatible with the interests of lower-level decision-makers. The data also indicate that functional differentiation facilitates adoption of this type of innovation. A revised model of adoption behavior is suggested, and its implications for a general theory of organizational adoption behavior are explored.

Molnar, J. J. & Rogers, D. L. A comparative model of interorganizational conflict. *Administrative Science Quarterly*, 1979, 24, 405-425.

Two types of interorganizational conflict are investigated in this study: structural and operating. Structural conflict involves rules that govern a relationship, whereas operating conflict occurs over interpretation and application of such principles. Among the many factors affecting interorganizational relationships are the similarities and differences of the interacting units. Comparative properties represent the fit, congruence, and compatibility of the interface between organization. The purpose of this study is to develop a model of interorganizational conflict that incorporates key aspects of the organizational interface, modeling conflict on the basis of the similarities and differences of the interacting organizations.

The study examined 147 dyadic relationships in networks of natural resource organizations in five non-metropolitan midwest counties. The model includes variables measuring domain and administrative context as well as organizational age differences, as exogenous factors causally related to interdependence and the two types of conflict. Correlation results show comparative properties to be significant determinants of interorganizational conflict. Comparative variables are primarily related to interdependence and structural conflict. Implications of comparative properties for the study of interorganizational relationships are discussed.

Motowidlo, S. J. & Borman, W. C. Behaviorally anchored scales for measuring morale in military units. *Journal of Applied Psychology*, 1977, 62, 117-183.

Behavioral examples of how military units express varying degrees of morale were provided by US military personnel in the United States and in two foreign locations. From these examples, behaviorally anchored rating scales were developed for eight dimensions of group morale. They were used to rate morale of 47 platoon-sized units in the US Army stationed in a foreign location. Although errors of leniency and restriction of range did not seem severe, the ratings did show indications of halo error and only low to moderate interrater reliability. Despite these psychometric deficiencies, correlations with ratings of unit effectiveness and self-reports of unit members provided some evidence for convergent validity. Military units rated high on the morale scales were also rated high on overall effectiveness and low on frequency of low-morale activities like dissent, drug abuse, and destruction/sabotage. Members of units rated high on some of the morale scales were more likely to report high morale and intention of reenlisting.

Mott, P. O. *The characteristics of effective organizations.* New York: Harper & Row Publishers, Inc., 1972.

The objectives of the research summarized in this book are to define and develop measures of organizational effectiveness and to determine some of the characteristics of organizations that influence their effectiveness. Chapter 1 is devoted to the development of a more general model of large organizations that is typically found in the literature. In this model, organizations are conceptualized as collections of centers of power in varying degrees of centralization, related to one another through interfaces that vary in degree of organization and directness of connection. One advantage of this model is that it provides an opportunity to study the conditions that lead to varying degrees of closure in different organizations. Organizational closure is believed to be an important variable mediating many of the relationships between other organizational properties and organizational effectiveness.

The definition and measurement of organizational effectiveness is discussed in Chapter 2. Organizational effectiveness is defined as the ability of an organization to mobilize its centers of power for action -- production and adaptation. Available measurement tools in OE research are discussed. The remainder of the book is devoted to discussions of relationships between selected organizational characteristics and organizational effectiveness. Variables which are examined in terms of effectiveness are: decision-making, organizational and individual needs, leadership and leadership styles, flexibility, adaptability, and productivity. Conclusions are drawn as to the optimal conditions for each of these variables in effective, adaptable, and productive organizations. Recommendations for future research are given.

Muchinsky, P. M. Organizational communication: relationships to organizational climate and job satisfaction. *Academy of Management Journal*, 1978, 20, 592-607.

This study explores the relationships among measures of organizational communication, organizational climate, and job satisfaction. Three questionnaires were completed by 1,160 employees of a large public utility rating the various dimensions of communication, climate and satisfaction. A questionnaire developed by Roberts and O'Reilly (1974) was used to measure organizational communication; Form B of the questionnaire by Litwin and Stringer (1968) to measure organizational climate, and the Job Descriptive Index developed by Smith as a measure of job satisfaction. The means and standard deviations of the 16 communication dimensions, six climate dimensions, and five job satisfaction dimensions were computed and compared via correlational analyses.

The results of this study indicate that certain dimensions of organizational communication are highly related to both organizational climate and job satisfaction, while others are not. The findings of this study bring into focus some of the problems associated with broad, multidimensional concepts. Of particular concern is the construct validity of concepts like organizational communication and climate. There is a great deal of ambiguity as to unit of analysis appropriate for research on these concepts. The unit of analysis (individual vs. organization) is an important determiner of whether one is talking about psychological vs. organizational climate, or individual vs. organizational communication. The ambiguity in the results of this study serve as a caution to future researchers against crossing units of analysis, e.g., relating an individual unit of analysis in one concept to an organizational unit of analysis in another concept. The need to establish the construct validity of such concepts and to identify the parameters of them appears particularly acute.

Nadai, R. A., Duey, W. E., Ray, R. & Schaum, F. W. *Organizational effectiveness in the U.S. Army*. Washington, DC: Organizational Effectiveness Study Group, DACS-DM-OE, 1977. ADA043-500.

This study is an assessment for the Chief of Staff, Army of Army-wide organizational effectiveness (OE) activities and training and includes a recommended strategy and courses of action for institutionalizing the application of this technology. The study focuses on the long-term development and sustainment of an Army-wide OE capability from the standpoint of organization, staffing, resources and management requirements.

Since the 1950s, advancements in the fields of management and applied behavioral science in conjunction with successful command and leadership practices have provided the foundation of OE concepts, methods and skills. In the broadest sense this use of OE as a technology in the Army represents a desire to understand the human forces at work in the military and to improve combat readiness, motivation, commitment and personal involvement. Findings and recommendations from several different OE efforts are reproted on in detail.

Nadal, R., Schwar, J. & Blascak, D. *An analysis of corporate organizational development experience and its implications for the future of the Army's organizational effectiveness program.* Carlisle Barracks, PA: US Army War College, 1978. ADA060-968.

The fundamental purpose of this study is to evaluate the experience of select organizational development user corporations and compare the results with the Army experience in organizational effectiveness. Data were gathered from a literature search and interviews with corporate personnel and academicians.

The recent Army effort, to the extent that it has developed, compares favorably with the corporate early experience and has the capacity built into its process to manage the change of the process itself. The Army is not yet doing two pertinent levels of OD which the corporations visited are doing. The strategic OD, accomplished to systematically address the organizational future in a participatory way, and the socio-technical areas of OD which are executed to enhance jobs, redesign work, and increase productivity at the worker level are not done in the Army at this time. Recommendations follow that the Army should expand its process, change the role of the OESO and the content of the OETC, educate manager/commanders at all levels, and develop a survey feedback system in order to accomplish strategic and socio-technical functions to vertically integrate the OE process in the Army.

Nealey, S. M. *Organizational influence: Interpersonal power in military organizations.* Washington, DC: Battelle Human Affairs Research Center, 1976. ADA022-603.

Research activities are described over a four-year period of study of interpersonal influence (leader power) in the military. The study included two phases. During Phase I, interpersonal influence questionnaires were administered to three samples of enlisted men (N=1596) at three stages of their military careers -- new recruits, basic trainees, and enlisted men with two years of duty. The questionnaire probed leadership power and leadership climate dimensions. Abstracts of six technical reports of the findings are reproduced.

Phase II of the study involved the development and administration of an indirect measure of leadership power attitudes based on critical incidents in Navy leadership. One hundred and ten officers and 110 enlisted men served as subjects. Abstracts of three technical resports describing this activity are reproduced.

The major conclusions from the total study is that enlisted men report heavy reliance by military superiors on leadership power based on rank, authority, threats and punishment. Enlisted men favor greater use of leadership power based on knowledge, experience and mutual respect. This discrepancy between leadership attitudes and actual leadership behavior remains unanswered.

Negandhi, A. R. *Organization theory in an open system.* New York: Dunellan Publishing Co., Inc., 1975.

This study reports the findings of empirical research undertaken in 236 industrial firms in seven countries. Details are provided on methodology and design definition, conceptualization and operationalization of major variables, samples, and methods of data collection. A comparative analysis is made of management practices of the US parent companies, the US subsidiaries, and the comparable local firms in the seven countries.

The controlling function of management is examined first. Elements of control investigated are: the nature and scope of policy-making, setting standards for production and clerical employees and for supervisory, cost budgetary, and quality controls, etc. Following is an analysis of the long-range planning practices of the US parent firms, their subsidiaries and the foreign firms and of the organizational set-up of these companies. A number of organizational characteristics are discussed, including: departmentalization, formalization and documentation of policies, authority, layers of hierarchy, decentralization in decision-making, leadership practices and the impact of socio-cultural variables on leadership systle, and management practices (e.g., job analysis and appraisal systems, and training and development programs). The summary discussion focuses on the universality of management practices and principles.

Negandhi, A. R. & Reimann, B. C. Task environment, decentralization and organization effectiveness. *Human Relations*, 1973, 26, 203-214.

Most research has emphasized the importance of actual environmental conditions on the effective functioning of an organization. However, there are various sociological and behavioral researchers who emphasize instead the perception of those conditions formed by the decision makers. The authors of this study contend, like the latter, that the impact of "true" task envorinoment on organizational functioning and structure may not be direct; rather, it is mediated through the perception of the decision-makers

Two sets of relationships are explored: (1) organizational concern toward task environmental agents and the degree of decentralization in decision-making; and (2) the degree of decentralization and organizational effectiveness. The data used for this study were collected from 30 manufacturing companies in India. Spearman's rank correlation and the Kruskal-Wallis Test were used to evaluate the data. The results support the following hypotheses: (1) there is a positive relationship between decentralization and organizational effectiveness; and (2) the autonomy of managerial personnel is a function of task environment structure, the accessibility of information about that environment, and the managerial perception of the meaning of environmental information. Implications for future research on the impact of the external environment on the functioning of organizations is discussed.

Nicholson, N. Absence behavior and attendance motivation: A conceptual synthesis. *The Journal of Management Studies*, 1977, 14, 231-252.

This paper proposes a new model and associated methodology for the analysis and prediction of employee absence. The first part of the paper briefly reviews theoretical writings on the topic and concludes that a radically different orientation is needed for any useful integration to be achieved from the fragmented insights to be found in these works. A first step toward the building of such an integrated theory is a consideration of the requirements for an adequate theory of absence. To discover this, the nature of absence is explored in a conceptual analysis, leading into a consideration of methodological and measurement problems.

The "A-B Continuum" is proposed as an answer to these problems, characterizing absence-inducing events in terms of their avoidability. It is suggested that the impact of these events varies from person to person, and that the variation is due to the mediating influence of attendance motivation. The construct of "attachment" is introduced as a means of measuring attendance motivation, and its main constituents are specified. The final section of the paper attempts to show how the full model may be used to explain and predict individual differences in attendance behavior.

Nutt, P. Models for decision-making in organizations and some contextual variables which stipulate optimal use. *Academy of Management Review*, 1976, 1, 84-98.

Six organizational decision-making models are described and critiqued. They include: (1) Bureaucratic Model, (2) Normative Deicison Theory, (3) Behavioral Decision Theory, (4) Group Decision Making, (5) Conflict-Equilibrium, and (6) Open System. Advocates of these models often assume that a particular model should be used for most, if not all, decision-making tasks. This paper challenges that assumption. A counter proposition is offered, stating that factors characterizing the decision-making environment stipulate when a particular model can be optimally used. Propositions for selection of an appropriate decision-making model are derived, based on: the primary, managerial and institutional layers of an organization, the nature of the organization's key tasks, the types of dependencies among organizational units, the assessments required between adjacent layers; and some characteristics of the organization's environment.

O'Connor, E. J. & Farrow, D. L. A cross-functional comparison of prescribed versus preferred patterns of managerial structure. *Journal of Management Studies*, 1979, 16, 222-234.

While numerous studies have found an appropriate match of environmental and task requirements with organizational structure to be conducive to high output efficiency, comparable investigations of the relative satisfaction of employees under these varying conditions have been notably absent. In recognition of this lack of past data, the current research is designed to investigate whether those relative structural levels recommended as best for performance would also be considered most desirable by production and research incumbents. A two-stage investigation was designed to clarify this question. Initially, an exploratory study was conducted with a sample of 258 managers from the US and UK. Based on the results of this pilot project, an hypothesis was formulated which held that employees in effective production subunits typically operate in significantly more certain external environments and under more structured systems than do their research counterparts.

A study using two separate samples of 95 and 166 British managers was conducted to test this hypothesis. Seven tests were made of differences in the attitudes, preferences and behavioral self-descriptions of production and research managers. Of these, six provided signficiant support for the hypothesis. Findings were consistent for attitude, preference, and for behavioral measures. Some problems exist with this study, however. Since the results are based on secondary analyses of previously collected data, the responses utilized may not meet all the assumptions required to justify the use of significance tests. Also, the limited set of structural dimensions measured and the nature of the programmed exercised employed to collect the data tend to restrict the generalizability of the study. Suggestions for further research are discussed.

O'Reilly, C. A., III & Roberts, K. H. Information filtration in organizations: Three experiments. *Organizational Behavior and Human Performance*, 1974, 11, 253-265.

There is considerable empricial evidence confirming the notion that people often distort information as it travels through organizations. The research reported here focuses on selective filtration or omission as a mechanism for distortion. Two independent variables, directionality of information flow and interpersonal trust and influence, are related in three experiments to nine measures of information filtration.

The subjects for this study were 171 graduate and undergraduate students, randomly assigned across the three experimental conditions. The subjects were asked to role play positions as subordinates, superiors, or peers in an organizational hierarchy. After reading some background information on the organization, the subjects were told that a problem requiring their immediate attention had just arisen. The situation required the subject to provide information for his superior, peer or assistant. To determine the effects of directionality of flow on respondent information behavior, a one-way analysis of variance was computed for each of the nine dependent variables, using each of the three directions of information flow as independent variables. A 2 x 2 analysis of variance was computed to test the effects of trust and influence, with these two variables as independent variables and each of the nine types of information as dependent variables, for each of the three experimental replications. A 2 x 2 analysis of variance was also computed for the aggregate of the three replications. The results indicate that senders acted to filter different types of information, depending on the direction the information was to be sent and the senders' trust in the receiver.

Offenberg, R. M. & Cernius, V. Assessment of Idiographic Organizational Climate. *The Journal of Applied Behavioral Science*, 1978, 14, 79-86.

In preparing an organizational diagnosis, one problem faced by change agents is the integration of the different perceptions of the individuals who make up the client organization. In this study, it is hypothesized that factor analysis and elements of social exchange theory (cost, reward and commitment) could be used to resolve this problem. An instrument prepared in a preliminary study administered to the faculty of two schools (N=50). Quantitative descriptions of each organization were made on the basis of factor patterns.

Simultaneous factor analysis showed that there were systematic differences in the factor patterns obtained from the two schools. Faculty who reviewed the descriptions could correctly identify the one derived from their school's data, indicating that descriptions were valid. These results indicate that the social exchange and factor analysis combination is a promising technique for organizational diagnosis.

Olmstead, J. A. Factors in organizational effectiveness. (HumRRO-PP-1-72). Alexandria, VA: Human Resources Research Organization, 1972.

This article offers an alternative conceptual framework for the understanding of organizational effectiveness. The author bases his discontent with traditional organizational theory on Bennis' (1966) contention that it is "out of joint" with an emerging view of organizations as adaptive, problem-solving systems, and insensitive to the critical need of organizations to cope with external stress and change. Traditional methods of evaluating effectiveness provide static indicators of output characteristics; proposed here is a measure of an organization's capacity to cope with continuously changing environments. The framework developed to describe this is based on the notion of organizational competence -- the ability of an organization to sense changes in its external and internal environments, to process the information sensed, and to adapt operations to the sensed changes.

The data presented to support these concepts result from a HumRRO project designed to determine the contribution of four factors (adaptability, reality-testing, identity, and integration) to competence, and of competence to organizational effectiveness. Subjects used in this study were 10 groups of 12 experienced officers who participated as battalion commander, battalion staff, and company commanders in an 8-hour role simulation of light infantry battalion engaged in internal defense operation. Correlations were computed (1) between the group scores of each of seven processes performed (sensing, communicating information, decision-making, stabilizing, communicating implementation, coping actions and feedback) and effectiveness; and (2) between the components of competence and effectiveness.

The results of this study show that the processes which occur in organizations have heretofore been neglected when, in fact, they appear to be critical determinants of effectiveness. The conceptual framework embodied in organizational competence appears to provide one productive means for overcoming this limitation in both research and application. Specifically, the processes that have been identified provide both a framework for evaluation and bases for training and OD. Organizational competence, and hence effectiveness, can best be improved by efforts that focus upon developing the organization as a system, that is team training of all key personnel together, rather than skill development with isolated individuals.

Olmstead, J. A., Christensen, H. E. & Lackey, L. L. *Components of organizational competence test of a conceptual framework.* Alexandria, VA: Human Resources Research Organization, 1977.

The purpose of the Work Unit FORCE is to explore the human factors within organizations that impede or enhance command and control activities, with the aim of improving ability to control these factors. To accomplish this purpose, a conceptual framework and supporting methodology were developed. The framework was developed around several concepts that are subsumed under the rubric "organizational competence". Competence, the capacity of an organization to cope with continuously changing environment, was conceived to be a major determinant of organization effectiveness (OE). It consists of 3 major components: reality-testing, adaptability, and integration. Where OE is the final outcome, competence is the ability of the organization to perform certain critical operational functions that lead to effectiveness.

The analysis of organizational competence reported in this study is based on a simulation involving ten 12-man groups of Vietnam-experienced infantry officers who participated in an 8-hour role-play of a light infantry battalion engaged in combat operations in Vietnam. Zero-order correlations of competence components with effectiveness resulted in coefficients of .96 for reality-testing, .79 for adaptability, and .11 for integration. Eight conclusions are drawn from this and other correlations relating competence and effectiveness. Implications of this study for improving organizational functioning are discussed.

Olmstead, J. A., Elder, B. L. & Forsyth, J. M. *Organizational process and combat readiness: Feasibility of training Organizational Effectiveness Staff Officers to assess command group performance.* (HumRRO IR-ED-78-13). Alexandria, VA: Human Resources Research Organization, 1978.

This report describes the results of the first phase of a project concerned the relationship between performance of certain critical organizational processes and combat readiness of US Army units. The research was devoted to (1) an analysis of the relationship between process performance of battalion command groups and the combat outcomes of battle simulations in which the battalions participated and (2) determination of the feasibility of training OESOs to observe and assess the process performance of TOE unit battle staffs and to feedback their observations so that improved performance would result.

Twelve battalions participated in the simulation during July and August 1978. A significant correlation was found between overall command group process performance and overall combat outcomes across the four modules of the battle simulation. This confirmed the strong relationship believed to exist between the quality of organizational process performance and combat outcomes. Four conclusions were drawn from this study relating unit effectiveness to (1) the quality of command group performance, (2) the feedback of process observations by OESOs, (3) the ability to train command groups and battle staffs to improve their process performance and (4) the ability to train OESOs to better assess and constructively feed back observations to the command groups.

Osborn, R. N. & Hunt, J. G. Environment and organizational effectiveness. *Administrative Science Quarterly*, 1974, 19, 231-246.

This investigation of environmental complexity is based on a unique conceptual view of organizational environments which distinguishes among broad factors facing many organizations, conditions unique to a system, and interorganizational characteristics. Environmental complexity is viewed as the interaction between environmental risk, dependency, and interorganizational relationships.

Research questions concerning complexity in the task environment are investigated in 26 small, rigidly structured social service organizations. Measurements were taken of overall effectiveness, task environment risk (degree of heterogeneity among task environment members on the dimensions of objectives, goals, output, size, and structure), and interorganizational interaction. Kendall's tau was used to examine the relationship among OE, task environment risk, task environment dependency and interorganizational interaction. A multiple linear regression approach was used to test a series of propositions made about the relationships stated above. Results showed that neither complexity nor risk was associated with organizational effectiveness. Both task environment dependency and interorganizational interaction alone and in combination were positively and significantly correlated with effectiveness. Some of the results may be unique to the sample, but a separation of internal and external conditions alters typical interpretations of external impacts. A more careful differentiation among internal, external and linkage variables is recommended.

Ottaway, R. N. & Cooper, C. L. Moving toward a taxonomy of change agents. *International Studies of Mangement and Organizations*, 1978, 8, 7-21.

This paper reviews some of the existing literature on change agents and proposes a more comprehensive and sequential taxonomy which may help in focusing future research efforts. The viewpoint taken is based on Argyris's (1970) concept of intervention in conceptualizing change-agent strategies. The assumption is that change agents often experience rejection in their role, or the change they are attempting to implement is rejected, because they follow a plan such as that described by Rogers (1972).

Based on a review of the literature on the conditions favorable for change and change-agent typologies, a taxonomy of change agents is proposed. It is based on six assumptions: (1) everyone is a change agent to some degree; (2) the classification ranges from the one extreme of scope, focus, number, and benefit to the other; (3) all the major taxa are required in any change process; (4) all major taxa are in chronological order; (5) all taxa are of equal value; (6) commitment to common values must permeate all the categories in a particular change process. The taxonomy develops three major taxa: Change generators; intentional change implementors; and unintentional change implementors. This framework is designed to clarify the process of change and to help unscramble the confusion over the variety of change-agent roles described in numerous typologies.

Ouchi, W. G. The transmission of control through organizational hierarchy. *Academy of Management Journal*, 1978, 21, 173-193.

This paper addresses the problem of control loss in hierarchies. The literature supports the contention that all forms of control may not be equally susceptible to hierarchical loss. Since it is demonstrably true that organizations achieve five and more levels of hierarchy, there must be some forms of control which can operate through mulitple levels. The hypothesis tested in this study is that control based on outputs is relatively less susceptible to hierarchical attentuation than is control based on behavior.

Data were gathered on 215 departments (aggregated from 2,363 questionnaires) of retail department stores in the midwest. The test used is admittedly weak because it does not measure agreement between levels on the substance of the goals and the exact levels of performance which are considered satisfactory and unsatisfactory. The principal measures are of behavior control given, behavior control received, output control given, and output control received. Four separate questionnaires were used to measure each of these factors.

Zero-order correlation coefficients were computed among these variables to test their relationship. The findings indicate that behavior control and output control differ sharply in transmission. Behavior control shows almost no interlevel consistency while output control is transmitted through three levels of hierachy with relatively little loss. Further analysis suggests that behavior control is determined by local, particularistic conditions and therefore cannot be expected to show high interlevel consistency or transmisssion.

Paine, F. T. & Anderson, C. R. Contingencies affecting strategy formulation and effectiveness: An empirical study. *The Journal of Management Studies*, 1977, 14, 147-158.

Recent attempts at clarifying the strategy formulation problem have centered around managerial perceptions of environmental uncertainty (the need for information) and perceptions of the need for internal change. This research empirically tests one such formulation, a four quadrant model incorporating these two perceptual variables. Data sources were 62 longitudinal case studies involving a variety of organizations and environments. Characteristics of strategy-making in each quadrant and differences between successful and unsuccessful organizations were examined through quantification of nine strategic variables for each case. These variables included: perceived uncertainty, internal change, objectives, innovation, risk-taking, futurity-organization form, role of policy-maker(s), and success.

Findings revealed differences between each quadrant on a number of strategic properties including risk taking, role performance of the key policy-maker(s), degree of innovation, extent of futurity in planning, and success of the organization. Strategic properties which predicted differences in success of each quadrant included perception of uncertainty, maximizing versus satisfying behavior, innovation, futurity of planning, and role performance of the policy maker(s). Successful firms in each quadrant tended to follow a strategic mode appropriate for the prevailing conditions. The four successful modes identified were adaptive planning, planning, adaptive entrepreneurial, and entrepreneurial or stress modes. Motivational aspects of these results and implications for future research are discussed.

Pasmore, W. A., Gaertner, K., Haldeman, J., Francis, C. & Shani, A. *Sociotechnical systems: An integrated literature review and analytical model.* Case Western Reserve University: Department of Organizational Behavior, 1979. Under contract to U.S. Army Research Institute.

The purpose of this review is to summarize current knowledge in the field of sociotechnical systems, with emphasis on its applicability to military settings. Sociotechnical systems theory is eclectic, drawing upon research in the areas of motivation, industrial engineering, systems theory, and many other frameworks and disciplines. The apparent lack of a central set of guiding assumptions in sociotechnical systems theory is probably due to the fact that the theory has been developed largely from practice rather than vice-versa.

Experimentation in sociotechnical systems theory are discussed. A review of more than 120 experiments indicates that sociotechnical system interventions can be quite successful if those involved maintain commitment to them. Examples of such interventions are given. A review of the analytical models for sociotechnical systems follows. The model developed by Foster (1967) and some of its variations are presented in detail. The related theoretical concepts of technology, motivation and cooperation, quality of work life, organizational power, and organizational change are examined in this framework.

The review concludes with a discussion of the applicability of the sociotechnical systems model in a military setting. In response to the uniqueness of the military environment, an analytical model is developed which encompasses the best aspects of traditional sociotechnical systems techniques while adding unique features designed specifically for the military environment. Experiments are suggested for testing the validity of this model.

Patten, T. H., Jr., (Ed.). *OD - Emerging dimensions and concepts: A collection of papers.* NY: American Society for Training and Development, 1973.

This collection of papers covers a wide spectrum of organization development issues. (1) T. H. Patten points out that OD and MBO are complementary parts of an organizational change strategy and should be integrated with organizations' reward systems if they are to be optimally effective. Alternate ways of carrying out an organizational change strategy are discussed. (2) B. T. Alban and L. I. Pollitt provide a statement on the nature of team building. The issues involved in starting a total organization change strategy with a team-building thrust are discussed. (3) R. E. Byrd describes the risk-taking laboratory design used to enable individuals to function more freely and think more innovatively. Implications for an OD program using this type of

laboratory education are discussed. (4) R. R. Blake and J. S. Mouton set forth a number of interventions managers can use to be effective in the conduct of their work. A two-dimensional OD grid is presented (client vs. outcome) which can be used to select an effective intervention style. (5) C. Mrazek recounts an attempt to make OD interventions in a resistant organization. His article points out the need for external change agents to help obtain the insight and leverage needed for internal organizational change. (6) G. H. Varney and H. J. Lasher recount their personal experiences with an OD intervention in the academic department of a university. Feedback information on feelings is presented, along with the Beckhard model upon which the study was based. (7) M. M. Moore discusses the inner workings of the commitment to sustained action required of management if change is to occur. (8) S. D. Anderson discusses in detail his experiences as an external change agent. The content of the workshops and the tools used in them are presented.

Payne, R. & Mansfield, R. Correlates of individual perceptions of organizational climate. *Journal of Occupational Psychology*, 1978, 51, 209-218.

This paper discusses the possible factors affecting the ways individuals perceive differently the climate of their employing organizations, and empirically tests the effects of three sets of possible determinants. Data were gathered from questionnaires completed by 387 persons working at different work organizations. The interrelationships between six aspects of climate and the other variables relating to organizational context, structure and position were examined using correlational analysis.

The results of this study tend to show that the perceptions of significant others may have greater influence than either variables reflecting the individual's position or objective indicators of organizational structure or context on individual perceptions of organizational climate. Also, salary was found to be a better predictor than the literature would lead one to expect.

Payne, R. & Pugh, D. S. Organization structure and climate. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.

The purpose of this chapter is to review work focusing on the concepts of organizational structure and organizational climate. This involves examining studies which relate the two constructs themselves as well as studies which explore the determinants of each (e.g., organizational contextual features such as technology and size). The review is organized around a distinction between objective and subjective methods of measurement. These two methods of measurement are not synonymous with structure and climate, and

it is argued that both structure and climate can, and have been, measured by both methods. The validity of structure and climate is investigated by systematically reviewing studies according to the various combinations possible for the structure and climate/objective and subjective distinctions (e.g., objective structure and subjective structure, subjective structure and subjective climate).

A final section looks at the relationship between measures of organizational climate and individual factors such as job satisfaction. Attention is drawn to the need to distinguish whether such studies used the individual or the organization as the unit of analysis. Consistent patterns are difficult to find, particularly when subjective measures are used. The reader is invited to draw his own conclusions about the value of future work on these two concepts and is helped towards this evaluation by being offered a pessimistic and an optimistic interpretation of the chapter.

Pedalino, E. & Gamboa, V. U. Behavior modification and absenteeism: Intervention in one industrial setting. *Journal of Applied Psychology,* 1974, 59, 694-698.

Behavior modification was used in an attempt to decrease absenteeism in a sample of 215 hourly employees at a manufacturing/distribution facility. Employees in four adjoining plants served as comparison groups. An ABA (baseline, intervention, return to baseline) intervention using a lottery incentive system constituted the experimental design. Absenteeism decreased significantly following the experimental group intervention but did not decrease in any of the four comparison groups. Further, stretching the schedule of reinforcement did not increase the rate of absenteeism. Findings are discussed in light of Lawler and Hackman's 1969 study which indicated participation, not the incentive system, decreased absenteeism.

Pennings, J. M. The relevance of the structural-contingency model for organizational effectiveness. *Administrative Science Quarterly,* 1975, 20, 393-407.

This paper examines the structural-contingency model, relating the environment and technology to the structure of complex organizations. The implication is that for a given environment or technology, a particular structure is appropriate. Through both subjective and objective data, this paper explores the degree of association between measures of structure and environmental uncertainty and related measures of complexity, resourcefulness, competition and instability.

The data for the study were collected in 40 widely dispersed branch offices of a large US brokerage organization. Subjective data were obtained from questionnaires; objective data were collected from company records and census information. Spearman-Brown correlational coefficients were computed on the questionnaire measures, and Pearson product-mement coefficients computed on the environmental and structural variables tested in the questionnaire and records. Results failed to support the model. The environment seems to have structural correlates, except for the variables of resourcefulness and complexity. The results show further that the goodness of fit between environmental and structural variables fails to explain variance in effectiveness.

Pennings, J. M. *Coordination and organizational effectiveness: A canonical analysis.* Pittsburgh, PA: Carnegie Mellon University, 1976. AD264-440.

This paper investigates the relationship between various aspects of coordination and indicators of organizational effectiveness (OE). Canonical correlational analysis represents a multivariate analysis procedure which can isolate the shared variance of two sets of variables. A design incorporating this procedure has been used to relate coordination to OE. This study is a follow-up of a previous effort in which environmental variables were used in a contingency framework. The earlier study failed to show that variables such as environmental uncertainty and complexity act in a contingent way upon the coordination-effectiveness variables.

Using data from 40 brokerage offices of a large US brokerage firm, the author tests six measures of coordination: horizontal and vertical communication, frequency of two types of meetings, participativeness, and team effort. Measures of effectiveness are: satisfaction and three static indices and three dynamic indices regarding customers and commission earned. The results indicate that the last four coordination measures have some predictive power with respect to effectiveness. There are two pairs of canonical variates. In the first pair meetings frequency and team effort on the one hand and commission earned and satisfaction on the other hand dominate. In the second pair all variables, except horizontal and vertical communication and active customers dominate. Coordination appeared sufficiently important to predict effectiveness. Implications of this study for organizational design are discussed.

Perrow, C. The analysis of goals in complex organizations. *American Sociological Review*, 1966, 31, 354-366.

This article addresses the lack of distinction between types of goals in organizational literature. It is argued first that the type of goals most relevant to understanding organizational behavior are not the official goals, but rather the operative goals embedded in the major operating policies and daily decisions of the personnel. Second, these goals will be shaped by the particular problems or tasks an organization must emphasize, since these tasks determine the characteristics of those who will dominate the organization.

The article begins with a theoretical discussion of the differences between operative and official goals, and the roles of each in organizational behavior. The author contends that if one knows something about the major tasks of an organization and the characteristics of its controlling elite, it is possible to predict its goals in general terms. The major tasks of every organization are four: (1) secure inputs in the form of capital sufficient to establish itself, operate, and expand as the need arises; (2) secure acceptance in the form of basic legitimization of activity; (3) marshal the necessary skills; and (4) coordinate the activities of its members and the relations of the organizations with other organizations and with clients or customers. Each of these task areas will not be equally important at any point in time, and will provide a presumptive basis for control or domination by the group equipped to meet the problems involved. Illustrative examples of the different combinations of goals-authority are evaluated in terms of their impact on organizational behavior. The examples used are: a voluntary service organization; a non-voluntary service organization, and a profit-making organization.

Pettigrew, A. M. Strategy formulation as a political process. *International Journal of Management and Organizations*, 1977, 7, 78-87.

An assumption is made that strategy formulation can be understood as a process of political decision-making. Because political processes evolve at both the group and the individual levels, the political decision process in turn must be understood as the resolution of conflicting demands from various interested individuals and groups. The extent of the disparities among these demands is conditional on the structure of the decision unit, the complexity and uncertainty of the dilemma, the level of salience of the dilemma in the organization, the stated value positions, the external pressures, and the history of relationships among the decision-makers.

Mobilization of power is another important aspect of the political decision-process. A demand is poltically feasible only if sufficient power can be mobilized and committed to its support. Thus, an analysis of the power structure and processes within an organization is crucial to an understanding of its method of strategy formulation. A key concept in an understanding of power mobilization is that of legitimacy. The management of meaning is a process of symbol constuction and value use designed to create legitimacy for one's demands and to de-legitimize an opponent's. Implications of this conceptualization of strategy formulations for managers are discussed.

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

This study explores supervisory behavior along the dimensions commonly used in studies of leadership behavior, but with emphasis on the extent to which that behavior is determined by constraints deriving from the supervisor's set of organizational and social interactions. It is argued that the supervisory behavior is constrained by the demands of others in his role set.

It was found that the expectations of a supervisor's superior and those of his subordinates and peers accounted for a significant portion of the observed variation in behaviors across 53 supervisors in the housing division of a large state university. Further, the extent to which supervisors conformed to their superiors' expectations was related to the number of persons and the proportion of the time spent supervising, the demands to produce, the supervisor's sex, and the proportion of the decisions made by superiors. Multivariate analysis indicated that the expectations of subordinates were more importnat in influencing social behaviors, while the expectations of the superiors were more important in determining work-related behaviors. Results are discussed in terms of Weick's (1969) finding that individuals in an organization will interlock behaviors to obtain a stable mutually satisfying interaction.

Pondy, L. R. Organizational conflict: Concepts and models. *Administrative Science Quarterly*, 1967, 12, 296-320.

This article discusses several of the most widely accepted concepts and models of organizational conflict. It has been argued that conflict within an organization can be conceptualized best as a dynamic process underlying a wide variety of organizational behaviors. The term conflict refers neither to its antecedent conditions, nor individual awareness of it, nor certain affective states, nor its over manifestations, nor its residues of feelings or structure, but to all of these taken together as a history of a conflict episode. An organization's success hinges to a great extent on its ability to set up and operate appropriate mechanisms for dealing with a variety of conflict episodes.

Conflict has many sources, possible modes of regulation, and effects on the organization. Thus, to be useful in the analysis of real situations, a general theoretical framework for the study of organizational conflict must at least fit several broad classes of conflict, some or all of which may occur within the same organization. This suggests that different ways of abstracting or conceptualizing a given organization are required, depending on the phenomena to be studied. Three models of the organization are described which serve as the basis for a general theory of conflict. They are: (1) a bargaining model, which deals with interest groups in competition for resources; (2) a bureaucratic model, which deals with authority relations and the need to control; and (3) a systems model, which deals with functional relations and the need to cooperate.

Porras, J. E. & Berg, P. O. Evaluation methodology in organization development: An analysis and critique. *The Journal of Applied Behavioral Sciences*, 1978, 14, 151-173.

This review analyzes and critiques the present state-of-the-art in empirical research in organizational development. In so doing, some of the generally shared assumptions about the quality and character of this body of knowledge are challenged. The search procedure yielded 35 empirical studies in the OD field for the period 1959-1975. Each study was analyzed according to (a) research design, (b) data collection procedures (c) subject characteristics, (d) treatment dimensions, and (e) data analysis approaches.

Findings show that the overall quality of OD research methodology was spotty. Research designs were relatively strong, with large percentages of investigators using quasi-experimental designs. An excessive reliance on questionnaires as the sole data collection

approach exists. Only a small percentage of studies reported using other quantified approaches. Most studies were conducted in one organization or in situations where n's for units of analysis larger than the individual were small (less than 10). The heavy use of laboratory training intervention techniques is noted, although a strong shift from process to task orientation has occurred in recent years. Over 75% of the studies reported the use of statistical tests of significance. Although data analysis procedures are becoming more sophisticated, the vast majority of studies used very simple analytical techniques. Based on this analysis, a series of suggestions for improvement of methodological approaches to OD research is presented.

Porter, L. W., Lawler, E. E. III, & Hackman, J. R. *Behavior in organizations*. New York: McGraw-Hill Book Co., 1975.

This book deals with organizations, individuals, and the interaction between them, with major focus on the behavior of people in work situations. Written in textbook fashion, its treatment of organizational and individual concepts are grounded in empirical research findings and behavioral science concepts. Discussion begins with a consideration of the nature of individuals and organizations and of the basic forms of their interaction. The discussion then turns to the emergence and growth of individual-organization relationships -- how each party chooses the other, adapts to the other, and develops continuing relationships. The third part of the book delineates the nature and impact of structural factors --both organizational and job-related-- on the individual's behavior. The topic of organization design is examined in terms of contextual and structural factors. The fourth section analyzes the influences of various organizational practices and social processes on employee's experiences and feelings and on their performance. The final section reviews and critically assesses the methods and goals of changing and developing organizations and concludes with the authors' personal thoughts on where organizations should be going in the future.

Porter, L. W. & Roberts, K. H. Communication in organizations. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.

Communication is treated as an important, under-researched aspect of organizational functioning. The topic is first examined from an organizational theory perspective, followed by a critical review of recent relevant empirical investigations. These studies include those concerning interpersonal communication in organizations and those pertaining to the organizational context of communication interactions. Methodological aspects of communication studies in the aggregate are discussed, with some suggestions offered concerning future research in this area.

Conclusions include: (1) no adequate theories exist to explain the nature of communication in organization; (2) considerable extrapolation of relevant research findings from other areas (i.e., attitude change) is required when these findings are applied to organizations; (3) available research findings are of limited usefulness in providing guidelines for effective ways to cope with communication problems in organizations; and (4) more varied and more innovative methodologies for studying organizational communication are necessary for future advances in knowledge in this area.

Pownall, R. E. *Organizational development in practice.* Carlisle Barracks, PA: Army War College, 1973. AD779-565.

This article addresses the applicability of organizational development within the military establishment. A definition of OD is developed as an effort planned, organization-wide, and managed from the top to increase organizational effectiveness and health through planned interventions in the organization's "processes" using behavioral science knowledge. OD is viewed as an effective way to cope with the rapidly changing environment facing both the industrial and military communities.

By use of a brief development of management theory coupled with the need for adapting to change and the knowledge based on five years of OD practice, an approach to determine whether OD can be used in the military is supplied. The author's conclusion is that OD can and should be adopted within the military establishment. Some specific suggestions are made regarding conditions to look for which favor a successful OD experience and some conditions which will lead to failure.

Price, J. L. *Organizational effectiveness: An inventory of propositions.* Homewood, IL: Richard D. Irwin, Inc., 1968.

The purpose of this book is to present the core of what behavioral scientists know about the effectiveness of organizations. The format used for this presentation is an inventory of a set of propositions specifying the determinants of organizational phenomena. The independent variables in the set are different for each proposition; the dependent variable, effectiveness, is the same throughout. The inventory focuses on organizations; i.e., social systems with a specific purpose. Effectiveness is defined as the degree of goal achievement specifically, the attainment of operative goals. Diverse measurements of effectiveness are accepted, and are assumed to classify organizations no differently than would a standardized measure. For the purpose of manageability, methodological issues are generally excluded from analysis.

Three systems of the organization are analyzed: (1) The economic system — that part of the organization directly involved in producing the output of the system. Organizations likely to have a high degree of effectiveness are characterized by economic systems which have high degrees of division of labor, specialized departmentalization (except where there is a high degree of complexity), and mechanization (except where there is a high degree of professionalization), and by continuous systems of assembling output. (2) The political system — those components of the organization which make decisions and which attempt to obtain support for those decisions from the environment. To maximize effectiveness, the organization's internal political system should be characterized by: high degrees of legitimate decision-making, rational-legal decision-making, and centralization with respect to tactical and strategic decisions (except where there is a high degree of complexity). The external political system should be characterized by: a high degree of autonomy, an ideology with high degrees of congruence, priority and conformity, co-optation, major elite co-optation, a high degree of representation, major elite representation, and a major elite constituency. (3) The control system — the components of the organization which motivate conformity to norms. An effective organization's control system is characterized by: a high degree of sanctions, a norm enforcer-norm conformer relationship which is basically secondary, a sanction system with a high degree of grade, a collectivistic sanction system; and high degrees of communication (vertical and norizontal) which is primarily instrumental, personal and formal.

It is emphasized that all the propositions, conditions and intervening variables presented in this inventory require systematic verification. This inventory has attempted to state all it can about the determinants of effectiveness; but it is admittedly incomplete. The systematic verification required necessitates the future development of standardized measurements of the variables.

Price, J. L. The effects of turnover on the organization. In Spray, S. L. (Ed.). *Organizational effectiveness*. Kent, OH: Kent State University Press, 1976.

This paper presents a codification and systematic ordering of the literature on the effects of turnover on the organization. Turnover is defined as the degree of movement across the membership boundary of the organization. The literature dealing with the effects of turnover seems to have two concerns: (1) the documentation of the costs of turnover, and (2) the effects of these costs on effectiveness. This paper reconceptualizes the literature dealing with the costs of turnover and critically examines the assumption that turnover, by increasing costs, reduces effectiveness. It also goes beyond this to determine the effects of turnover on other organizational variables.

The effects of turnover on effectiveness are described. In general, successively higher amounts of turnover produce (1) successively higher proportions of administrative staff members relative to production staff members, (2) successively higher amounts of formalization, and (3) successively lower amounts of participation in primary groups. Higher amounts of turnover also serve to increase innovation and to decrease satisfaction and conformity. The conclusion is drawn that the relationship between turnover and effectiveness is probably problematic rather than axiomatic. Suggestions for future research are discussed.

Pugh, D. S., Hickson, D. J. & Hinings, C. R. An empirical taxonomy of structures of work organizations. *Administrative Science Quarterly*, 1969, 14, 115-126.

The taxonomy of work organization structures presented here is based on three previously established empirical dimensions: structuring of activities, concentration of authority, and line control of workflow. One the basis of a sample of 52 organizations in the English Midlands, clusters of organizations on these three dimensions are examined and a sevenfold classification of organization structures is developed. These are identified as full bureacracy, nascent full bureaucracy, workflow bureaucracy, nascent workflow bureaucracy, preworkflow bureaucracy, personnel bureaucracy, and implicitly structured organizations. Their characteristic contextual features relating to size, technology, interdependence and ownership are demonstrated, and a possible developmental sequence suggested. These results indicate that the concept of a single bureaucratic type is no longer useful, since bureaucracy takes different forms in different settings.

Pugh, D. S., Hickson, D. J., Hinings, C. R., Macdonald, K. M., Turner, C. & Lupton, T. A conceptual scheme for organizational analysis. *Administrative Science Quarterly*, 1963, 8, 289-315.

A review of the literature indicates that studies of work behavior have been primarily processual rather than factorial. There has been a great concentration on the one-case study and little systematic attempt to relate behavior to contextual and organizational settings. A survey of the literature on bureaucracy leads to an analysis of organizational structure in terms of a set of variables (specialization, standardization, formalization, centralization, configuration, and flexibility) that are capable of empirical verification.

This study is concerned with the attempt to generalize and develop the study of work organization and behavior into a consideration of the interdependence of three conceptually distinct levels of analysis of behavior in organizations: (1) organizational structure, (2) group composition and interaction, and (3) individual personality and behavior. A factorial analysis is undertaken to establish the significant variables at each level and their relationships, and to develop at each level a processual analysis within the framework thus established. In order to examine the relationships between the structure and activities of an organization, its social and economic context, and its other characteristics, a list of contextual variables is developed to which detailed reference is made. This list is used as a series of independent variables which could be related to the dependent variables of organizational structure and functioning. In this way, the effect of various patterns of these independent variables on organizational structure can be identified.

Reference Book: *Organizational Effectiveness.* Fort Leavenworth, Kansas: U.S. Army command and General Staff College, 1979.

This reference book synthesizes the various factsheets, briefings, and speeches that address organizational effectiveness in the Army. It begins with a brief introduction to the systems theoretic concept of OE as it applies to the Army. An article by MAJ F. Schaum on the evolution of OE in the Army briefly summarizes some of the major advancements in management and behavioral science integral to the technology of OE and presents a thumbnail historical sketch of how organizational effectiveness has evolved in the Army. A major portion of this reference book is a reprint of the Summary of OE on the Army Staff, by J. F. Hallen (1977). This report provides a consulting summary and assessment of OE activity on the Department of Army staff. It reports in detail on MILPERCEN, one of the most successful OE efforts achieved in the Federal Government. Several other articles, letters, and speeches are reprinted which focus on OE/OD attempts in various Army units and the implications of them for future efforts in this area.

Reimann, B. C. Dimensions of structure in effective organizations: Some empirical evidence. *Academy of Management Journal*, 1974, 17, 693-708.

The research reported in this article was designed to examine the relationship between the underlying dimensions of structure and organizational performance. Two questions in particular were explored: (1) What differences, if any, exist between the structural dimensions of relatively high and low performing organizations? and (2) If different from those of low performing organizations, what are the dimensions associated with the relatively high performing organizations?

The sample for this study consisted of 29 industrial organizations manufacturing a wide variety of products. Data were gathered from personal interviews with from four to ten top executives in each firm, and by consulting relevant corporate documents. Two measures of effectiveness were used: subjective (financial and non-financial) and objective (executive turnover). Eleven measures of structure were used: functional specialization, formalization, lack of autonomy, delegation, centralization, functional dispersion, hierarchical control, functional specificity, staff density, administrative density, and vertical span. Cluster analysis of the correlations among the eleven measures of structure isolated three relatively independent dimensions -- (a) dencentralization, (b) specialization, and (c) formalization -- among the ten high performing firms, but failed to produce any such independent measures among the low performing firms. While the relatively high effective organizations can be described by a multidimensional framework along the lines of that proposed by the Aston group, the relatively low performing organizations tend to conform more closely to the Weberian, unidimensional conception. Findings also indicate that the organizational patterns of high performing firms is one of independently varying degrees of decentralizations, specialization and formalization. These independent dimensions may be considered as forming a three-dimensional structure space. The authors conclude that one of the reasons for the differences in conclusions drawn by various researchers regarding the dimensionality of the organizational structure space may be their failure to analyze the relationship between an organization's structural arrangements and its performance.

Reimann, B. C. Organizational effectiveness and management's public values: A canonical analysis. *Academy of Management Journal*, 1975, 18, 224-241.

This paper introduces a conceptualization of effectiveness -- organizational competence -- which is not tied to the accomplishment of specific goals and is, therefore, superior to many earlier constructs in providing some comparability between different organizations as well as different field studies. A new predictor variable is introduced -- management's values with respect to the organization's relevant

publics -- which has not received much attention in previous organizational research.

The sample for this study consisted of 19 American manufacturers competing in a variety of industries. Data on organizational structure, effectiveness and situational variables were gathered from interviews with the top level executives in each organization and through an inspection of relevant company documents. The results of a canonical correlation analysis revealed that none of the situational (size, dependence, technical change) or structural (centralization, specialization, formalization) variables were very strongly related to organizational competence. A strong positive correlation was found between OE and management values and philosophies with respect to the organization's publics. The results of this study must be interpreted with care, however, in view of the fact that effectiveness was conceptualized as a function of the degree to which high ranking decision-makers were satisfied with the relative performance of their organizations in terms of achieving a set of typical goals. It is quite possible that their value judgements about the organization's publics may have been influenced by their feelings about their own organization's relative effectiveness.

Reimann, B. C. & Negandhi, A. R. Strategies of administrative control and organizational effectiveness. *Human Relations*, 1975, 28, 475-486.

Conceptually and empirically, research on the concept of organizational control is surrounded with conflicting evidence. This study reports results of a comparative analysis of 30 manufacturing firms in India on: (1) administrative control strategy, including: degree of decentralization and formalization of decision-making; and (2) organizational effectiveness, in terms of financial indicators (sales, profit) and social-behavior measures (morale, turnover, etc.). Pearson's Product Moment and Spearman's rank correlations indicated that the indices of decentralization, personnel control, and process control were significantly and positively related for all 30 firms. These results support the findings reported by Child (1972).

In this study, most effective organizations tended to choose a unidimensional strategy of administrative control. This strategy consisted of the use of formalized procedures to control decentralized decision-making in terms of both human and material resources. The least effective firms chose a similar strategy of control, but emphasized those procedures involving the control of material resources, while neglecting their human resources in this respect. These results support a normative theory of administrative control in organizations. The most effective strategy for maintaining indirect control over a decentralized decision-making process appears to be one which effectively integrates the rational material resource controls with the more intangible human resource control mechanisms.

Renwick, P. A. Perception and management of superior-subordinate conflict. *Organizational Behavior and Human Performance*, 1975, 13, 444-456.

This study investigates interpersonal conflict occurring on the job. The purpose of the study is two-fold: (1) to examine the frequency with which specific topics are perceived as issues of conflict as well as the frequency with which various sources are viewed as the determinants of superior-subordinate conflict; and (2) to investigate the effects of status differences on the management of conflict and attitudes toward disagreement from the perspective of both supervisor and subordinate and within the context of organizational climate.

Members of 36 superior-subordinate dyads representing 10 organizational subunits completed the Employee Conflict Inventory (ECI). An independent sample of 169 employees from the same subunits completed the Profile of Organizational Characteristics used to measure organizational climate. Spearman rank order correlation coefficients were computed for each dyad in a comparison of topics and sources of conflict. A 2 (status) X 5 (method) analysis of variance with method of conflict resolution repeated over subjects was used to investigate the effects of status differences on the management of conflict. The dependent variable was the likelihood that each of the five methods of conflict resolution would be used. Results indicated that dyad members held similar perceptions concerning the topics and sources of superior-subordinate conflict: technical and administrative issues were the most frequent topics, and differences in perception and knowledge were the primary reasons. Although perceptions of the other party's management of conflict were similar to the respondent's description of self, they differed significantly from the other's own self description. Conflict management was related to status differences as well as to attitudes toward conflict and corresponded to response styles predicted to emerge in consultative organizational climates.

Roberts, K. N. & O'Reilly, C. A., III. Some correlations of communication roles in organizations. *Academy of Management Journal*, 1979, 22, 42-57.

This paper is part of a large-scale research program concerned with organizational communication. Its purpose is to examine a set of variables possibly associated with the communication roles (isolate vs. participant) occupied by organizational members. The general hypotheses tested are: (1) there exists significant demographic and personality differences between isolates and participants in organizational communication networks, and (2) there are significant differences between role occupants in their perceptions about communication, their affective responses to work, and their performance. Participation in

communication activities is believed to have a positive effect on organizationally relevant outcomes; isolation, a negative effect.

An investigation was conducted on 579 officers and enlisted personnel in three high technology military organizations. Respondents were asked to complete a survey instrument containing various questions concerned with demographic characteristics, perceptions of work environment, and sociometric issues. Data were analyzed through discriminant function coefficients for isolate-participant groups on each variable described. The results of this study provide strong support for the hypotheses regarding communication roles. Additional research is suggested on the causal relationships between participation in communication networks and role determinations and outcomes. It is futher suggested that future research be done in other types of organizations in order to attain more generalized validity for these findings.

Ross, P. F. Innovation adoption by organizations. *Personnel Psychology*, 1974, 27, 21-47.

This article discusses the importance of understanding adaptation, or learning, by organizations. A review of the current theory and research on organizational adaptation reveals that no existing model of the process by which organizations adopt new practices is general enough to reasonably fit a major fraction of the innovation adoption histories described in the literature. A general model is developed to answer this need. According to this model, the adoption climate in an organization is affected by the presence and strength of initating mechanisms which import ideas about new practices and sustaining mechanisms for the creation of an internal environment favorable to the survival of new ideas. Any combination of initiating and sustaining mechanisms will foster innovation, but some of both are essential for adoption to occur. Correlational studies are cited which support the validity of the hypotheses about initiating and sustaining mechanisms affecting adoption performance. While the theoretical implications of this model are assumed generalizable, more research is called for in validating the model empirically.

Rousseau, D. M. Technological differences in job characteristics, employee satisfaction, and motivation: A synthesis of job design research and sociotechnical systems theory. *Organizational Behavior and Human Performance*, 1977, 19, 18-42.

A review of job design research and sociotechnical systems theory demonstrates their points of divergence and convergence. Their difference occurs primarily in a consideration of the scope of each. While the sociotechnical systems approach considers the entire system or organizational unit in planning organizational change, job design studies have traditionally focused upon interrelated job functions or single jobs. The latter suffers from a failure to consider the interrelations of jobs in the redesign of work processes. The overlap of the two approaches occurs in their use of the same job characteristics as the vehicles for desired organizational change. These are: the variety of tasks performed and skills employed, responsibility for and control over the work process, completion of meaningful units of work, feedback, interpersonal interaction, and learning. Both approaches emphasize these job characteristics as important to employee satisfaction and motivation.

These job characteristics were examined in a survey of employees in 19 production companies. The organizational units were classified into three technological categories: long-linked, mediating, and intensive. Through MANOVA and ANOVA analyses, significant differences were found between job characteristics, employee satisfaction, and motivation across technology. In addition, there were substantial positive relations between the job characteristics, satisfaction and motivation. The job characteristics of variety and task significance were found to be particularly important to employee satisfaction and motivation.

Salancik, G. R. & Pfeffer, J. Who gets power - and how they hold on to it: A strategic contingency model of power. *Organizational Dynamics*, Winter, 1977, 3-21.

This article argues that traditional political power, far from being a "dirty business" is, in its most basic form, one of the few mechanisms available for aligning an organization with its own reality. Institutionalized forms of power -- authority, legitimization, centralized control, regulations -- tend instead to buffer the organization from reality and obscure the demands of the environment. Political processes, rather than being mechanisms for unfair and unjust allocations and appointments, tend toward the realistic resolution of conflicts among interests. And power, while it eludes definition, can be recognized by its consequences -- the ability of those who possess it to bring about the outcomes they desire.

The model of power advanced in this article is an elaboration of what has been called strategic-contingency theory, a view that sees power as something that accrues to organizational subunits (individuals, departments) that cope with critical organizational problems. Power is used by subunits to enhance their own survival through control of scarce critical resources. Because of the processes by which power develops and is used, organizations become both more aligned and more misaligned with their environment. An analysis of this contradiction and its implications for managers and administrators are presented.

Samuel, Y. & Mannheim, B. F. A multidimensional approach toward a typology of bureaucracy. *Administrative Science Quarterly*, 1970, 15, 216-228.

This study reformulates and measures variables defining bureaucracy and presents a multidimensional method for classifying bureaucratic patterns. The suggested approach is to view bureaucracy as a multidimensional phenomenon characterizing every formal organization, with each dimension reflecting a specific organizational aspect. The dimensions should be conceived as a continua of intensities, showing ranges of variation.

The empirical data used in this study were collected in 30 industrial plants. The Guttman-Lingoes multidimensional scalogram analysis-I program was employed for establishing the typology, and six bureaucratic types have been identified: rudimentary, interpersonal, emergent, balanced, technical, and managerial. No claim is made for the exhaustiveness of the typology, but only for the usefulness of the approach.

Schein, E. H. & Bennis, W. G. *Personal and organizational change through group methods*. New York: John Wiley & Sons, Inc., 1966.

This book attempts to describe and conceptualize an educational strategy which proports to influence the learning of individuals and to induce change in organizations — laboratory training. Laboratory training is a method used to promote changes in the learning process itself and to communicate a particular method of learning to the participants. In this way, it can be thought of as "learning how to learn".

Part I provides a general introduction to laboratory training. A scenario is developed in which the reader is oriented to the laboratory training experience as he follows a subject through a typical two-week laboratory. The nature of laboratory training is discussed in terms of (1) its underlying assumptions; (2) its values and "meta"

goals; (3) its goals and outcomes; (4) some of the necessary conditions for learning in a laboratory; (5) two proposed models of learning (Dilemma-Invention Model and Learner-Change Model); and (6) the laboratory components which exert a major influence on learning outcomes.

Part II is devoted to the uses of laboratory training. Samples are presented of some of the most effective sophisticated designs in a variety of situations. Part III focuses on the recent research which has been done on the processes and outcomes of laboratory training. Part IV brings the concept of laboratory training into the realm of organizational change. The learning theory in which laboratory training is grounded is presented. The aspect of the theory dealing with attitude change is identified as an area in which laboratory training can aid the organization in stimulating this process in its members. Discussions in this portion of the text are abstract in the hope that they will serve to develop the beginnings of a testable learning theory.

Schein, V. E. & Greiner, L. E. Can organization development be fine tuned to bureaucracies? *Organizational Dynamics*, 1977, Winter, 48-61.

Firmly embedded in most of the organizational development (OD) literature is the basic ideology that organizations need to become more organic systems capable of responding to a rapidly changing environment. Accordingly, the OD change agent typically employs a variety of organic-oriented techniques centered around team building, survey feedback and third-party consultation in all organizations. However, the preponderance of evidence shows that bureaucratic, non-organic, structures are still the dominant organizational form. Such organizations are characterized by pyramidal authority, downward communications, a workforce largely employed on "rational" functions, and the omnipresence of specialization of labor. The challenge to OD is to effect changes within this bureaucratic context.

For OD to enhance its effectiveness within bureaucratic structures, a conceptual point of view is needed. The absence of such has long plagued OD efforts. A contingency approach to OD is proposed, which views organizational problems emanating from bureaucratic structures as uniquely different from those of organic structure, and hence demanding a specialized kind of treatment. Four steps are suggested for the "fine tuning" of OD to deal effectively with bureaucratic structure: (1) adopt a more positive and accepting attitude toward bureaucratic organizations; (2) acquire a more thorough knowledge of bureaucratic operations; (3) adopt a more conceptual and realistic orientation for understanding bureaucratic behavior; and (4) develop a more versatile range of OD techniques that apply to bureaucracies. It is believed that the future growth and impact of OD may hinge on its acceptance of the bureaucratic structure, rather than on continued attempts to convert all organizations into organic forms.

Schneider, B. & Snyder, R. A. *Some relationships among and between measures of employee perceptions and other indices of organizational effectiveness.* Maryland University, 1974. AD781-888.

This study concurrently examines: (1) relationships among measures of job satisfaction and organizational climate, (2) relationships among more traditional criteria of organizational effectiveness (and their temporal reliability), and (3) joint or common relationships between employee perceptions and these other criteria. Relationships among two measures of job satisfaction, one of organizational climate, and seven production and turnover indices of organizational effectiveness were investigated in 50 life insurance agencies (N=52). It was shown that (a) climate and satisfaction measures were correlated for some people but not for others: (b) people agree more on the climate of their agency than they did on their satisfaction; (c) production and retention were uncorrelated but size was positively related to the former and negatively related to the latter; (d) ratings of agency effectiveness were highly related to gross agency size; and (e) satisfaction, but not climate, was correlated with retention. Implications of these data for research on climate and satisfaction as well as organizational change are discussed.

Schneider, B. & Snyder, R. A. Some relationships between job satisfaction and organizational climate. *Journal of Applied Psychology,* 1975, 60, 318-328.

This study examines the relationships among employees' responses to two measures of satisfaction and one measure of climate and effectiveness data on the organizations in which the respondents were employed. It is argued that a logical and empirical distinction between the concepts of satisfaction and climate is possible if (a) both variables are properly conceptualized, and (b) each variable is assessed according to an appropriate level of analysis. The distinctions suggested between the two concepts are as follows: Organizational climate is a summary perception which people have about an organization. It is a global impression of what the organization is. Juxtaposed to this is job satisfaction, which is a personalistic evaluation of conditions existing on the job or outcomes that arise as a result of having a job. It is the perception of internal responses. This distinction leads to a classification of climate as organization/description oriented and satisfaction as individual/evaluation oriented.

The study was conducted on personnel in 50 life insurance agencies (N=522). A questionnaire was distributed to respondents measuring organizational climate, job satisfaction, and need satisfaction. Effectiveness ratings were accomplished by the six company personnel most concerned with agency policy on the indices of gross volume, achieving appointment, agency turnover, and average volume by staff size. The results showed that (1) climate and satisfaction measures were correlated for people in some positions in the agencies but not for others; (b) people agreed more on the climate of their agency than they did on their satisfaction; (c) neither climate nor satisfaction were strongly correlated with production data; and (d) satisfaction, but not climate, was correlated with turnover data. Implications of these data for research on climate and satisfaction as well as organizational change are discussed.

Schriescheim, C. A. & Murphy, C. J. Relationships between leader behavior and subordinate satisfaction and performance: A test of some situational moderators. *Journal of Applied Psychology*, 1976, 61, 634-641.

The purpose of this paper is to examine the moderating effects of two situational variables, stress and units size. It also examines the effects of four situational moderators (stress, unit size, consideration, and role clarity) on the relationships between (a) leader behavior and subordinate satisfaction and (b) leader behavior and subordinate performance.

The sample used for this study consisted of 54 respondents in geographically dispersed units of a national black social services organization. Each respondent completed a 76-item instrument measuring his/her perceived job stress, the unit head's leadership behavior, job satisfactions, and work role clarity. All analyses on the data were performed on a dyadic basis; that is, relationships between leader behavior and subordinate satisfaction and subordinate performance were analyzed on an individual basis, and averaged scores were not used. To examine the effects of the hypothesized moderators on relationships between leader behavior and subordinate satisfaction and performance, subgroup moderator variable analysis was used. Results indicate that the effect of work unit size was significant, with leader structure related to satisfaction in larger units and consideration related to satisfaction in smaller units. The results confirmed earlier findings that in low-stress jobs consideration enhances satisfaction and performance, where in high stress jobs, structure is more helpful. Also confirmed were the results showing that high structure had dysfunctional effects only when accompanied by low consideration. Finally, role clarity did not moderate the relationship between leader behavior and subordinate satisfaction and performance.

Schuler, R. S. Role conflict and ambiguity as a function of the task-structure-technology interaction. *Organizational Behavior and Human Performance*, 1977, 20, 66-74.

Based on the premise that organizational behaviors are phenomena of complex, interacting variables, this study analyzed the task-structure-technology interaction as a predictor of perceived role ambiguity and conflict. The hypothesis tested states that incongruent matches of task-structure-technology are associated with higher levels of role ambiguity and conflict than congruent matches of these variables.

The sample was composed of 272 employees of a large public utility. Role conflict and ambiguity were measured on eight- and six-item scales, respectively; task characteristics were measured by the Job Diagnostic Survey, and organizational structure by the Organizational Practices Questionnaire. The data were compared on the basis of cell mean and standard deviations, and planned contrasts. The results support the hypothesis; however, some incongruent matches were found to result in more role ambiguity and conflict than others. These results suggest that research on role ambiguity and conflict should consider the influence of the organization's structure and technology as well as the incumbent's task.

Schuler, R. S., Aldag, R. J. & Brief, A. P. Role conflict and ambiguity: A scale analysis. *Organizational Behavior and Human Performance*, 1977, 20, 111-128.

Role theory has been suggested as the conceptual framework in which to relate or join the properties of the organization and the individual. Two major concepts from role theory are role conflict and ambiguity. These concepts, measured with scales developed by Rizzo, House and Lirtzman (1970) have been used in most of the recent studies on role perceptions. Although the scales are frequently related to attitudinal and behavioral variables, they have remained relatively unexamined. This paper is an examination of the psychometric properties of the role conflict and ambiguity scales, including the factor structure, coefficients of congruency, internal reliabilities, test-retest reliabilities, absolute levels of conflict and ambiguity, and correlations with additional attitudinal and behavioral variables.

The analysis was conducted across six samples. Data were collected from 1573 employees from four different organizations. For each sample, zero-order correlations between role indices and all other variables were computed. An inter-item correlation matrix was calculated for the six role ambiguity and eight role conflict items. Two factor varimax rotations were obtained for each sample, and factor congruency values were calculated. In addition, internal

reliability estimates were computed for each role scale, and test-retest reliabilities were computed for role conflict and ambiguity with the matched respondents in two of the samples. The results suggest that continued use of role conflict and role ambiguity scales appears to be warranted.

Schwartz, D. E. & Jacobson, E. Organizational communication network analysis: The liaison communication role. *Organizational Behavior and Human Performance*, 1977, 18, 158-174.

This study represents an elaboration of the descriptive analysis of complex organizations. A field study was conducted to test the utility of a procedure for describing and analyzing inclusive networks of communication in complex organizations. In particular, the role of liaison persons was identified and operationally defined.

Evidence is presented that supports the validity of employing a sociometric procedure for identifying liaison persons as individuals who perform a communication linking function among primary groups in a complex organization. Liaison persons among the 142 professional staff of a college faculty were compared with nonliaison persons on demographic, interactional and functional dimensions. Differences were found that lead to a more detailed and systematic understanding of the liaison role and the persons who occupy that role.

Scott, [illegible] R., Dornbusch, S. M., Busching, B. C. & Laing, J. D. Organizational evaluation and authority. *Administrative Science Quarterly*, 1967, 12, 93-117.

This paper presents a conception of authority and authority systems, as well as a theory predicting the instability of certain kinds of authority systems. Empirical studies designed to explore the utility of the conception and to test hypotheses derived from the theory are presently under way in a number of organizations. The operationalization of the concepts presented here and a report of the empirical findings are presented in a later paper.

In this paper, authority systems in formal organizations are analyzed in terms of the process by which the performance of organizational participants is evaluated. Authority is viewed as authorization to attempt to control the behavior of others, and rests in four different kinds of authority rights, each of which is a component of the evaluation process. Authority systems are defined in terms of

the distribution of these rights among participants. The theory proposed in this paper specifies certain problems in the evaluation process which make the authority system incompatible with participants' achievement of evaluations acceptable to them. Incompatible authority systems are postulated to be unstable and to remain so until the incompatibility is resolved. A set of indices is developed for the identification of unstable systems. This theory is the basis of a current study of authority systems in five organizations.

Seashore, S. E. & Yuchtman, E. Factorial analysis of organizational performance. *Administrative Science Quarterly*, 1967, 12, 377-395.

The annual performance of 75 insurance sales agencies over an 11 year period is examined by factorial analysis methods with a view toward discovering the factorial elements, initially presumed to be goals, that characterize the behavior of small business organizations. It was discovered that ten factors serve to describe most of the variance in a set of 76 selected performance indicators. The investigation included an analysis of the stability of the obtained factor structure, which is very high, and the stability of the performance of individual agencies over the period of time, which proved to be high for some aspects of performance and low for others. The factors of performance are of kinds that preclude their being viewed as respresenting stable goals of the organization, i.e., as end states or outcomes of instrinsic value. They represent, instead, the continuing processes of resource acquisition which are characteristic of adaptive open systems. It is proposed that the conventional concepts of goals and goal attainment are not applicable to organizations. Organizational performance should be assessed and described in terms of generalized resource-getting capabilities under conditions of competition for scarce and valued resources.

Shull, F. A., Jr. & Mosely, D. C. The Peter Principle: Personal or organizational incompetence? *The Journal of Management Studies*, 1974, 11, 21-35.

This article offers the concept of organizational development as a rebuttal to the "Peter Principle". It proposes that incompetence in management may not be explained so much by terminal weaknesses of personnel in faulty promotion systems, as it is by the organizational climate in which managers perform, i.e., by outmoded supervisory styles and limiting structural relationships. While organizational development is not a panacea for all individual and organizational ills, it is a vehicle for enabling executives to remove many obstacles retarding individual and organizational growth and renewal.

The Matrix Organization Design is offered as a means of reconceptualizing the nature and form of collective behavior. The focus of this design is on sequential social and behavioral changes over time. Its key notion is that of process. In this context, OD is defined as an effort which is planned, organization-wide and managed from the top, designed to increase organizational effectiveness through planned interventions in the organization's processes. The fundamental purpose of OD, therefore, is to amplify or increase the use of managerial competency in terms of organizational goals. While necessitating the consultation of responsible OD agents, this notion of organiztional development heightens the creative potential of organizational members. Mitigating the possibility of the Peter Principle, therefore, is dependent upon extensive training and coaching of involved personnel -- not by changes in structure alone.

Simon, H. A. On the concept of organizational goal. *Administrative Science Quarterly*, 1964, 9, 1-22.

It is difficult to introduce the concept of organizational goal without reifying the organization -- treating it as something more than a system of interacting individuals. On the other hand, the concept of goal appears indispensable to organization theory. This paper proposes a definition of "organizational goal" that resolves this dilemma.

The goal of an action is seldom unitary, but generally consists of a whole set of constraints the action must satisfy. It appears convenient to use the term "organizational goal" to refer to constraints, or sets of constraints, imposed by the organizational role, that have only an indirect relation with the personal motives of the individual who fills the role. More narrowly, "organizational goal" may be used to refer particularly to the constraint sets that define roles at the upper levels of the administrative hierarchy. In actual organizations, the decision-making mechanism is a loosely coupled, partially decentralized structure in which different sets of constraints may impinge on decisions at different organizational locations. Although the description of organizational goals is consequently complex, the concept of goal can still be introduced in an entirely operational manner. Operationalizing the concept of goal necessitates a reference to individual goals, motivations and roles, as well as to the overall organizational decision-making system in defining the extent to which goals define the actual courses of action taken by the organization.

Slocum, J. W., Jr. & Sims, J. P., Jr. A typology for integrating technology, organization, and job design. *Human Relations*, 1980, 33, 193-212.

This paper proposes a theoretical model of technology that consists of three elements: workflow predictability, task predictability, and job interdependence. Various configurations of these three elements can be formed into cells that describe different technologies. The different models of managerial control and self-regulation associated with each cell are discussed.

The technology model and Hackman and Oldham's model of job redesign are combined to form an integrated technology/job redesign model. Various relationships between technology and job characteristics are explored. A major hypothesis is formulated that in order to change the job characteristics that are associated with a target work system, the unavoidable introduction of uncertainty is necessary. The amount of self-regulation and the perceived degree of autonomy are shown to be critical variables that link technology and job redesign principles.

Sorensen, P. F., Jr. Control and effectiveness in twenty-seven Scandinavian voluntary organizations. *The Journal of Management Studies*, 1976, 13, 182-190.

This study is concerned with the testing and extension of control theory, based on utilization of the Control Graph, to a group of Scandinavian voluntary organizations. The Control Graph is a theoretical and conceptual tool used to illustrate patterns of organizational control by plotting the amount of control exercised by various levels within an organization. Data were collected, through questionnaires, from 27 clubs of totally male membership. Four hypotheses were tested: (1) Organizational Effectiveness (OE) is positively related to total control; (2) OE is positively related to democratic control; (3) OE is positively related to agreement on the distribution and total amounts of control; and (4) OE is closely associated with the combination of high total control, democratic distribution of control and high level of agreement in the perception of control.

Results of correlational tests conducted on the data support each of these four hypotheses. These results are somewhat contrary to the findings of previous research into the nature of control and participation in various types of organizations (i.e., Woodward, Burns & Stalker). The conclusion is that the appropriateness of

control patterns within an organization needs to be considered within a contingency framework. Such variables as type of technology, voluntary vs. non-voluntary, nature of environmental change impacting the organization, etc., will influence the type of control pattern most conducive to organizational effectiveness. The need for additional comparative studies to clarify more precisely the relationship of control patterns to a number of contingency considerations is discussed.

Spekman, R. E. Influence and information: An exploratory investigation of the boundary role person's basis of power. *The Academy of Management Journal*, 1979, 22, 104-117.

This paper examines the boundary role person (BRP) as an influence agent and investigates an aspect of his potential ability to influence the decision outcomes of other organizational members. The sample used in this study consisted of 20 firms from the greater Chicago area. The focus of the research was on the purchasing agent and his interaction with members of the buying task group (BTG) (e.g., those constituents responsible for purchasing related decisions). Through questionnaires distributed to the purchasing agents in these firms, two issues were explored: (1) whether the degree of power attributed to the purchasing agent by other BTG members is associated with their level of perceived environmental uncertainty; and (2) the nature of the individual power-related behaviors of BRPs.

The results of the study indicate that as the BRP's information requirements increase under conditions of higher perceived environmental uncertainty, the constituent members attribute to the BRP greater power in the decision-making process. The results further suggest that, in light of the BRP's position in the transference of information across the organization's boundary, the reliance on expert power appears to be the most effective basis of social power for dealing with other organizational members.

Spencer, L. M. Jr. & Cullen, B. J. *Taxonomies of organizational change: Literature review and analysis.* (ARI TR-78-A23). Alexandria, VA: Army Research Institute for the Behavioral and Social Sciences, 1978.

This report presents a taxonomy and data collection methodology for assessing Army organizational effectiveness interventions. The authors reviewed the literature on organizational development classificatory schema and identified four variable dimensions that can be used to summarize this literature. These variable dimensions are: change agent characteristics, competencies and role; client characteristics and problems; intervention methods and processes; and outcome objectives and results.

Most descriptions of intervention methods are found to be too vague to permit a reviewer to determine exactly what change agents actually do to produce outcome results. It follows that research to identify (1) the competencies of effective change agents and (2) the design elements of successful interventions is likely to be most fruitful in advancing knowledge in this field. Three data collection methods designed to capture these variables are proposed for the development and analysis of Army OE intervention case studies. Behavioral event and structured interview protocols used to collect data from internal Army OE change agent and client subjects are presented with a classification system which can be used to summarize and code intervention variables.

Starbuck, W. H. Organizations and their environments. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology.* Chicago: Rand McNally, 1976.

This chapter reviews and evaluates the literature on organization-environment interaction. It is composed of three main sections. The first focuses on the notion of boundaries, in which it is argued that the trend in research to sharply distinguish (implicitly or explicitly) an organization from its environment is untenable. The second section deals with domains, roles and territories. The logical associations between organizational and environmental characteristics found to be lacking in the literature are discussed. The general conclusion is that to no small degree, an organization's environment is an arbitrary invention of the organization itself. The organization selects the environments it will inhabit, and then subjectively defines the environments it has selected. The final section deals with adaptation, evolution and research strategy. It is generally devoted to the dynamics over time of organization-environment interactions.

Steers, R. M. Problems in the measurement of organizational effectiveness. *Administrative Science Quarterly*, 1975, 20, 546-558.

Seventeen multivariate models of organizational effectiveness are reviewed in terms of their primary evaluation criteria, normative or descriptive nature, generalizability, and derivation. Little consistency was found in the evaluation criteria of these models. Eight problems of such models are discussed which appear to reduce their utility for the study of organizational effectiveness. These problems relate to: construct validity, criterion stability, time perspective, multiple criteria, precision of measurement, generalizability, theoretical relevance, and level of analysis.

An operative goal approach is suggested as an alternative model which answers some of the problems discussed. The operative goal approach rejects the notion that effectiveness can be universally defined or measured in terms of a static set of variables. It also takes issue with models that view effectiveness as the ability of an organization to compete successfully in the acquisition of scarce and valued resources. The operative goal approach defines effectiveness in terms of goal attainment; that is, the capacity of an organization to use its resources successfully toward specific ends. In this model, the critical criterion is goal optimization; effectiveness is measured against the feasible goal set, not the desired goal set. This model lends itself to the study of effectiveness through computer simulations and other related techniques.

Steers, R. M. Task-goal attributes, n achievement, and supervisory performance. *Organizational Behavior and Human Performance*, 1975, 13, 392-403.

This study investigates perceptions of five factor-analytically derived task-goal attributes as each relates to supervisory performance. The five attributes are: (1) participation in goal-setting; (2) feedback on goal effort; (3) peer competition for goal attainment; (4) goal difficulty; and (5) goal specificity. Previous research identified these attributes as potentially having an important impact on resulting performance. Based on this earlier evidence, it was hypothesized that four of the five attributes (participation, feedback, goal difficulty, and goal specificity) would be positively related to performance, while the fifth (peer competition) would be unrelated to performance.

Questionnaires were completed by 133 female first-level supervisors in the Accounting and Customer Service Department of a large public utility. The questionnaire packet included the Task-Goal Attribute Questionnaire, the Adjective Checklist, demographic data, and performance measures. The data analysis was performed on two levels. On the first, subject scores for each of the five task-goal attributes were correlated with two performance measures for the total sample. On the second, the sample was divided into high and low n Achievement Groups by need strengths. Correlational analyses were run separately for each group between task-goal attributes and performance measures. Before need strengths were taken into account, little consistent relationship was found between the five task-goal attributes and performance. However, after dividing the group, it was found that performance was significantly related to increases in feedback and in goal specificity for high n Ach subjects, and to participation in goal-setting for low n Ach subjects. Goal difficulty and peer competition were found to be unrelated to performance for both groups. These results are then compared to other similar studies. The conclusion reached is that individual difference factors, like n achievement, must be taken into account in any comprehensive theory of goal-setting in organizations.

Steers, R. M. Antecedents and outcomes of organizational commitment. *Administrative Science Quarterly*, 1977, 22, 46-56.

This study proposes and tests a preliminary model concerning the antecedents and outcomes of employee commitment to organizations using a cross-validation framework. Organizational commitment is defined as the relative strength of an individual's identification with and involvement in a particular organization. The model suggests that the antecedents of commitment come from the general areas of organizational life: personal characteristics (need for achievement, age, education); job characteristics (task identity, feedback); and work experiences (group attitudes, organizational dependability). It further suggests that commitment, in turn, leads to several specific behavior outcomes: desire and intent to remain, attendance, retention, and good job performance.

The study was carried out among 382 hospital employees and 119 scientists and engineers. Measurement data were gathered through questionnaires on the antecedent and outcome factors listed above. Through a series of multiple correlations, regression analyses, and Pearson Product Moment correlations, the following results were obtained. Commitment was found to be strongly related to intent and desire to remain for both samples and moderately related to attendance and turnover for one sample. Performance was generally unrelated to commitment. Results are compared with earlier findings and implications for future research are discussed.

Steers, R. M. *Organizational effectiveness: A behavioral view.* Santa Monica, CA: Goodyear Publishing Company, Inc., 1977.

This book is an examination of the current level of understanding on organizational effectiveness theory and research. The conceptual framework within which this study is undertaken is Open Systems Theory. Attention is first given to the nature and quality of organizational effectiveness. The systems approach used in exploring this phenomenon facilitates an insight into the influence of both organizational and environmental factors on ultimate organizational success. Effectiveness is defined in terms of the attainment of optimized goals; that is, as the extent to which an organization can acquire and utilize its available resources to attain feasible operative and operational goals. Consideration is given to the important roles played by structure, technology, environment, and personal characteristics as they relate to effectiveness of operations.

Chapter 2 focuses on the notion of goals -- organizational and individual. Two prominent models of organizational goal formulation are reviewed: the Cyert and March Model and the Thompson and McEwen Model. An integration of these two models leads to the conclusion that two of the most potent forces in the goal formulation process are relative power distributions and the nature of an organization's prior commitments. Chapter 3 provides a detailed analysis of the concept of organizational effectiveness. Eighteen models of OE are presented and compared as to primary evaluation criteria used in each. Problems associated with the measurement of organizational effectiveness are discussed.

The next four chapters focus on developing a conceptual understanding of how individual, organizational, and environmental factors can facilitate or inhibit effectiveness. Chapter 4 deals with the factors of structure and technology, analyzing the impact on OE of such variables as decentralization, specialization, formalization, span of control, and organization size. The research of Woodward and others on the effects of technology on structure are reviewed. Chapter 5 addresses the relationship between the environment and OE. A review of several major studies in this area reveal that predictability, perception, and rationality are all important factors which affect the environment-organization relationship. Chapter 6 examines the nature of the internal environment, or organizational climate in organizational effectiveness; Chapter 7 continues this analysis, introducing the role of individual characteristics in the internal environment as influences on job performance and OE.

The final sections attempt to build upon the conceptual base by suggesting several areas for managerial action aimed at improving effectiveness. Strategic goal setting, resource acquisition and utilization, performance, communication, leadership and decision-making, and adaptation and innovation are discussed. The overall

conclusion of this detailed examination is the appropriateness of a multi-dimensional approach to the study of OE. This approach includes three interrelated perspectives concerning the nature of the relationships among major elements of an organizational system and the way these elements interact to facilitate or inhibit the attainment of feasible organizational goals. All three perspectives -- goal attainment, systems, and behavioral -- must be represented in a model of organizational effectiveness.

Steers, R. M. & Porter, L. W. The role of task-goal attributes in employee performance. *Psychological Bulletin*, 1974, 81, 434-452.

This paper systematically reviews the relevant research dealing with the role played by task-goals in employee performance. Consideration is initially given to the way in which the goals of an organization are translated into manageable tasks for employees to perform. Later, findings of these investigations are placed in the larger organizational context as they ultimately relate to the attainment of organization-wide goals. Goal-setting models are reviewed in this context.

Three hypothetical examples are given of how goal-setting factors can be better understood by placing them within a specific motivational framework. An examination of each reveals that performance under goal-setting conditions appears to be a function of at least three important variables: the nature of task-goals, additional situational-environmental factors, and individual differences. Thus, individual performance on task-goals must be viewed within both a motivational framework and within the larger organizational context. Suggestions for future research are discussed.

Stephenson, R. W., Kaiser, H. F. & Erickson, C. E. *The implications of a "see-saw" model of organizational effectiveness.* (Final Report No. AIR-32900). Silver Spring, MD: American Institutes for Research, 1974. AD773-951.

A "see-saw" model of organizational effectiveness (OE) was designed as a result of a systems analysis of previously collected data describing organizational climates in research and development organizations. The model distinguishes between variables that have a generally increasing or decreasing effect on both creativity and productivity, and variables that have a differential effect in the sense that they increase creativity at the expense of productivity, or vice-versa. Each of the previously developed organizational

climate questionnaire items was rated by twelve psychologists and creativity experts for the extent to which the item would have a general effect or a differential effect if it were changed. The two subsets of items were then subjected to factor analysis separately as well as to factor analysis of all items combined.

The differential-effect clusters of items tended to be mixed with general-effect clusters of items in all three of the solutions in which general-effect and differential-effect items were combined. For a number of practical reasons, solutions in which separate factor analyses are made for differential effect and general-effect items are considered to be superior to solutions in which these two kinds of items are combined. The implications of the study for multivariate studies in which multiple criteria are involved are discussed.

Stern, L. W. & Sternthal, B. Strategies for managing interorganizational conflict: A labaratory paradigm. *Journal of Applied Psychology*, 1975, 60, 472-482.

A laboratory paradigm was developed for examining interorganizational conflict and its management. Sixty-two triads (drawn randomly from 282 business administration students) participated in two experimental groups. One group acted as manufacturer and the other as wholesaler — their goal being agreement on the price and quantity of microscalpels. Conflict was induced by presenting a profit-loss matrix, a bogus distribution of past groups' earnings, and contrived information on complementary skills of group members. Semantic differential responses differed significantly for conflict management (superordinate goal, exchange of persons) and no-conflict management groups, indicating lessening conflict in the former groups. There were no specific differences on in-group/out-group items. Expressive-Malintegrative Behavior Indexes, derived from Bale's Interaction Process Analysis, provided further support for the exchange-of-persons strategy.

Three conclusions are drawn. First, these analyses confirm the previous findings regarding parasimulation as a successful paradigm for generating an interorganizational conflict situation in a controlled setting. Second, the findings for the exchange of persons program are consistent with those of Johnson (1967). In situations in which goal compatability is possible, an exchange or role reversal strategy enables understanding of a counterpart's position, the finding of common ground, and ultimately the reduction of conflict. Finally, the evidence regarding the efficacy of a superordinate goal as a means of conflict management is not compelling. Several modifications in the existing paradigm are suggested to aid future research.

Taylor, J. C. *The conditioning effects of technology on organizational behavior in planned social change.* University of Michigan: Institute for Social Research, 1969. AD694-995.

A review of the literature suggests that sophisticated production technology tends to provide forces in the direction of increased work group autonomy, decision-making and responsibility. This document presents a brief discussion of technology as a potential lever in organizational change. Emphasis is placed on the interrelatedness of subunits in organizational reaction to external change forces. A hypothesis is offered stating that if sophisticated production technology leads to greater worker participation, and if this can be used as a force in planned organizational change in the direction of greater worker participation, then planned change will be facilitated.

A new model of technological classification is presented, which includes elements of raw material input, output control, and machines. It was hypothesized that the direct effects of sophisticated technology would be manifest in higher levels of peer leadership and group process before change programs were undertaken. This was confirmed by the refinery data, not by the insurance company data. A third major hypothesis is that sophisticated technology would mediate between planned change attempts on the part of outside change agents, and employee's reaction to change. The results confirm this effect rather directly, and provide an unexpected explanatory concept as well. The results further suggest that technology and its immutable situational constraints act to affect organizational change via the connectedness of subunits in the social system.

Terreberry, S. The evolution of organizational environments. *Administrative Science Quarterly,* 1968, 12, 590-613.

This paper argues that evolutionary processes occur in the environments of organizations. Ideal types of environment, originally conceptualized by Emery and Trist, are elaborated and extended. A review of recent literature gives evidence of the decreasing autonomy and the increasing interdependence of organizations.

Four approaches to organizational analysis (Evan, 1966; Levine & White, 1961; Litwak & Hylton, 1962; Thompson & McEwen, 1958) are reviewed and found inadequate to deal with present-day conditions. An alternative perspective is offered which allows any organization, its transactions, and the environment itself to be viewed in a common conceptual framework. The model proposed views the organization in a systems theoretic -- in terms of inputs, outputs and semi-permeable boundaries characterizing the interaction between organization and

environment. The model is preliminary, but points out the importance of such concepts as communication, interdependence, and turbulence. Two hypotheses are discussed in terms of this integrative framework: (1) that organizational change is increasingly externally induced, and (2) that organizational adaptability is a funciton of ability to learn and to perform according to changes in the environment.

Thomas, K. Conflict and conflict management. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology.* Chicago: Rand McNally, 1976.

A balanced view of conflict is emerging in the literature which recognizes that conflict can have constructive or destructive effects, depending on its management. To aid in conflict management, two general models of conflict are synthesized from the literature -- a process model and a structural model. The process model focuses on the sequence of events within a conflict episode, and is intended to be of use when intervening directly into the stream of events of an ongoing episode. The structural model focuses upon the conditions which shape conflict behavior in a relationship, and is intended to help in restructuring a situation to facilitate various behavior patterns. The chapter concludes with some general observations on the state of conflict literature, and offers suggestions for specific areas needing research.

Thompson, J. D. *Organizations in Action.* New York: McGraw-Hill, Inc., 1967.

This book calls attention to the multidisciplinary developments in organizational theory. A central purpose is to identify a framework which might link at important points several of the now independent approaches to the understanding of complex organizations. The focus is on the behavior <u>of</u> organizations; behavior <u>within</u> organizations is considered only to the extent that it contributes to an understanding of the entire organization.

Chapter 1 introduces the two strategies used to describe complex organizations: closed-system and open-system. A new system is introduced to bridge this dichotomy, which views the organization as an open system, indeterminate and faced with uncertainty, but subject to criteria of rationality and hence needing certainty. A detailed discussion of the problem of uncertainty is presented in Chapter 1, and of rationality in Chapter 2.

Chapter 3 discusses the concepts of domain and self-control. The domain claimed by an organization and recognized by its environment determines the points at which the organization is dependent, facing both constraints and contingencies. To attain any significant measure of self-control, the organization must manage its dependency. Five propositions are offered relating the nature of task environments to the amount and type of power exerted by the organization in accomplishing this.

Chapters 4 through 6 consider the elements of organizational design: size, boundary-spanning, technology and structure. The constraints and contingencies of the environment are shown to be determining factors in the characterization of the organization. Chapter 7 follows with a discussion of the variables involved in the assessment of organizations. Several propositions are offered relating to the priorities and activities of organizations with the techniques used to assess their performance.

Chapters 8 through 12 address the extent to which organizations gain a measure of certainty or predictability with respect to the behavior of their members and others in the task environment. This is believed to be of considerable importance if one accepts the fact that organizations abhor uncertainty while subject to norms of rationality. The second part of this book explores the administrative process characterizing organizations in terms of the theoretical foundation already established in Part One. This book is considered a conceptual inventory; recommendations for empirical research are discussed.

Trist, E. L. On socio-technical systems. In Bennis, W. G., Benne, D. K. & Chin, R. (Eds.). *The planning of change*. (2nd Ed.). New York: Holt, Rinehart & Winston, Inc., 1969.

This article serves two purposes. First, it applies the model of open systems to industrial enterprises in order to integrate the social human systems with the technical activity system. Considering enterprises as open socio-technical systems provides a more realistic picture of how they influence and are influenced by their environment. It is a frame of reference which points in particular to the various ways in which enterprises are enabled by their structural and functional characteristics (systems constants) to cope with the lacks and abundances in their available environment. Unlike mechanical and other inanimate systems, they possess the property of equifinality. Therefore, in coping with internal change they are not limited to simple quantitative change and increased uniformity but may, and usually do, elaborate new structures and take on new functions.

The second purpose is to demonstrate the way in which spontaneous reorganization toward states of greater heterogeneity and complexity occurs while work goes on. This is done primarily through a transformation of the environment. Management must be concerned with "managing" both the internal system and an external environment. If management is to control internal growth and development, it must in the first instance control the boundary conditions; i.e., forms of exchange between the enterprise and its environment. Two strategic considerations can be derived from this paper: (1) major requirements in organization arise from the engineering and technical aspects of the enterprise; and (2) the process of organizational growth arises from system dynamics.

Tuggle, F. D. An analysis of employee turnover. *Behavioral Science*, 1978, 23, 32-37.

A model of employee turnover is developed using explanatory theories and studies of systems at the organization level dealing with behavior and cost data. The model optimizes the costs associated with turnover and ignores the turnover rates. It is a synthesis of economic theory and behavioral phenomena. From this model normative guidelines are produced by which the costs due to turnover are balanced against the costs of the measures needed to reduce turnover. Obtaining the point of optimality detailed by the model rests upon the organization's knowledge of its costs and the attitudinal disposition of its employees.

The implications of the model necessitate further research on: (1) a model which evaluates the causes and costs of other undesirable organizational symptoms, such as absenteeism or low productivity; and (2) new approaches to organizational design based on effectiveness, efficiency and cost, rather than simply optimizing the existing systems.

Turney, J. R. & Cohen, S. L. *The development of a Work Environment Questionnaire for the identification of organizational problem areas in specific Army work settings.* (Technical Report 275) Alexandria, VA: U. S. Army Research Institute for the Behavioral and Social Sciences, 1976. AD028-241.

This report discusses the development and validation of the Work Environment Questionnaire (WEQ) used to identify organizational problem areas and evaluate interventions. The questionnaire defines organizational effectiveness research as an attempt to increase human performance effectiveness in an organization and to improve teamwork and job satisfaction, by developing diagnostic instruments to identify problem areas, intervening with OD techniques to correct the problems, and finally evaluating the intervention results in

terms of productivity and job satisfaction. The WEQ was developed and validated over a 3-year period as part of an organizational effectiveness program at an Army field installation. Focusing on individual work motivation and the situational factors affecting this motivation, it was designed to elicit from both supervisor and subordinates their attitudes and perceptions on their job duties, training, etc. Section formats apply to a wide range of Army settings, but item content is specific to the Army work setting and job. Three questionnaires were tailored with job-specific items for a supervisory NCO position and two different subordinate positions; the three as a whole comprise the WEQ. Validation procedures significantly correlated the attitude measures with independent measures of performance and effort.

Turney, J. R. & Cohen, S. L. Organizational implications for practicing OD in the Army. *Personnel Psychology*, 1978, 31, 731-738.

During the past five years, organizational development has actively entered the military arena. This type of organization has certain characteristics which have strong implications for the practice and impact of OD interventions. Drawing specifically upon Army organizations, six of these characteristics are discussed including structure, total immersion environment, personnel rotation, personnel reductions, military-civilian dichotomy, and organizational objectives.

The central issue addressed in this article is whether the behavioral sciences do, in fact, provide a sufficiently advanced body of knowledge on which to base an extensive Army-oriented OD technology. It is the author's belief that research on the impact of OD techniques in Army settings has not yet made a strong case for the utility of OD in that type of organization. This inadequacy is attributed to the failure of OD techniques heretofore attempted to deal with the characteristics unique to the Army, and to penetrate to the core of Army organizations as represented by their enlisted troops. The authors do not offer any solution to this problem. Rather, they conclude that OD may eventually be able to demonstrate utility in the Army organizational setting -- if the required research is accomplished before time and resources run out.

Umstot, D. D. Organizational development technology and the military: A surprising merger? *Academy of Management Review*, 1980, 5, 189-201.

The results of organization development (OD) efforts in the United States military are reported and analyzed. The Army uses a decentralized approach with strong top management support, participation, and understanding. The Navy relies heavily on a centralized survey-feedback model using mandatory participation. The Air Force has experimented with many OD approaches, the most widely adopted one being job enrichment. Although considerable resources are committed to OD, most claims of success are based on testimonials and anecdotal evidence. There is little empirical evidence that OD either changes organizations or results in improved performance. In spite of these weaknesses, the very existence of larger-scale OD in the military environment raises some interesting issues that revolve around values and the general applicability of OD technology.

Umstot, D. D., Bell, C. H., Jr. & Mitchell, T. R. Effects of job enrichment and task goals on satisfaction and productivity: Implications for job design. *Journal of Applied Psychology*, 1976, 61, 379-394.

Although there has been an increasing interest in improving the quality of work so that employees are more satisfied, concern for productivity is still the dominant focus of managers. This study is based on the assumption that what is needed is an approach to job design that results in both increased productivity and increased employee satisfaction. This study reports on a two-phase research project which investigated the effects of job enrichment and goal setting on employee productivity and satisfaction in a well-controlled, simulated job environment.

In the first phase, two conditions of goal setting (assigned goals vs. no goals) and two conditions of job enrichment (enriched vs. unenriched) were established, producing four experimental conditions. The results indicated that job enrichment had a substantial impact on job satisfaction but little effect on productivity. Goal setting, on the other hand, had a major impact on productivity and a less substantial impact on satisfaction. In the second phase, (after 2 day's work), people with unenriched jobs worked under the enrichment conditions and people originally without goals were assigned goals. Again, job enrichment had a positive effect on job satisfaction, while goal setting had a positive effect on performance. These results are discussed in terms of the current theoretical approaches for understanding employee motivation on the job.

Umstot, D. D., Mitchell, T. R., & Bell, C. H., Jr. Goal setting and job enrichment: An integrated approach to job design. *Academy of Management Review*, 1978, 3, 867-879.

Productivity and job satisfaction are two dominant concerns of managers. One approach to designing jobs so that these outcomes result is to combine job enrichment and goal setting. This article reviews the empirical literature relating these two techniques in an attempt to better define the interrelationship between them. Research studies are cited which demonstrate the interaction of goals with such job characteristics as: skill variety, task identity, autonomy, task significance, feedback, role clarity, job challenge, and individual-organizational goal congruence. The review indicates that because most of the interactive effects of goal setting and enrichment are positive, an integrative approach combining the two seems appropriate to job design.

A general conceptual integrative model of job design is developed. Its primary advantage is that it unites goal setting, which has been consistently related to higher performance, with job enrichment, which has been related more to work satisfaction. A combination of the two could result in a simultaneous increase in both performance and satisfaction. Because research in this area is very limited, many questions are posed by this model. Implications for future field and laboratory research are discussed.

Vancil, R. F. Strategy formulation in complex organizations. *Sloan Management Review*, 1976, 17, 1-18.

Managers often see strategy formulation in a complex organization as a one-time event and not as a dynamic process. The purpose of this article is to provide a detailed description of how strategy can be determined so that it can keep pace with changing environments. First, the author disassembles the concept of strategy and examines the interrelationships between the components. The basic elements of strategy are identified as objectives, constraints and policies, and goals and plans. Second, he explores how these components are viewed by managers who have various strategic responsibilities at the different levels in the corporate hierarchy. The principal levels of authority are corporate managers, business managers, and activity managers. Effective strategy formulation at all levels is characterized by operational guidance, personal commitment, and expectations of change.

Finally, the pieces are reassembled, and the author discusses institutional strategy as a complicated, connected set of individual strategies which are formulated and pursued by the managers who are responsible for making them successful. To be effective, strategy must personally affect the manager, constraining the scope of his activities to some extent, yet providing him with enough space to devise his own strategy within the broader context. One should not think about the strategy of an organization, but rather of the strategy as a collection of strategies, one for each manager, linked together by a progressive series of agreements on objectives, constraints and policies, and goals and plans. The overall aim of all strategies must be the adaptation and growth of the organization in a changing environment.

Vroom, V. H. Leadership. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology.* Chicago: Rand McNally, 1976.

This chapter reviews past research efforts in order to shed light on the leadership process through empirical studies. The author begins by describing the major approaches to the investigation of leadership, evaluating their theoretical underpinnings and summarizing the principal empirical findings which bear on them. The approaches discussed conceptualize leadership in terms of (1) personality traits; (2) behavior; (3) its nature as a role to be played, a job to be done, or a set of functions to be carried out.

In the second half of the chapter, the author attempts to sketch some new directions for the study of leadership -- directions which build on evidence concerning the critical role of the situation in influencing how leaders behave and in determining the effectiveness of their actions. The nature of these new directions is then illustrated through a detailed examination of one facet of leadership -- participation in decision-making.

Warmington, A., Lupton, T. & Gribbing, C. *Organizational behaviour and performance: An open systems approach to change.* Reston, VA: Reston Publishing Co., 1977.

The main purpose of this book is to describe and illustrate a method of detailed organizational analysis, developed in the course of a program of change, and to describe some techniques and tools developed from it. The principal concern is to demonstrate their theoretical validity and practical application. The major contribution of this book to organizational change and development literature is its thesis that effective change can only be made when the needs

of the 'work face' have been identified, and can best be implemented through consultation between managers and workers.

Through an account of their work in three contrasting areas of an organization, the authors develop a framework of analysis which they call an open sociotechnical systems approach. In their work, a varied team of managers was formed to devise methods for investigations, construct explanatory models and involve the members of each section in explanation, implementation of changes, and discovery of new concepts of management and new patterns of control. A critical account is made of the actual effects of changes in the three case studies. Some questions are posed about the adequacy of this and any other theories of planned organizational change.

Warner, M. Organizational alternatives: Towards an analysis of experimental processes. *The Journal of Management Studies*, 1979, 16, 355-367.

This article explores the notion of "organizational experimentation." Defined as the manipulation of at least one organizational variable relating to structure and/or process, this concept has been considered in too narrow a conceptual framework in the literature to date. The purpose of this article is to point out the past deficiencies in the treatment of this topic, and to suggest methods for broadening future research in this area.

The critique of existing approaches discloses the preponderance of short-term organizational experiments, the excessive emphasis on scientific procedure in organizational research, and the narrowness of the criteria developed to date. In response to these deficiencies, an alternative model is proposed based on a "building block" approach. This model enables the researcher to distinguish between cases where explicit experimentation took place to "design" a new organizational form and those where novel organizational forms came about through either "evolutionary" development or random chance.

Warner, W. K. & Havens, A. E. Goal displacement and the intangibility of organizational goals. *Administrative Science Quarterly*, 1968, 12, 539-555.

An attempt is made to highlight some of the key problems in attaining instrumental goals in organizations with social change and development programs. These activities and programs too often contribute relatively little to the attainment of the major goals of the organization. A common form of the tendency to concentrate on these programs is goal displacement, in which the major goals claimed by the organization are neglected in favor of goals associated with building or maintaining the organization.

Five major hypotheses and a model of marginal propensity to perform are suggested which show that goal attainment in organizations is maximized when goal displacement is minimal, and that goal displacement is minimal where goals are tangible. If there is a high degree of goal intangibility, goal attainment can still be maximized by keeping tangible goals directed toward the central intangible goals, but it is reduced by displacing tangible goals to peripheral goals of system maintenance. A system of evaluation and sanctioning reinforces both the peripheral displacement of goals and the neglect of the claimed goals in favor of goals designed to maintain the organization primarily as an end in itself. The concepts suggested are not readily operational, nor are the hypotheses empirically proven. It is believed, however, that such attempts at conceptualization are necessary prior conditions to research design and analysis.

Waters, L. K., Roach, D. & Batlis, N. Organizational climate dimensions and job related attitudes. *Personnel Psychology*, 1974, 27, 465-476.

The purpose of the present study is to factor analyze 22 perceptually based organization climate scales from three climate questionnaires, and to relate the dimensions found in the factor analysis to employees' subjective reports of satisfaction, involvement, intrinsic motivation, effort and performance. The respondents in this study were 105 employees of seven radio and TV stations.

The climate scales used in this study were: disengagement, hindrance, esprit, intimacy, aloofness, production emphasis, thrust, consideration, structure, responsibility, reward, risk, warmth, support, standards, conflict, identity, conflict and inconsistency, formalization, adequacy of planning, selection based on ability, and performance, and tolerance of error. The factor scores included: effective organizational structure, work autonomy, close impersonal supervision, open challenging environment, and management and peer support. These climate variables were then factor analyzed with seven job-related attitudes: interpersonal relationships, task-involvement, opportunity for recognizable advancement, job involvement, intrinsic motivation, effort and performance. Detailed analyses of the relationships between these organizational and individual factors are discussed. No conclusions are drawn beyond a statement of the correlation coefficients.

Webb, R. J. Organizational effectiveness and the voluntary organization. *Academy of Management Journal*, 1974, 17, 633-677.

The recent increase in the number of writing and research studies pertaining to organizational effectiveness have not resulted in a universally acceptable definition, theory, or methodology for the assessment of OE. This article discusses the goal model and systems model as they have been used in OE research. The purpose of the present study is to identify organizational characteristics acting as determinants of effectiveness of a voluntary organization -- in this case the institutional church.

The data base for this exploratory study consisted of church members in a large presbytery. Questionnaires were collected from 117 respondents rating church goals on a seven-point Likert scale. The data were factor analyzed in an attempt to find a smaller set of underlying factors that could be used as an index of effectiveness. Six different regression models were developed; one model for each of the 5 independent indices of organizational effectiveness as well as an overall general model. The general model included four organizational characteristics which accounted for 45 percent of the variance in the independent judgments of the church members. They were: cohesion, efficiency, adaptability and support. The relationship between these characteristics and effectiveness differ markedly from earlier studies of OE and indicate that organization effectiveness in voluntary organizations may need to undergo rethinking.

Weed, S. E. & Mitchell, T. R. The role of environmental and behavioral uncertainty as a mediator of situation-performance relationships. *The Academy of Management Journal*, 1980, 23, 38-60.

The causes and consequences of two types of uncertainty (environmental and behavioral) were investigated in a simulated job environment. Sixty-four randomly selected subjects were divided into 8 experimental conditions. There were two levels of task structure (ambiguous, structured), two levels of leader style (high IS-low CONS and low IS-high CONS), and two levels of goal setting (no goal, specific goals), resulting in a 2 x 2 x 2 factorial design. The task involved three separate designs to be drawn on a blueprint according to a series of instructions.

The results indicated that the structuring leader and structured task produced greater certainty than the considerate leader or the unstructured task. Goal setting had no effect. The same independent variables and increased certainty resulted in higher performances.

Weitzel, W., Mahoney, T. A., & Crandall, N. F. *A supervisory view of unit effectiveness.* (Technical Report 9000). University of Minnesota: Industrial Relations Center, 1971. AD720-711.

First level supervisor's (N=53) from a cross-section of business and industrial organizations in a metropolitan city provided evaluative and descriptive information about the immediate work group which each supervised. From this information a model was built depicting first level supervisory perceptions of behaviors which lead to work unit effectiveness. This model was compared with a model based upon higher level managers' perceptions of what leads to first level unit effectiveness. The overwhelming importance of production emphasis by both groups and the use of human relations behaviors in an instrumental fashion by first level supervisors is discussed in connection with managerial philosophy. Other similarities and differences between the models from the two organizational levels are considered.

White, S. E. & Mitchell, T. R. Organization development: A review of research content and research design. *Academy of Management Review,* 1976, 1, 57-73.

This article develops a classification system to describe the types of variables that are typically changed by means of an OD intervention and the variables that are used as criteria to assess the effectiveness of the intervention. The major criticism of traditional OD classification systems is that they do not use the same set of logical criteria for classifying both the independent and dependent variables. An alternative classification system, derived from facet analysis, is offered to resolve this dilemma.

An analysis is conducted of the types of research designs typically employed in empirical efforts to evaluate OD programs. Because the field of OD is currently embracing various types of contingency approaches, it is necessary to provide inferences and conclusions based on sound research techniques in order to accurately describe the contingencies. Current research techniques are described and compared in terms of: types of research settings, number of criterion measurements, types of statistical support, types of instruments used, and possible experimenter bias. A review of these methods indicates the need for an increase in sophistication of research designs, methodology and statistical procedures currently in use.

Wofford, J. C. Factor analysis of managerial behavior variables. *Journal of Applied Psychology*, 1970, 54, 169-173.

Research into the leadership function of management has considered a number of behavioral dimensions. Many of these appear to overlap in content. This study attempts to identify the basic dimensions of several areas of managerial behavior in a broad scope of organizational sitations. One hundred of these items were selected for factor analysis. Analysis of the 100 x 100 correlational matrix yielded five interpretable factors: (1) Behaviors which concern the care, thoroughness, neatness and accuracy with which the manager handles the functions of planning, organizing and controlling. (2) Behaviors which relate to the use of authority and control. (3) Interpersonal relationship that the manager establishes with his men. (4) Behaviors which are concerned with reactions to or the avoidance of insecurity feelings. (5) Behaviors characterizing managers who are dynamic, aggressive, and self-assured. These factors provide new insights into the structure of managerial behavior.

[illegible], R. J. & Carroll, T. M. Ignorance, error and information in the classic theory of decision. *Behavioral Science*, 1976, 21, 107-115.

This paper introduces an additional dimension of incompleteness or inaccuracy of information held by the decision-maker. Up to this time decision theory, applicable to any level of the living system, has looked at situations in which there were varying degrees of knowledge about the connections between actions selected by the decision maker and the occurrence of states of affairs which the decision maker valued. Two new notions are introduced here. The first is ignorance. A decision-maker is ignorant if there are states of affairs which may come about as a consequence of actions open to him, but about whose possibility he is unaware. The second is error. A decision maker commits error if he makes decisions in the belief that there is a set of outcomes which may occur, but which, in fact, includes some states of affairs which cannot occur. The effects of these two types of divergence between actual and perceived state of the world are examined. The probability and expected cost of these mistakes under conditions of certainty, risk, and uncertainty are investigated. The traditional notion of irrationality, it is suggested, can be replaced by the behavioral notions of error and ignorance.

Woodman, R. W. & King, D. C. Organizational climate: science or folklore? *Academy of Management Review*, 1978, 3, 816-826.

This article reviews the current status of theory and research on organizational climate. Particular emphasis is placed on issues raised by research and suggestions for future work. The article begins with a review of the generally accepted definitions of organizational climate, pointing out the similarities and differences between them. Research issues are then discussed. Conceptual issues raised in research to date include (1) the relationship between a situational variable (e.g., organizational climate) and performance; (2) the relationship of environmental characteristics to job behavior; (3) the relationship between job satisfaction and organizational climate; and (4) the appropriate measurement of organizational climate. A review of the most significant research on each issue is presented.

Yitzhak, S. *The role of social consensus as a conditioner in organizational planned change.* University of Michigan: Institute for Social Research, 1971. AD731-669.

This document summarizes the major considerations and results of the first phase of a larger project studying the role of social consensus in conditioning organizational change and development. A concise conceptual, theoretical and methodological scheme is elaborated at the outset. In this construct, social consensus is perceived as a collective property reflecting degree of similarity in a given set of orientations toward an object, behavior or issues. This conception views the social consensus phenomenon as at least bi-dimensional, characterized by two main aspects: distance and stress.

Three hundred and thirty-two groups selected from six main industrial settings represented by 20 organizations served to test the relationship between social consensus and organizational change. Findings demonstrate a direct positive correlation between degree of consensus and level of participative-collaborative behavior of supervisors as well as of subordinates. Initial degrees of social consensus were found to produce differential rates of change over time in organizational behavior.

Yuchtman, E. & Seashore, S. E. A system resource approach to organizational effectiveness. *American Sociological Review*, 1967, 32, 891-903.

The prevailing formal and implied conceptions of organizational effectiveness are examined and found deficient. When effectiveness is defined with reference to goal attainment, there are both methodological and conceptual problems. The goals are those of persons, not of the organization itself. There is in principle no possibility for stable consensus about the nature of the goals. When defined with reference to societal function, the values and standards for assessing organizational effectiveness are similarly external to the organization itself. An improved conceptual framework derived from systems theory is proposed. The framework emphasizes both the distinctiveness of the organization as an identifiable social structure and the interdependence of the organization with its environment. The interdependence takes the form of transactions in which scarce and valued resources are exchanged under competitive conditions. The organization's success over a period of time in this competition for resources is regarded as an expression of its overall effectiveness. Since the resources are varied, and the competitive relationships (bargaining positions) multiple, the assessment of organizational effectiveness must be in terms not of any single criterion, but of an open-ended multidimensional set of criteria. The implications of this conceptual framework for theory, empirical research, and organization management are discussed.

Ziller, R. C. Toward a theory of open and closed groups. *Psychological Bulletin*, 1965, 64, 164-182.

Four characteristics differentiate groups in which membership is in a constant state of flux (open groups) as opposed to groups in which the membership is relatively stable (closed groups). They are: time perspective, equilibrium, frame of reference, and changing group membership. The significance of these characteristics for social behavior is explored. A number of tested and testable propositions concerning group stability and social behavior emerged from a rapprochement of research, relevant subtheories, and concepts associated with open- and closed-group behavior. The failure to consider the dimension of group stability in most previous social-psychological research poses a question concerning the generality of social-psychological theories which are based upon research but which ignore the pervasive dimension of group stability.

III. SIMULATION AND TRAINING

Barton, R. F. Desiging simulation laboratories. *Simulation and Games*, 1972, 3, 219-225.

Simulation laboratories range from a small one-way window between two ordinary rooms to NASA's massive spacecraft docking simulator. This paper offers a collection of things to consider for those who may design a simulation laboratory. These items grew out of visits to simulation laboratories, discussions with persons administering existing laboratories, and the experience of designing one.

The simulation laboratory designer must consider: (1) Flexbility -- the laboratory should be quickly changeable from one use to another. (2) Space -- future expansion should be an element of planning. (3) Number of concurrent subjects -- size and number of modules should not be restrictive. (4) Number of concurrent observers -- size and number of observer modules must be ample. Ideally, these two types of modules should be interchangeable. (5) Floor plan -- the plan should allow ample room for modules, storage and traffic flow. (6) Physical features, such as observation glass, ceiling and height of observation area, climate, lighting, equipment maintenance and operation, and sound control. (7) Computer support -- ample power, space, and equipment for man-computer simulations.

Bass, B. M. Business gaming for organizational research. *Management Science*, 1964, 10, 545-556.

A non-computer business game is described which can be used to test hypotheses about the effects of different organizational structures on material and social psychological outcomes. This competitive game requires firms of about 15 men each to compete in a common market. In the first three competitions, it was observed that the simpler organizational structure served more adequately than the more complex hierarchy that was designed for the problem. Whether or not a radically different structure, without a hierarchy, worked well depended upon the extent to which the real-life managers operating the organization had been indoctrinated in the rationale behind the innovation and had accepted it as desirable.

Bouchard, T. J., Jr. Field research methods: Interviewing, questionnaires, participant observation, systematic observation, unobtrusive measures. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.

In this chapter it is argued that from the point of view of both science and society field research is as important as laboratory research. This is because the field is where the generality, applicability, and utility of psychological knowledge are put to the test. The field researcher is the mediator of a relevant sociopsychological science. With this perspective in mind, the methods listed in the title are discussed. The special characteristics of each method are discussed in detail and each method's peculiar methodological traps are explicated. New uses for old methods are suggested and their wider application recommended. Throughout the chapter it is urged that researchers: (1) choose the method that is most likely to serve their purpose rather than the easiest method; (2) use more than one method whenever possible; and (3) focus more on the actual behavior of theoretical or practical concern and less on verbal behavior and test responses than they have in the past.

Cabell, D. W. E. The relevance of a management game. *Simulation and Games*, 1974, 5, 201-211.

The similarity between the game setting and the real world is a critical criterion of effectiveness of simulation as a teaching tool. This criterion is known as "relevance". A management game was conducted using 216 business administration students in order to test two hypotheses regarding the students' perceptions of their duties, decisions, and relationships. Although the decisions required by the management game provided the rationale for the student's interactions, a systems model of organizational behavior was used to control the interaction patterns. Four different interaction patterns were developed by experimentally manipulating the leadership style and specialization variables and experimentally controlling the variables relating to information system, control system, and delegation of authority. The four experimental conditions thus created were: product specialization-participative leadership style, functional specialization-participative leadership style, product specialization-nonparticipative leadership style, and functional specialization-nonparticipative leadership style. The two hypotheses tested in this experiment were: (1) The degree of specialization within the group strucure is significantly related to the students' perceptions of relevance; and (2) The leader's style of interacting with the student specialists is significantly related to the students' perceptions of relevance.

The study indicated that the students' perceptions of the similarity between the management game and the real world were related to the simulation parameters and the interactions which took place during the simulation.

Chertkoff, J. M. & Esser, J. K. A test of three theories of coalition formation when agreements can be short-term or long-term. *The Journal of Personality and Social Psychology*, 1977, 35, 237-249.

This experiment tested the competing predictions of the bargaining theory of coalition formation, the weighted probability model, and minimum winning coalition theory in two triadic resource structures. In the long-term condition, a coalition agreement could extend over two or over all three trials if both partners wished. In the short-term condition, a coalition had to be negotiated on all trials. In general, the results conformed most closely to the bargaining theory, but the data suggest that two changes in the theory are necessary. First, the weightings of the two norms assumed to affect divisions of payoffs, the parity and equality norms, will not be equal in all situations. Second, the equality norm affects the Trial 1 expectations of the weaker member of a potential coalition more than it does the Trial 1 expectations of the stronger member. In general, the short-term condition was advantageous to participants who were usually excluded from the first trial coalition, and the long-term condition was advantageous to participants usually included in the first trial coalition. The implications of the data for a general theory of fairness in social exchange are discussed.

Cole, S. G., Phillips, J. L. & Hartman, E. A. Test of a model of decision processes in an intense conflict situation. *Behavioral Science*, 1977, 22, 186-196.

A particularly intense form of conflict is u-elative conflict. It is a situation in which at most one of some set of participants may obtain an objective and in which it is possible that none will obtain their objective. A mathematical model is derived from basic assumptions about the decision making process in a three-person u-elative conflict situation, a truel. It is proposed that the model is generalizable to n-person situations. A preliminary test of the model that varies only one of the parameters reveals support for the model. More extensive tests of the model are warranted. In addition, the applicability of the model to internation or intergroup conflict is explored.

Cook, T. D. & Campbell, D. T. The design and conduct of quasi-experiments and true experiments in field settings. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand McNally College Publishing Company, 1976.

This chapter has three purposes. The first is to explicate four kinds of validity. Statistical conclusion validity refers to the validity of conclusions we draw on the basis of statistical evidence about whether a presumed cause and effect co-vary; internal validity refers to the validity of any conclusions we draw about whether a demonstrated statistical relationship implies cause; construct validity refers to the validity with which cause and effect operations are labeled in theory-relevant or generalizable terms; and external validity refers to the validity with which a causal relationship can be generalized across persons, settings, and times.

The second, and major, purpose of the chapter is to outline a number of quasi-experimental designs that have been previously used in industrial and organizational psychology or could be so used. These designs are grouped as non-equivalent control group designs, cohort designs, regression-discontinuity designs, time-series designs, and correlational designs. The specific designs under each of these headings are critically examined with respect to each kind of validity, and each design's typical strengths and weaknesses are pointed out.

The last purpose of the chapter is to examine why true experiments (involving random assignment to treatment groups) are not more common in field research on organizations since true experiments permit stronger causal inferences than quasi-experiments. The practical problems besetting field experiments are outlined, and ways of overcoming these are mentioned as are the contexts that are particularly appropriate for successful randomization. The discussion points out several past examples of true experiments that were successfully implemented and maintained in field settings.

Crawford, M. P. Dimensions of simulation. *American Psychologist*, 1966, 21, 788-796.

The author discusses the application of simulation to education and training. Three connotations of the term "simulation" are suggested and discussed: (1) representation or substitution of one thing for another, (2) portrayal of the environment (study of perception), and (3) dynamic systems involvement — function of computers. Five dimensions of simulation are identified: (1) the scope, extent or segment of the environment represented in the simulation; (2) the duration of the experience provided by simulation; (3) the degree of mediacy between the person and the raw environment; (4) the degree of centrality of interpersonal relationships; and (5) the degree of apparent cognitive involvement.

Cross, J. G. Negotiation as a learning process. *Journal of Conflict Resolution*, 1977, 21, 581-606.

This paper presents a discussion of the role of adapting expectations in the bargaining process. Negotiators are characterized as persons who choose bargaining strategies in their attempt to optimize their payoffs from the situation. These strategies are contingent on each party's perception of the strategy of his opponent; and if these perceptions contain errors, expectations will change and thus will lead in turn to a modification of each party's strategy choice. The payoff demands and manipulative moves which characterize the bargaining process are seen as combinations of actions which are specified in the original bargaining plans of the parties and of changes in the plans themselves.

Because empirical usefulness is the objective of any theory, the authors emphasize five implications of this theory in a few practical areas. (1) Parties with access to potent threats will do well, as will those who are relatively unconcerned about the timing of an agreement. (2) Political negotiations will take more time than economic negotiations. (3) Very large initial payoff demands may worsen a party's settlement payoff. (4) Multidimensional negotiations may actually come to settlement earlier than unidimensional ones. (5) Even in the presence of an equilibrating tendency in the learning process, initial expectations will be reflected to some degree in the final settlement; and these initial expectations are themselves determined by observable variables.

DeGreene, K. B. Force fields and emergent phenomena in sociotechnical macrosystems: Theories and models. *Behavioral Science*, 1978, 23, 1-14.

It is proposed that further qualitative progress in the computer simulation modeling of complex social systems is dependent on incorporation of field-theoretic constructs embodying truly behavioral and social forces. A number of separate developments are reviewed in the context of the revitalization of field theory in social science. These are: field theory in sociotechnical systems theory, hierarchy theory, critical phenomena, and catastrophe theory. It is argued that the sociotechnical macrosystem can best be viewed as a field of interacting forces which manifests certain unique phenomena. The phenomena emphasized are: slow, continuous change followed by sudden, discontinuous or catastrophic jumps; incipient changes in the field; hierarchical restructuring; emergency of new properties at successive hierarchical levels; and turbulence of the environmental field. Examples of these phenomena, taken from the dynamics and evolution of societies, are given.

Two important contemporary advances in the computer simulation modeling of societies, the "Systems Dynamics National Model of the United States Socioeconomic System", and "Mankind at the Turning Point", are discussed in terms of both reflecting field-theoretic interpretations of the dynamics of the macrosystem and the nontrivial incorporation of behavioral and social factors. Both modeling approaches are found wanting. It is argued, therefore, that these models lack fidelity, the faithful capturing of real world phenomena.

Diskin, A. & Felsenthal, D. S. Decision making in mixed situations in which both chance and a rival player are confronted simultaneously. *Behavioral Science*, 1978, 23, 256-263.

The unfolding theory of decision making has extensively discussed competitive decision situations. However, one barely finds any discussion of mixed situations, i.e., situations in which both chance and a rival player are confronted simultaneously -- especially when players are totally ignorant of the objective probabilities of the different natural states and when the formation of subjective probabilities is impossible. It is quite plausible that in two-dimensional mixed situations (that are characteristic of most bargaining situations or noncompetitive situations in which the players' payoffs are mutually independent) the confronting rivals will end up by choosing the same alternative if they adopt the same decision criterion. Meaningful labeling of the various states of nature in symmetrical situations led to respondents in an experiment to view problems confronting the rivals as asymmetrical. Many of those unfamiliar with decision theory were unlikely to employ subjective probabilities in their decision analysis even when these could be formed, and tended to employ, instead, mainly the minimax-maximin criterion.

Drabek, T. E. & Haas, J. E. Laboratory simulation of organizational stress. In Evan, W. M. (Ed.). *Organizational experiments: Laboratory and field research*. New York: Harper & Row, Publishers, 1971.

A research technique developed by Drabeck in the late 1960s, known as "realistic simulation", is used to develop replica organizations which can be subjected to environmental change to test organizational theory. In the research described here, a realistic simulation technique was applied to the study of the communication system of a metropolitan police organization under stress. Three shifts of personnel from the simulated police radio room participated in each of three laboratory

sessions in which demands were identical to what the system normally experienced. These sessions were followed by a "stress" session, in which demands on the system were markedly changed through a simulated crash of a large jet aircraft into an apartment house complex. The communication behavior of the police officers was observed and recorded during all four sessions.

The data indicated that, while the communication system did continue to function under stress, the internal interaction among the officers in the laboratory changed in both rate and pattern. Rate increased in two dimensions: number of interaction sequences in each session and number of words per minute. Pattern change occurred in several ways. First, the mode of interaction changed; from written words occurred. Second, the initiator pattern changed; the sergeant consistently emerged as the major initiator during high stress. These and other results provided support for the major hypothesis that response to the simulated disaster would result in increased rates of task performance and rather substantial changes in the patterns of task performance. Thus, the conceptual framework and simulation methodology utilized in this laboratory experiment proved useful in predicting organizational behavior under stress.

Driver, M. J. & Streufert, S. Integrative complexity: An approach to individuals and groups as information-processing systems. *Administrative Science Quarterly*, 1969, 14, 272-285.

Individuals and groups can be viewed as information-processing systems which respond in a curvilinear fashion to three components of input load: complexity of information, noxity (unpleasantness), and eucity (pleasantness). An optimal input load is postulated, at which each system is expected to achieve maximum complexity in information-processing. At similar input levels, some systems are expected to show more complex information-processing than others. Research is reviewed which suggests that the model holds for perception, information search, decision-making and innovation. When productivity criteria are associated with complex information-processing, the model predicts productivity. A more complex phasic theory is then advanced, which argues that perceptual and decision-making functions are separate and not synchronous.

Druckman, D. Understanding the operation of complex social systems: Some uses of simulation design. *Simulation and Games*, 1971, 2, 173-195.

Most discussions of simulation techniques focus largely on the learning values inherent in participation. An attempt is made in this paper to point out the heuristic benefits that result from engaging in the process of design. As conceived of in this paper, environmental design consists of an attempt to reproduce a social system in terms of a laboratory (or computer) model. Several recent developments in the use of simulation techniques are making apparent the feasibility of involving the participant in this process.

The author distinguishes between making a contribution to the scientific enterprise and engaging in activities that are characteristic of scientists. One purpose of this discussion is to underscore the advantages of engaging in the process of environmental design per se, irrespective of the quality of the end product. Thus, simulation is seen more in terms of its value as an "ecology for discovery" than as a tool for the development of a systematic body of theory. However, until the research tools for evaluating the effectiveness of simulation techniques are better developed, judgment on this issue will be suspended.

Druckman, D. Boundary role conflict: Negotiation as dual responsiveness. *Journal of Conflict Resolution*, 1977, 21, 639-662.

The boundary role conflict suggests two types of functions in negotiations: monitoring the other side for evidence of movement and monitoring one's own side for evidence of preferences. These functions differ in terms of focus and information-processing. This paper addresses these functions in terms of two general models, referred to as the negotiator as bargainer and the negotiator as representative. The negotiator-as-bargaininer model assumes responsiveness between opposite-number negotiators. Two versions of this model show that responsiveness can be based on both one's own previous concessions and the other's concessions, or it can be a more complex function of expectations and evaluations. Each of the versions is supported in part by the data which suggests that these may be early and late processes in negotiation.

The negotiator-as-representative model assumes responsiveness between the negotiator and his constituents. Such responsiveness is depicted in the form of a utility model where the negotiator attempts to balance n-components of value in the process of building a package. He is concerned with maximizing the value of the package in terms of both his own and his constituents' priorities. Experimental results suggest that the model accounts for a significant portion of variance in actual decisions. Finally, implications are drawn toward a reconceptualization of the boundary role conflict.

Eliason, A. L. A closed model approach to business gaming. *Simulation and Games*, 1973, 4, 3-17.

While the subject of business management games is not new, two recent developments have added realism to simulated gaming models. The first is that analytic techniques are being incorporated into game-player decision instructions for computerized gaming models. The second is that closed, rather than open-ended, gaming models have been designed and tested. Closed gaming models differ from traditional business management games in that the game player is given the choice of whether or not to overrule programmed decisions with his own during the course of play. The purpose of this paper is to compare the design features of a business gaming environment which employs a closed model to that of a traditional business management game. This comparison highlights weaknesses in traditional models and thereby permits the value of the closed design to be summarized.

Supported by the author's research findings, the specific points of comparison discussed in this context are: the issue of realism, evaluation of player performance, integration of business gaming with management development, and the relevance of business games for management research. The advantages of the closed model are as follows: (1) It preserves a more genuine decision-making process in that the decision to make no decision is viewed as essential; (2) It not only facilitates the development of a par player, but also identifies the performance of a "null" player -- one who decides not to interact during the simulation. (3) It offers the researcher alternatives to experimental investigations.

Felsenthal, D. S. & Fuchs, E. Experimental evaluation of five designs of redundant organizational systems. *Administrative Science Quarterly*, 1976, 21, 474-488.

This study attempts to evaluate the relative reliability of several designs of redundant human organizational systems as a function of three variables: (1) number of participants, (2) type of redundant process used, and (3) level of agreement reached among participants. The study was based on a simulation using 1,674 students, all of whom were required to compute a hypothetical person's salary according to certain instructions and manuals. Each participant was assigned randomly to a group of three or six, which used one of five redundant processes: completely independent, sequential, mixed-independent, group, and delphi. For each redundant number and process, the frequencies of four different levels of agreement were recorded (total disagreement, plurality, simple and qualified majority, unanimity) as well as the probability of obtaining the correct solution given a certain agreement level.

Tha main conclusions of the study are: (1) there is no gain in overall reliability by increasing the group size beyond a triad; (2) there is a significant increase in reliability when some agreement is obtained as compared with total disagreement, but no gain in reliability as a function of the actual level of agreement; (3) the completely independent and the sequential processes are inferior regardless of group size and should be avoided; (4) the mixed-independent group and delphi processes are equally reliable in triads, while the delphi process is the most reliable in hexads; hence delphi may be the best choice among these three processes.

Fox, J. & Guyer, M. Group size and others' strategy in an n-person game. *Journal of Conflict Resolution*, 1977, 21, 323-338.

The effects of group size and cooperativeness of others upon an individual's propensity to cooperate is studied using the Take-Some format of the Prisoner's Dilemma game. By holding utility effects constant, this format permits comparisons to be made between the performances of subjects in different size groups. A 2 x 2 experimental design was employed in which 48 male subjects were assigned to stooge-player groups comprised of either two or eleven "others". Stooge players in these groups employed either high or low cooperative strategies in 200 repeated trials of play.

The results of this game show a significant group-size effect upon the degree of cooperativeness evidenced by the subjects. A significant group size x stooge strategy interaction was also observed, subjects in the 3-person group being responsive to the "others" while subjects in the larger group remained relatively unaffected by "others'" cooperativeness. An interpretation of these results is made in terms of the "accountability" of an individual to others in the group.

Fromkin, H. L. & Streufert, S. Laboratory experimentation. In Dunnette, M. D. (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.

The failure to heed Weick's (1965) earlier admonishments concerning the disadvantages which arise from the underrepresentation of laboratory experiments has produced a significant vacuum in the data about organizational phenomena. In spite of the unique advantages and valuable contributions of experimental strategies, recent rejection of the laboratory as a legitimate research site constitutes a dilemma to the scientist and administrator who are thereby unable to take advantage of a substantial portion of social psychology. This chapter provides a perspective to bridge the gap between data

generated in laboratory experiments and their application to theoretical and practical problems of organizations. The approach resides in judgmental processes which render laboratory findings more serviceable in a two-fold manner. First, in lieu of customary warnings, arguments are presented which mitigate the shibboleths about laboratory experiments (e.g., artificiality and realism, etc.). Second, some suggestions are offered about how prohibitory cautions can be more profitably translated into specific "boundary variables" which vary according to inferences that can be drawn when moving from laboratory to any given domain of application.

Gausser, G. C. & Johnson, S. R. On the limitations of simulation in model evaluation and decision analysis. *Simulation and Games*, 1975, 6, 115-147.

With the advent of the systems approach and development of simulation as a method for experimenting with models of large systems, numerous studies have appeared on an array of problems. While these studies and surveys of such work have recognized from time to time the various shortcomings of simulation, there appears to be no comprehensive statement of limitations in the literature. The purpose of this paper is to provide a statement which can be used to assess the limitations of simulation for alternative types of decision and model evaluation problems.

Two general conclusions are made in comparing ad hoc simulation, analytical simulation and analytical methods as approaches to evaluation and policy problems. First, analytical methods appear to be superior when models take simple forms. As models become stochastic and nonlinear, the comparative advantage of analytical simulation and ad hoc simulation methods increases. Second, for the purpose of generating information relating to policy decisions, the comparative usefulness of the approaches depends heavily on isolation of an explicit form for a set of criteria functions. Aside from the issue of criterion function, the advantages of the analytical and analytical simulation approaches over the ad hoc simulation approach are substantial. The authors conclude by qualifying their remarks by emphasizing that the problem of selecting among approaches to evaluation analysis of policy problems is one of degree. Obviously, the researcher must make his decision as to simulation or analytical approaches on the basis of resources available.

Gillespie, J. V. & Zinnes, D. A. Embedded game analysis and international conflict control. *Behavioral Science*, 1977, 22, 22-27.

The use of game theoretic models for understanding international relations has been widely critized. In this paper, the authors suggest that the theory of embedded differential games with optimal control is a productive methodology for responding to the critics. Several noncooperative differential game models with embedded objectives are formulated. Concepts for obtaining undominated solutions based on game structure, the quadratic objective functions and linear differential kinematic equations are discussed. The paper concludes that models with rich empirical reference can be formulated and productively used in understanding international conflict.

Greenblat, C. S. & Uretsky, M. Simulation in social science. *American Behavioral Scientist*, 1977, 20, 411-426.

This article provides an overview of computer simulation as a tool for the analysis of complex systems. Several types of models are described, including the verbal, graphic, mathematical, physical, and operational models. The choice between types of simulations requires an answer to several questions regarding goals, relevant variables in the system, available resources, and constraints. A final criterion for choosing an appropriate simulation methodology is validity -- theoretical, empirical, and face. Specific examples of man-machine and computer simulation are described in detail.

Guetzkow, H. (Ed.). *Simulation in social science: Readings*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1962.

This volume represents the contributions of twenty-five authorities in the field of simulation. The volume provides source material on the use of man, man-computer, and all-computer simulation in military and industrial operations. Two chapters are devoted to each of seven applications of simulation in the social sciences: (1) Simulation in Psychology. Discussion in this section focuses on the computer simulation of thinking and its application in the design and use of dynamic flight training. (2) Simulation in Sociology. Simulated bureaucracies are analyzed as a technique for organizational analysis. The use of simulation in inter-nation relation studies is described by Guetzkow, along with a report of the Simulmatics project conducted for the Democratic Pary in the 1960 campaign. (4) Simulation in Economics and Business. The design of economic systems'

simulation is described as one example of simulation applied to a complex organization. A separate chapter is devoted to an explanation of the Carnegie Tech Management Game. (5) Simulation in Education. A study is described which attempted to identify some of the major dimensions of administrative behavior and their relationships to a variety of other measurable characteristics of people. (6) Simulation in Industrial Engineering. System simulation is described as the fundamental tool for industrial engineering. Applications of it, and computer simulation, are given in several case studies. (7) Simulation in Military Operations. The System's Research Laboratory's air-defense experiments are reported on, as well as examples of simulation used in model building for military applications.

Guetzkow, H., Alger, C. F., Brody, R. A., Noel, R. C., & Snyder, R. C. *Simulation in international relations: Developments for research and training*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1963.

This book explores a man-computer approach to the simulation of the international political-economic system. Several chapters are devoted to a description of actual operations of the inter-nation simulation from the viewpoint of the participant as well as the simulator. The evolution, development, and potential of such a technique are discussed in relation to the authors' experiences using the simulation as a laboratory exercise in courses in international relations.

One section of the book is a Participant's Manual, which allows the reader to follow instructions given to decision-makers in the games. Three systems are represented in this simulation: the national political system, the national economic system, and the international politico-economic system. The simulation was constructed to represent features of the processes involved in international relations. The decision-makers work within a conceptual environment similar to the decision environment confronted by members of government. Also included in this volume are examples of protocols, messages, and displays characteristic of the inter-nation simulation.

Gullahorn, J. E. & Gullahorn, J. T. Simulation and social system theory: The state of the union. *Simulation and Games*, 1970, 1, 19-39.

Simulation has provided an attractive vehicle for operationalizing the propositions of social exchange and other dynamic models, and for observing whether the interaction of fundamental interpersonal processes generates systemic consequences. In this paper, the authors describe a representative sample of these simulations, distinguishing between those that emphasize universal social system change processes as opposed to models that focus on micro-behavioral information

processing. The simulations of total social system processes reviewed include the models developed by Kundstadter (1963, 1965) and Gilbert & Hammel (1965, 1966). The simulations of micro-behavioral processes include models developed by McPhee (1964), Smith (1969), Coleman (1962, 1965), Breton (1965), Abelson & Bernstein (1963), and Gullahorn & Gullahorn (1963, 1964, 1965, 1970). Each of these models is reviewed in terms of its methodology and findings. The authors conclude with a positive note on the potentials of social system simulation.

Hallenbeck, C. E., Gallaher, R. B. & Warren, J. Q. The community mental health center management game: Teaching administrative skills by means of computer simulation. *Behavior Research Methods and Instrumentation*, 1977, 9, 202-208.

Clinical training in psychology rarely includes the opportunity for students to exercise managerial responsibility for a functioning human service organization. Nevertheless, many clinicians are called upon to assume such decision-making duties, despite their lack of administrative training. This study examines the feasibility of using a computer model of a typical Community Mental Health Center (CMHC) as a training device, permitting clinical students to "manage" a complex social agency over a course of many months of simulated time. The system provides a valuable and interesting supplement to the usual training materials in psychology programs.

Hare, A. P. Simulating group decisions. *Simulation and Games*, 1970, 1, 361-376.

In a test of three computer models to simulate group decisions, data were used from 31 American and Austrian groups on a total of 307 trials. The task for each group was to predict a series of answers of an unknown subject on a value-orientation questionnaire after being given a sample of his typical responses. The first model, which used the mean of the individual opinions as a simulation of the group judgment, exactly simulated over half the trials. The simulation was improved in Model Two, which also used the mean, when individual opinions were weighted according to their total participation in the discussion, and learning was added. This was especially true when the cutting points were changed so that the mean would represent more extreme opinions.

The best simulation occurred with Model Three, which used the median of the individual opinions as a simulation of the group decision. Using this model, over 75% of the trials were accurately simulated. Since Model Two involved the most elaborate simulation of a variety of group processes, some of the details of this program are presented together with a sample of the data for one five-man group.

Hart, E. W. & Sung, Y. H. Computer and experimental simulation of triad decision making. *Behavioral Science*, 1976, 21, 532-547.

A computer simulation of triad decision making was performed which examined four system variables that may affect the group members' satisfaction with the group decision and the groups' difficulty in reaching the decision. These variables were: (1) the decision rule used, (2) the relative similarity of the individual member's initial preference position to the group decision, (3) the initial concordance of the group members' preferences, and (4) the group members' preference strengths. The subjects used in the simulation were 108 male volunteers enrolled in the introductory psychology course of a university.

Ego involvement, from Sherif's social judgment theory of attitudes, was found to be a plausible process through which individual preference can influence group decision. This conceptualization of the incorporation of individual preference strength in the group decision was contrasted with the approach of Coleman's theory of collective decisions. These results were compared to the results from an experimental simulation of triad decision making obtained by Sung and Castore. Differences and similarities in the two results and their implications for understanding decision-making are discussed.

Harvey, M. D. & Enzle, M. E. Effects of a dependent other's psychological need on subjects' use of power in a simulation game. *Simulation and Games*, 1977, 8, 405-418.

Reviews of the literature indicate that freely interacting dyad members typically do not respond responsibly to each other's dependency, but instead engage in mutually defeating attempts to exploit each other. The authors of this study believe that this discrepancy between behavior in helping situations and game situations is due mainly to the fact that mixed-motive game participants typically have equal influence over each other's outcomes. Neither person is more or less dependent than the other.

Subjects (N=60) in the present study were assigned to the power position in a power game and interacted with a dependent person who was ostensibly in one of three mood states (positive, negative, neutral). It was predicted that subjects who interacted with the negative mood target would be less exploitative in the use of their power than would subjects who interacted with a target who was in either a neutral or positive mood. The results strongly support the predictions derived from Schwarts's (1975) formulation of the justice norm. Subjects who believed their partner to be in a very depressed mood

state were significantly less exploitative than were subjects who believed their partner to be in either a neutral or very good mood state. Subjects' responses to the item that assessed perceived need provides further evidence that the effect was due to justice considerations. These results closely conform to those obtained for helping behavior by Enzle and Harvey (1976), and add to the evidence that criticisms of the laboratory game have been too severe.

Heslin, R. & Streufert, S. Task familiarity and reliance on the environment in decision making. *The Psychological Record*, 1968, 18, 629-637.

This study investigates the effect of increasing familiarity with a complex decision-making task on subjects' perceptions of the task environment as a "source of influence" on their decisions. Previous research has hypothesized that subjects entering an unfamiliar task situation would be more cautious in making decisions and less likely to manipulate the environment. It was further hypothesized that subjects of complex conceptual structure would find it easier to master the environment and its requirements, and so lessen their caution, sooner than their simple counterparts.

Seventy-two students formed 36 dyads and played a complex tactical and negotiations game for six one-half hour periods. While all subjects reduced their use of the environment as a source of influence on their decisions, cognitively complex subjects reduced their dependency on the environment sooner and more sharply than simple subjects. It was concluded that as a task situation is mastered, decision makers gain the confidence to take a more active role in structuring it. The implications of increased familiarity with a task situation for the shift-to-risk phenomenon are indicated.

Higbee, K. L. & Streufert, S. Perceived control and riskiness. *Psychonomic Science*, 1969, 17, 105-106.

Twenty undergraduate students were placed in a complex decision-making situation, involving a simulated international conflict which approximates real-world decision making in many aspects. The analysis of the subject's economic decisions indicated that those subjects who perceived that conditions in the simulated environment were due to their own decisions tended to take fewer risks than subjects who perceived that conditions were due to forces beyond their control.

House, P. W. Building games: Retrospection. *Simulation and Games*, 1972, 3, 271-289.

The purpose of this paper is to report on a selected number of the findings which resulted from a game-building experience of a gaming project. The findings are derived from experiences gained during the development of a man-machine gaming model named CITY. The authors focus on two aspects of gaming: design and usage. The findings are summarized as follows: (1) Staff -- separate the design staff from the programming staff during the formative stages of the model. (2) Theory -- design a social simulation in the same way as you would a set of blueprints - one set of descriptions after another. (3) Computer vs. Noncomputer -- the decision for the use of computers should be based on the purpose and potential users of the game. (4) Validity -- there does not appear to be any method for testing the validity of complex social science gaming models. The authors conclude by suggesting the use of games as a policy device. This practice has already been undertaken in business and military settings.

Hunsaker, P. L. Current developments in leadership training simulations. *Psychological Reports*, 1978, 43, 115-125.

Three behavioral simulations have been developed to aid in the training and evaluation of ROTC cadets and OCS candidates in the area of leadership effectiveness. The first simulation is called the Tactical Pacification Game (Mudget, Hunsaker & Wynne, 1975), which provides a simulated environment allowing for the assessment of decision-making, leadership, and interpersonal skills. The success of this game led to the development of two additional simulations: The Leadership Assessment and Training Simulation (Hunsaker, 1974), and the Leadership Effectiveness Development Simulation. The former technique was developed to provide a method of identifying persons who are reasonably better able to cope with turbulence and to provide a training vehicle for enhancing this capability in all leaders. The latter is a military-decision situation which interrelates economic, socio-political, and tactical dimensions. It is designed to facilitate the development of specific tactical competencies as well as broader leadership, decision-making and interpersonal skills. This paper describes the procedures and scenarios for conducting the simulations and summarizes their applications and results. Future applications are discussed, including techniques for data collection, anticipated problem areas, and related research paradigms.

Hunsaker, P. L. & Hunsaker, D. M. Luna I Moon Colony: An adapted format for analysis of group decision-making in a competitive setting. *Psychological Reports*, 1974, 35, 411-414.

An experimental simulation is described as a method for measuring and training decision-making by groups under complex conditions and intergroup competition. The method employs a simulation game including selection of goals, relevance of strategy, risk-taking, consistency, competition, and other potential components. Similarities to previously described simulation techniques as well as the additional dimensions of the adapted simulation game are discussed.

Inbar, M. & Stoll, C. S. *Simulation and gaming in social science.* New York: The Free Press, 1972.

This book deals with simulation design and use. The principles and development of simulation are explained in terms of its role as a research and teaching tool. The four opening chapters introduce the basic aspects of the subject. The next section comprises fourteen case studies -- original contributions by the developers of well-known simulations, in which the actual construction process is described. The concluding chapters furnish guidelines for deciding whether and how to design a simulation or game according to one's aims and needs.

Kahan, J. P. & Rapaport, A. Decisions of timing in bipolarized conflict situations with complete information. *Acta Psychologica*, 1974, 38, 183-203.

Games of timing constitute a subclass of two-person, constant-sum, infinite games, where the problem facing each player is not what action to take, but rather when he should take action. The theoretical structure of games of timing with complete information and equal accuracy functions is described. An experimental paradigm of such games is presented by a computer-controlled, two-person, infinite game that simulates the Western-style duel.

Ten pairs of male subjects participated in three sessions each in a duel experiment. Each pair played 420 duels in which both players had the same accuracy function, but the starting number of bullets available to each player in the dyad was varied systematically. The results of this experiment show that, in general, players fired their first bullets later than the prescribed time, and then fired their later bullets a short time thereafter, mostly sooner than prescribed. In other words, the range of firing time was more compressed than the optimal policy would prescribe. The variables involved in this game are discussed as predictions arising from the mathematical theory of duels.

Kaplan, I. T. & Barber, H. F. *Training battalion command groups in simulated combat: Identification and measurement of critical performances.* Alexandria, VA: US Army Research Institute for the Behavioral and Social Sciences, 1978. (DRAFT)

The behavior of 23 battalion command groups was investigated in a simulated combat environment provided by the Combined Arms Tactical Training Simulator (CATTS). Thirteen mechanized groups performed a covering force operation followed by an attack, and 10 non-mechanized groups performed a defense and an attack. Their performance was rated on items derived from the subtasks of the battalion command group ARTEP (Army Training and Evaluation Program). Fifteen subtasks were identified as critical, because they or their elements were both low-rated and highly correlated with ratings of overall effectiveness.

The four missions observed in this investigation were markedly different with respect to subtask criticality. All but one of the 15 critical subtasks were identified in the covering force mission, five subtasks were critical in the mechanized attack, one in the defense, and one in the non-mechanized attack. There were significant differences among ratings of the same command group by several observers, each of whom observed the exercise from a different point of view. These results indicate a need for further research (a) to develop more objective measures of performance and (b) to identify those subtasks where the different perspectives of the raters should produce valid differences in performance ratings.

Keeney, R. L. & Sicherman, A. Assessing and analyzing preferences concerning multiple objectives: An interactive computer program. *Behavioral Science,* 1976, 21, 173-182.

This paper describes an interactive computer program designed to facilitate the quantification of a decision maker's preferences for multiple objectives in terms of a multiattribute utility function. The program is intended to alleviate many of the operational difficulties with current procedures for assessing and using multiattribute utility functions. The package includes commands for structuring the utility function, assessing single attribute, component utility functions of the overall multiattribute utility function, identifying the preference tradeoffs between attributes, evaluating alternatives, and performing sensitivity analysis. Suggestions for using the program are included.

Klimoski, R. J. Simulation methodologies in experimental research on negotiations by representatives. *Journal of Conflict Resolution,* 1978, 22, 61-77.

This paper reviews recent experimental (primarily social-psychological) research on intergroup conflict resolution with an emphasis on methodology. Specifically, it focuses on the creation of conflict forces and representational role obligations in simulations. The resulting typologies clarify the numerous strategies used by investigators. The favored approach to studying intergroup negotiation is the experimental simulation. By experimental simulation, the authors mean those studies which attempt to recreate or simulate the central features of some set of phenomena which are of interest and then to study those phenomena under relatively controlled conditions. The various types of experimental simulations used in the study of intergroup negotiations can be characterized by two schemes: enactment simulations and strategic simulations. These two types of simulation are compared on several issues. This paper calls for a systematic evaluation of these strategies, as researchers appear to be unaware of their potential impact.

Lashutka, S. A cross-cultural simulation as a predictor of cross-cultural adjustment. *Simulation and Games,* 1977, 8, 481-492.

This study deals with determining the potential effectiveness of a simulated cross-cultural experience as a predictor of cultural adaptability for use in the selection of personnel nominated to serve in a foreign culture. Eighty-six US Army enlisted personnel participated in this study. The subjects were divided into four simulation groups and participated in BaFa'BaFa' -- a cross-cultural interaction/cross-cultural adjustment simulation.

Results of this study indicate that three sets of variables are important in the cultural adaptation process. These sets may be labeled as specific culture variables, general cultural variables, and organizational context variables. Each of these variable sets include measures of the cognitive, affective, and behavioral domains. The authors conclude that this study supports the cross-cultural simulation as a potentially powerful solution to the problem of personnel selection for overseas assignments. Use of simulations provides a unique method of personnel assessment, prior to assignment, for cultural adaptability that has long been neglected in international personnel selection.

Lester, J. P. & Stoil, M. J. Evaluating a role-specific simulation. *Simulation and Games*, 1979, 10, 167-188.

College-level simulations have suffered, in general, from two sets of problems. First, there has been a conceptual problem in that simulation games have been treated more or less identically by evaluators, without regard for simulation format differences. Second, only a few attempts at evaluation employ rigorous empirical tests of the efficacy of the simulation as a learning tool. With regard to the former problem, the authors of this article have created a taxonomy of games by dividing simulations into categories of role-specific and role-generalized. The distinctions between these two types makes them better or less suited for the study of general principles governing political processes and institutions.

Several hypotheses regarding the role-specific simulation were tested within the context of an introductory course in international political economy (N=25). The results of this simulation indicate that simulation experience has a positive effect on learning. However, it also creates problems for the suggested "taxonomy of games". The hypothesis that a role-specific simulation, by its nature, would encourage substantive learning to a greater extent than it encourages process-oriented learning was not confirmed. Implications of these results for simulation development are discussed. The need for additional systematic studies of the proposed role-specific/role-generalized typology is emphasized. Also, investigation is encouraged into the possibility of dividing simulations into the categories of predominantly passive participation/predominantly active participation.

Lucas, H. C., Jr. Performance in a complex management game. *Simulation and Games*, 1979, 10, 61-74.

This article describes the New York University Management Game -- a complex simulation of business enterprises operating in a competitive industry. Several characteristics of management games are exemplified by this technique. The performance of players in a management game game is a multidimensional phenomenon. In addition to team measures such as profits, individual measures of performance are also needed. In this study, predictors of profits differ significantly from those of peer ratings for individuals.

There are a number of implications from this study. The designers of games should include multiple, independent performance indicators. The awards for achievement on independent indicators can be used to emphasize different educational objectives. For example, by emphasizing profits, the NYU Management Game encourages team performance focused on successfully operating a business. By basing grades partly on peer ratings, the game administration also encourages each individual to consider the dynamics and structure of the simulated organization. By emphasizing performance on a number of indicators, team administrators can create realistic conflict among competing objectives which provides a more accurate simulation of the real world.

McCall, M. W., Jr. & Lombardo, M. M. *Looking Glass, Inc.: An organizational simulation.* (Technical Report No. 12) Greensboro, NC: Center for Creative Leadership, 1978.

Looking Glass, Inc., is a simulation of a glass manufacturing corporation. It was designed as a research vehicle for studying leadership processes as they play out in an organizational context. There are twenty positions, ranging across three divisions and four levels (plant manger, director, vice-president, and president). The divisions face different environments, varying from volatile to stable. Looking Glass is typical -- the organizational type, structure, and environments are common. All problems contained in the simulation are based on actual events.

The report is divided into four sections. Section 1 describes the development of Looking Glass. Included are the chronology of what occurred from original idea to final pretest runs and a summary of assumptions and biases related to constructing a realistic management simulation. The next section discusses research issues, such as the experimental modes built into the design, possible manipulations, measurement strategies, and preliminary hypotheses. The third section outlines training uses of Looking Glass. The final section explains the nuts and bolts of running the simulation.

McClennen, E. F. Some formal problems with the Von Neumann and Morgenstern theory of two-person, zero-sum games, I: The direct proof. *Theory and Decision*, 1976, 7, 1-28.

This appraisal of the Von Neumann and Morgenstern argument begins with a summary of the main steps in their analysis: (1) a definition of an arbitrarily selected game, G, and its two variants; (2) an application of the two variants of G to G itself for heuristic purposes; and (3) a "final" and "direct" proof of the theory formulated in the previous two analyses. Subsequent sections argue for two related theses: (1) the formal or direct proof of their theory concerning the rational solution to G is logically defective in the sense that most of the conclusions which they draw do not follow in any rigorous sense from the premises which they employ; and (2) the problem with the formal or direct proof turns out to be the problem of deriving maximin and minimax criteria of rational choice from the expected utility maximization principle (ELUX) in game-decision contexts, and there are strong reasons for supposing that no such 'direct' derivation of these criteria is possible.

McCluskey, M. R. *Perspectives on simulation and miniaturization.* (HumRRO PP-14-72). Alexandria, VA: Human Resources Research Organization, 1972.

This presentation suggests a conceptual framework for making decisions regarding the use of simulation. It covers such aspects as the applications of simulation, the factors involved in selecting a simulation methodology, the aspects of the system to be simulated, and the conditions necessary for transfer to the real world. Finally, it examines some training applications of simulation and miniaturization.

The four basic areas of endeavor where simulation techniques have been applied are: training, performance measurement, system evaluation, and research. There are several advantages to using simulation in these areas. (1) It provides an excellent environment for training personnel to function effectively in a system. (2) It allows for precise control over situational, experimental, and time dimensions. (3) Simulation makes possible a relatively unlimited number of replications under the same or different conditions in order to develop predictive relationships concerning the performance of the system. (4) Simulation provides the capability for economically testing and evaluating system performance during exploratory and developmental stages. (5) It also assists in simplifying the complex environments in which some systems must function.

McHale, J. System simulation: Man plus. *Behavioral Science,* 1975, 20, 47-56.

This analytical essay is drawn from a larger study which attempts to redefine the human condition in terms of the evolutionary relationships with those diverse technologies, institutions, and organizational terms which have subtended our survival. The major premise is that, rather than being alien to or constraining upon human development, these supporting systems have made us human. We retain our human qualities only by externalizing various physical and intellectual capacities into autonomously evolving organismic systems which enable us to sidestep many of the natural processes of adapting the organism itself to the environment.

This article is a recommendation for both a systems approach and simulation as the proper analytical tools. Simulation is seen as a product of science which is a powerful tool for conceptualization as well as for attaining greater predictive understanding and extended control of the environment. The author contends that as we have consciously learned how to organize scientific and technical development on the large scale, we must now orient ourselves to the conscious process of social intervention, remolding and reshaping our institutions, organizations, and value systems. The development of social interventions called for requires an improved understanding of the elements involved and of their complex interactions. To gain the required understanding, we must apply all appropriate intellectual and technical tools available to us. Simulation is one such tool.

McLeod, J. Behavioral science, systems theory -- and simulation. *Behavioral Science*, 1974, 19, 57-69.

In this article, general systems theory and simulation are offered as the theoretical framework and methodology most appropriate for dealing with social systems in the future. The behavioral scientist typically constructs models in his attempt to research a particular problem. Defining a model as a systems synthesized for a particular purpose, it follows that a systems approach should be used in its development. Ideally, this means that a model must be considered in its environment, that is the totality of the suprasystem, or suprasystems, of which it is a subsystems. And the interaction of each of the subsystems of which it is comprised on each other, and on it, must be taken into account. Simulation is one technique facilitating the development of such a model. The author contends that general systems theory and simulation are both tools for analysis and synthesis. They are both strongly interdisciplinary, and involve a way of thinking -- the holistic approach to problems. They differ primarily, but symbiotically, in that one emphasizes theory, the other method.

The author reviews the many kinds of simulation, arranging them on a continuum from least to most sophisticated. The varied purposes of simulation techniques are discussed, including: to probe the future, model the present, formalize ideas, identify system pathologies, plan laboratory or real world experiments, demonstrate the dynamics of a proposed system, familiarize or train people, and investigate the interaction of social systems. The author admits the several problems surround the science of simulation: (1) simulation is more of an art than a science; (2) simulationists are divided into those who simulate continuous systems, and those who simulate discrete systems; (3) languages (natural and computer) often cause difficulties that impede progress in simulation; (4) simulation suffers from inadequate documentation; (5) simulation has been undersold, in that the people who are in a position to use the results have not been educated as to the proper role of simulation as a methodology they can use to solve their problems; and, on the other hand, (6) simulation has been oversold, in that many simulationists have promised more than simulation can deliver. In conclusion, the author states that if simulationists use systems theory and the scientific approach for the development and verification of their models, and overcome the problems described above, simulation will be well on its way to becoming a science to serve all mankind.

Michaels, J. W. & Wiggins, J. A. Effects of mutual dependency and dependency asymmetry on social exchange. *Sociometry*, 1976, 39, 368-376.

A theoretical analysis of the conditions of mutually profitable exchange -- when two people are partially but equally dependent on one another for outcomes -- led to four general hypotheses relating the frequency of mutual giving (exchange) and individual giving to magnitudes of mutual dependency, individual dependency, and dependency asymmetry. Three of the hypotheses were tested in a simulation involving volunteer students enrolled in a sociology course. Subjects were randomly assigned to high- and low-dependency positions in a dyad. The dyads were randomly assigned to three treatments, each having a dependency asymmetry of 0.4, but having mutual dependencies of 0.4, 0.6, and 0.7, respectively.

The three hypotheses tested received support under experimental procedures. (1) Exchange was not maintained by subjects when mutual dependency was just below the threshhold for mutually profitable exchange. (2) In the two treatments in which mutually profitable exchange was possible, exchange varied directly with mutual dependency. (3) The more dependent subjects in each dyad gave more frequently than the less dependent subjects. These findings were interpreted as supporting the theoretical analysis of the conditions of mutually profitable exchange under partial but unequal mutual dependence.

Michener, H. A., Fleishman, J. A. & Vaske, J. J. A test of the bargaining theory of coalition formation in four-person groups. *Journal of Personality and Social Psychology*, 1976, 34, 1114-1126.

Bargaining theory, unlike other theories, attends closely to the dynamics of negotiation in coalitional situations. Its predictions occasionally differ from those of minimum resource and pivotal power theories. The purpose of this article is to test bargaining theory against minimum resource and pivotal power theories in a series of situations where the theories make competing predictions.

This test involved eight veto and eight nonveto distributions. Male subjects (N=128) in four-person groups negotiated the division of rewards in an unconstrained, face-to-face format. For the nonveto distributions, results indicate that the bargaining theory is superior to minimum resource and pivotal power theories in predicting payoff division, and at least as good in predicting coalition formation. For the veto distributions, however, results indicate that the bargaining theory is less effective than the minimum resource and pivotal power theories in predicting payoff division.

Mihram, G. A. Simulation methodology. *Theory and Decision*, 1976, 7, 67-94.

This paper delineates explicitly the attributes of simulation methodology. Simulation is shown to be both an art and a science; its methodology, properly used, is founded both on confirmed (validated) observation and scrutinized (verified) art work. This paper further describes the existing procedures by which computer-directed models can be cyclically scrutinized and confirmed and thereby deemed credible. The complexities of the phenomena observed by social scientists are amenable to human understanding by properly applied simulation — the methodology of the scientist of systems.

Nydegger, R. V. & Owen, G. The norm of equity in a three-person majority game. *Behavioral Science*, 1977, 22, 32-37.

The study of n-person game theory and of coalition formation frequently provides useful analogs for the study of such systems as: face-to-face groups, states, nations, or any self-interested groups in situations involving the possibility of mixed motive or competitive interaction. The present study addresses itself to some of the processes that occur in triads when distribution of limited resources is the goal. Specifically, the processes involved are: decision-making, cooperation and conflict, bargaining, and social comparison.

Three players, A, B, and C, (N=60) were told that they could split a payoff if any two of them agreed upon a solution. If A and B formed a coalition, they would each receive 50% of the winnings. If AC or BC formed a coalition, then A or B would get 40% and C, 60%. They were also allowed to use side payments. It was predicted that in the absence of a formal solution, players would invoke psychological considerations to arrive at solutions. Since the norm of equity is widely held, it was predicted that the AB coalition would result most frequently and that A and B would show a pre-post bargaining change of opinion regarding C.

The results were not as expected, even though 15 of the 20 groups opted for the AB split. However, in 13 of the 20 groups the two included members used side payments to form a fully inclusive three-person coalition. In comparing the opinion change of the formally excluded member in the three-way split groups with the excluded member in the two-way split groups, there was greater opinion change of the excluded member in the two-way split group. While this was not predicted, it fits the basic predictions of the study.

Olmstead, J. A., Cleary, F. K., Lackey, L. L. & Salter, J. A. *Development of leadership assessment simulations.* (HumRRO TR 76-21). Alexandria, VA: Human Resources Research Organization, 1976.

This report describes a project to develop leadership assessment simulations to be used in US Army assessment centers. Simulations and associated assessment procedures were developed to assess three levels of military personnel on 11 leadership dimensions. The dimensions explored include: social skills, communication skills, adaptability, motivation, forcefulness, mental ability, decision-making, administrative skills, organizational identification, effectiveness in organizational leadership roles, supervisory skills, physical competence, technical and tactical competence, and problem-solving ability.

Materials and procedures were also developed for training staff personnel to conduct the simulations and employ the assessment instruments. The report describes the developmental process and the materials that resulted. It is concluded that organizational simulations contribute an aspect to assessment center programs that is not obtainable through other techniques.

Pettegrew, L. S. The Paradox Game: Identifying and overcoming untenable interactions. *Simulation and Games,* 1979, 10, 359-383.

This article explores the many facets of paradoxical communication in interpersonal encounters. Several issues are explained in considerable detail. First, the nature of paradoxical communication and how it might adequately be distinguished from other interpersonal dilemmas is discussed. Second, a structured interpersonal exercise is presented which provides students with experiential learning in how to identify and deal effectively with many subtle manifestations of paradoxical communication.

Variations on the paradoxical theme are suggested for application to special audiences. When accompanied by the requisite background information, these versions provide the individual instructor with a useful tool for introducing students to paradoxical communication and the potentially untenable situations which may occur. The authors lastly place the phenomenon of paradoxical communication into a paradigm of social power and interpersonal influence.

Rapoport, A., Frenkel, O. & Perner, J. Experiments with cooperative 2 x 2 games. *Theory and Decision*, 1977, 8, 67-92.

Nash's solution of a two-person cooperative gave prescribes a coordinated mixed strategy solution involving Pareto-optimal outcomes of the game. Testing this normative solution experimentally presents problems because rather detailed explanations of the concepts of 'threat strategy', 'strategy mixture', 'expected payoff', must be given to the subjects. To the extent that it is desired to test the solution using 'naive' subjects, the problem arises of imparting to the subjects a minimal level of understanding of the issue involved in the game without actually suggesting the solution.

Experiments were performed on 40 subjects to test the properties of the solution of a cooperative two-person game as these are embodied in three of Nash's four axioms: Symmetry, Pareto-optimality, and Invariance with respect to positive linear transformations. Of these, the last was discorroborated, suggesting that interpersonal comparison of utilities plays an important part in the negotiations. Some evidence was also found for a conjecture generated by previous experiments, namely that an externally imposed threat (penalty for non-cooperation) tends to bring the players closer together than the threats generated by the subjects themselves in the process of negotiation.

Roeckelein, J.E. *Simulation of organizations: An annotated bibliography.* (HumRRO TR-67-14) Alexandria, VA: Human Resources Research Office, 1967.

This collection of references on simulation of organizations was compiled in the course of HumRRO research program planning. The bibliography is divided into three principal areas: (1) man-centered simulation, (2) man-machine simulation, and (3) machine-centered simulation. Within each of these principal areas, publications are separated into those concerned directly with the simulation of organizations and those which may be related to organizations only indirectly. In addition, an initial section covers general reference works and bibliographies which are offered as useful source material and pertain either to simulation or to the study of organizations.

Roth, A. E. Bargaining ability, the utility of playing a game, and models of coalition formation. *Journal of Mathematical Psychology*, 1977, 16, 153-160.

A utility function for playing a given position in a game is developed as a natural extension of the utility function which defines the rewards available in the game. This function is determined by a player's opinion of his bargaining ability. A characterization of such utilities is obtained which generalizes previous results that the Shapley value and Banzhaf-Coleman index are both cardinal utility functions which reflect different bargaining abilities.

The approach taken here -- that of coalition formation -- is motivated by the work of Komorita and others. An expression for the expected reward of a player in a given position of a particular game is given. Rather than depending on a comparison between different games, this expression depends on detailed consideration of the game in question. In particular, the expected reward depends on an assessment both of how well the player will do if a given coalition forms, as well as the probability that the coalition will form. Results show that the expressions for the expected reward and for the extended utility have the same functional form. The connection is more than a formal one, since a player's experiences in a game should influence his opinion of his bargaining ability, while his opinion of his bargaining ability should influence his expectations of reward in a given game.

Ruben, B. D. Toward a theory of experienced-based instruction. *Simulation and Games*, 1977, 8, 211-231.

Presented in this paper is a generic model of experiential instructional methods which aims to (1) broadly enumerate the forms of experiential activities and their relationship to one another, (2) provide a classification scheme for examining the structural components and interactional dynamics of experiential activities, (3) suggest the relationship between structures of experiential activities and instructional outcomes, and (4) indicate the basis by which experiential techniques can be selected and utilized to match instructional objectives.

The framework presented in this paper is intended to be suggestive, not prescriptive. In general, the framework suggests that experiential activities with components that are externally defined and regulated -- externally parametered -- seem appropriate to instructional settings where the teaching of specific content is the primary goal. Conversely, activities that are more internally parametered seem better suited for instruction in more generalized coping processes.

Ruggiero, F. An overview of the development of computer modeling for instructional and research purposes. *Behavior Research Methods and Instrumentation*, 1977, 9, 76-80.

This paper presents an overview of the chracteristics, pedagogy, and future prospectus of some widely used computer-based laboratory simulation systems in psychology. These systems (DATACALL, EXPER SIM, MESS, LESS, and WRIST) were developed to augment undergraduate laboratory instruction by providing an experience which enables students to have considerable practice designing a series of experiments in an interesting and challenging context. The use of computer-based simulation makes possible the construction of a learning environment in which the laboratory class is converted into a research community engaged in scientific dialogue. The development of new simulation models is critical to the operation of this environment. A team approach for developing new models, requiring a programmer, content specialist, and instructional designer, is offered which has appropriate incentives built in to insure its success.

Schultz, R. L. The use of simulation for decision-making. *Behavioral Science*, 1974, 19, 344-350.

The problem of making use of simulation models in the sense of influencing decisions is a special case of the problem of using models or of achieving innovation or organizational change. In this paper, considerations about model use are viewed as a key to understanding the nature of policy simulations. It is argued that (1) policy simulations are designed to influence decisions; (2) factors related to making use of policy simulations are behavioral as well as technical; and (3) these application factors dictate a revised model development procedure.

Seltzer, R. A. Simulation of the dynamics of action. *Psychological Reports*, 1973, 32, 859-872.

The purpose of this study is to help in the process of examining the theory of motivation proposed in *The Dynamics of Action* (Atkinson & Birch, 1970), to clarify certain theoretical issues, and to aid in the formulation of experimental research strategies. Computer simulation was used so that a variety of experimental paradigms could be investigated in a highly condensed time period. Results of this study are very encouraging. First, they show that the theory could be simulated. The simulation brought out several theoretical issues which were examined and resolved. An experiment in progress was simulated, and as a result,

some changes in procedure were suggested. Certain behavioral patterns, following from the theory, were also found in the simulation. It is concluded that (a) computer simulation can be a highly valuable tool in theory building and testing, (b) the theory for which the simulation was undertaken implies certain identifiable behavioral patterns, and (c) simulation can aid in the design of experiments to test theoretical issues.

Shapira, Z. & Dunbar, R. L. M. Testing Mintzberg's managerial roles classification using an in-basket simulation. *Journal of Applied Psychology*, 1980, 65, 87-95.

Managerial work was described by Mintzberg as consisting of ten roles classified into the following three groups: (a) interpersonal roles, including the figurehead, leader and liaison roles; (b) informational roles, including the monitor, disseminator and spokesman roles; and (c) decisional roles, including the entrepreneur, disturbance handler, resource allocator and negotiator roles. An in-basket simulation exercise, constructed to test Mintzberg's classification, was administered to 54 Master of Business Administration students and 112 managers in two different studies. Analysis using the Guttman-Lingoes smallest space analysis suggested that the ten roles can be meaningfully divided into two facets. One facet consists of roles that deal with the generation and processing of information, and the second facet is comprised of roles that involve decisions. The implications of the results and the use of in-basket simulations for the study of managerial behavior are discussed.

Shubik, M. & Brewer, G. Methodological advances in gaming. *Simulation and Games*, 1972, 3, 329-347.

This paper explores the reasons for gaming and some basic types of gaming. It proposes a method for combining the strengths of two extremely different forms of gaming in an inexpensive and simple manner. Specifically, it discusses the potential use of a one-person, interactive computer game that combines the features of rigid-rule gaming with free-form exercise.

The one-person, computer interactive, quasi-rigid rule game is described as a technique which reconciles the inherent problems of computerized games and free-form games taken alone. The basic problem in reconciling the two is to meld the strengths of each game form to extract their mutual benefits at optimal trade-off in sacrifices to the play, imaginativeness, interest, coordination, control and evaluation of the game. The one-person game was developed by H. A. DeWeerd

and R. J. Meeker. The game involves 13 Soviet-Arab military steps that progressively endanger Israeli security. The roles of all the teams except those of the United States are played through scenario extensions. The purpose of the game is to reveal the stage at which the endangerment of Israel would lead the U.S. player to sanction large-scale direct military assistance to Israel. Methodological advancements possible through the one-person game are discribed in detail.

Spelt, P. F. Evaluation of a continuing computer conference on simulation. *Behavior Research Methods and Instrumentation*, 1977, 9, 87-91.

A 20-day computer conference was held in preparation for a face-to-face meeting to produce a computer simulation. The conference resulted in the generation of seven different models: one input, or initial training, model and the other six of the testing phase, during which transitivity data are generated. One of the significant realizations that came out of this conference was that the simulation finally produced would have to integrate training and testing phases, whereas none of the models the group had intially reviewed had done this. The author concludes by stating that computer conferencing appears to hold great value for faculty development in a period of reduced faculty mobility.

Starr, J. & Yngvesson, B. Scarcity and disputing: Zeroing-in on compromise decisions. *American Ethnologist*, 1975, 2, 553-566.

This paper critically examines the ways in which the concepts of "compromise" and "zero-sum game" have been used to describe the outcomes of disputes. In particular, it questions the assumption that disputants with multiplex ties will try to compromise their differences, because their goal will be maintenance of the relationship, rather than "winning". A re-analysis of case materials from three societies indicates that many persons in multiplex relations seek and obtain zero-sum outcomes to disputes. It is suggested that this can be explained if (1) the goals of the disputants are distinguished from the goals of the third party, and (2) the relative rank and power of the disputants is considered. It is further suggested that people with on-going relations will seek zero-sum outcomes to disputes when they are attempting to gain control over land or some other resource in a scarcity situation because control over that resource is a crucial factor in maintaining and altering power differences.

Steinfatt, T. M. The prisoner's dilemma and a creative alternative game: The effects of communications under conditions of real reward. *Simulation and Games*, 1973, 4, 389-409.

Two experiments are reported here which explore the role of communication in gaming studies of conflict. The first experiment investigated the effect of communication on cooperative choice during play of a Prisoner's Dilemma game under conditions of real reward. The results indicate that communication during the game affected the percentage of cooperative responses. The higher the level of communication, the greater the number of cooperative responses, at least under conditions of real reward.

The second experiment examined the effect of communication on a situation which simulated the type of environment which may result in collusive crime: a desired goal is obtainable if one person can convince the other that the goal can, in fact, be attained. At least two variables seem related to this process, according to the results of the experiment. First, communication -- the ability to transfer information between both parties concerning the possibilities of the situation -- is necessary for a creative solution to occur. Second, the personality variable of dogmatism seems to be related to the ability to achieve a solution in this type of game. This latter result has implications for effective leadership style.

Streufert, S. Increasing failure and response rate in complex decision-making. *Journal of Experimental Social Psychology*, 1969, 5, 310-323.

The effect of increasing failure on response rate and its components in complex decision making was investigated. Data were collected in a simulated decision-making environment permitting integrated, retaliatory, and general unintegrated decision-making by dyads. Forty-four undergraduate male volunteers from a state university participated in the Tactical and Negotiations Game simulation. Statistical analyses included ANOVA of decision-making response rate components and Newman-Keuls procedures based on the ANOVA error terms comparing failure levels.

The results indicated that: (1) integrated decision making first increases and then decreases as the failure levels of information which groups experience are increased; (2) general unintegrated decision-making increases when failure reaches moderate levels; and (3) retaliatory decision making is not affected by failure induction. The total decision-making response rate generally follows the characteristics of the curve for the integrated decision-making component, although it is somewhat higher.

Streufert, S. Complexity and complex decision-making: Convergences between differentiation and integration approaches to the prediction of task performance. *Journal of Experimental Social Psychology*, 1970, 6, 494-509.

A series of three experiments designed to measure effects of environmental complexity (information load, failure, and success) and complexity of personality structure on differentiation and integration in decision making were conducted. Eight hundred and thirty-nine male volunteers from a state university served as subjects for the experiments; 22 subjects of simple conceptual structure and 22 of complex conceptual structure were placed in each of three separate experiments. The dyad teams participated in the Tactical and Negotiations Game (TNG). The three experiments tested: (1) load variation, (2) failure variation; and (3) success variation.

It was found that increases in load, success, or failure produced initially increasing and then decreasing integration levels. Differentiation levels increased and then remained constant. Differentiation exceeded integration. Structurally complex subjects exceeded structurally simple subjects in integration scores, but not in differentiation scores. It is concluded that complexity theories dealing with differentiation and those dealing with integration should not be viewed as equivalent or widely related. Common theoretical predictions for differentiation and integration were placed in doubt.

Streufert, S. C. Effects of information relevance on decision making in complex environments. *Memory and Cognition*, 1973, 1, 224-228.

The present study was designed to test for the effects of information relevance on measures of complex decision making. To begin studying the separate effects of the two variables, information load was held constant at the previously determined optimal level and information relevance was varied as a proportion of the load. Subjects included 24 undergraduate college students randomly selected from a psychology course at a midwestern university. The subjects were evaluated on various decision making measures applied to a tactical and negotiations game. It was found that integrated decision making (a complex decision response) was modified by changes in information relevance, but that respondent decision making and information search (simple decision responses) did not change. The results were tentatively interpreted to suggest that complex decision making varies with relevance, while simple decision making varies with information load. It is suggested that the relevance concept would be a useful addition to complexity theory.

Streufert, S. & Castore, C. H. Effects of increasing success and failure on perceived information quality. *Psychonomic Science*, 1968, 11, 63-64.

Conceptualizations of information quality, although based on subject performance, are experimenter defined. The present experiment is concerned with examining the subject's (N=36) perception of information quality. The effect of increasing failure and success on perceived information quality is investigated.

The effect of experimentally-induced success and failure in a complex decision-making task on subjective estimates of information quality was obtained for information relevant to the subjects' own decision-making area and that of a marginal group member. It was found that quality initially is perceived to improve. Estimates of quality for success and failure conditions do not differ until success and failure levels are quite high. Once high levels of success are reached, subjects in the success condition consider information as further improving, while subjects in failure conditions maintain previous perceptions. The implications of this result for complexity theory are considered.

Streufert, S. & Castore, C. H. Information search and the effects of failure: A test of complexity theory. *Journal of Experimental Social Psychology*, 1971, 7, 125-143.

The effects of increasing failure and the structural complexity of decision-making teams on four aspects of information search and utilization were examined. Twenty-four structurally homogeneous dyads and 12 control dyads were constructed from 576 male volunteers serving as subjects in a complex experimental simulation running for six 30-minute periods. Information load was held constant at seven inputs per period. The proportion of failure inputs was sequentially increased from 1:7 in period one to 6:7 in period six. Dyads in the control condition were not exposed to failure.

Structurally simple subjects were found to engage in more delegated information search than complex subjects. Self-initiated information search initially increased, then remained fairly constant at higher proportions of failure. Contrary to expectations, no differences were found between simple and complex subjects in self-initiated search. Complex dyads exceeded simple dyads on two measures of information utilization. The number of search moves used in integrative decisions produced an inverted U-shaped curve with optimal levels at moderate proportions of failure. Efficiency of information utilization showed a general decrease as failure increased. The data produced limited support for complexity theory.

Streufert, S., Clardy, M. A., Driver, M. J., Karlins, M., Schroeder, H. M. and Suedfeld, P. A tactical game for the analysis of complex decision making in individuals and groups. *Psychological Reports*, 1965, 17, 723-729.

This paper presents a prototype of a simulation technique specifically designed to maximize differences in information processing characteristics. An appropriate simulation task must permit measurement of both (a) structural components of decision making behavior, and (b) relevant attitude and need content. The environment, in turn, must be designed to enable subjects to choose from a wide range of more or less complex strategies for dealing with the task. These were major considerations in the development of a simulated war game environment which lends itself to the analysis of performance and perceptual characteristics of individuals and social groups. Suggestions for procedures, space requirements, and measurement techniques are included.

Streufert, S. & Driver, M. J. Conceptual structure, information load and perceptual complexity. *Psychonomic Science*, 1965, 3, 249-250.

A simulated decision-making environment was used to test certain theoretical propositions of Schroder, Driver & Streufert. Subjects included 36 male university students who were tested to determine their level of conceptual structure. The subjects were divided into two groups on the basis of their scores on a sentence completion and impression formation test. Teams were placed in a tactical game situation.

It was shown that differentiation and integration in perception increases with increasing information load until a criterion of optimal perception is reached. Beyond this optimal point, differentiation and integration in perception decreases with further increasing information load. These findings may be represented as an inverted U-shaped curve relating load and perception. Differences in the conceptual structure of Ss resulted in different levels of this inverted U curve. Subjects scoring high on measures of conceptual structure score higher on the number of perceptual integration categories.

Streufert, S., Driver, M. J. & Haun, K. W. Components of response rate in complex decision-making. *Journal of Experimental Social Psychology*, 1967, 3, 286-295.

This paper focuses on response rates of task-oriented social groups in complex decision-making situations. The research question concerns the relationship of decision types to environmental variation (information load). An experiment was conducted to investigate the effect of changes in information load on response rate and its components in complex decision-making. Data were collected in a simulated decision-making environment permitting both integrated and unintegrated decision-making responses.

It was found (1) strategic integrated decision-making first increases, then decreases with increasing information load, (2) general unintegrated decision-making first decreases, then increases with increasing information load, and (3) simple retaliatory decision-making increases with increasing information load. Total decision-making response rate generally follows the ascending input-output rate curve which has been established for a number of information-processing organisms. The experiment demonstrates that environmental conditions have differential effects on decision types.

Streufert, S., Kliger, S. C., Castore, C. H., & Driver, M. J. Tactical and negotiations game for analysis of decision integration across decision areas. *Psychological Reports*, 1967, 20, 155-157.

An experimental simulation, using the Tactical and Negotiation Game (TNG) is described as a method for measurement of integration and response patterning in group decision making and strategic perception. The major disadvantage of the Tactical Decision-Making Game (TG) is the possibility that measurement of decision-making complexity may be incomplete when integration within one decision area is tapped and decision integration across decision areas is not considered. TNG was designed to overcome this disadvantage. This method employs a simulated game including tactical, negotiation, economic, intelligence, and other components. There is a greater richness of data in the TNG compared to the TG. This allows the possibility of measuring integration, decision frequency, information search, etc. across, in addition to within, game components.

Streufert, S. & Schroder, H. M. Conceptual structure, environmental complexity and task performance. *Journal of Experimental Research in Personality*, 1965, 1, 132-137.

This study tests the hypothesis that abstract persons or groups reach optimum performance characteristics (to criterion) at a level of environmental complexity where the performance of more concrete persons or groups has already begun to decline. Environmental complexity is considered in terms of information load.

A simulated decision-making environment was used to test (N=236) several proposed hypotheses relating behavior in complex environments. It was shown that integration involved in behavior increases with increasing information load until an optimum performance point is reached. Beyond such a point, the amount of integration decreases with further increasing information load. These findings may be represented as an inverted U-shaped curve relating load to performance. Differences in conceptual structure of group members resulted in different levels of this inverted U-shaped function. The more flexible, integrative, complex, or "abstract" the structure of the group members, the higher the level of integration involved in performance.

Streufert, S. & Streufert, S. C. Information load, time spent, and risk taking in complex decision making. *Psychonomic Science*, 1968, 13, 327-330.

In this study, an initial attempt was made to collect information on risk-taking variables in more complex decision-making tasks. The effect of the quantity of information which decision-makers receive per unit time and the effect of the length of time spent in decision-making were examined. A simulated decision-making task of some complexity was used for data collection to permit comparison with results obtained in simpler laboratory settings (N=56).

It was found that risk taking increases with time spent in decision-making and reaches highest levels under optimal information conditions. The results of this experiment are consistent with the findings of Davis, Hoppe, & Hornseth (1968) which suggested that risk taking is more often strategic (probably rational, integrated) than respondent (probably retaliatory, unintegrated). The attempt to look for strategies in risky decision-making is believed to be of considerable value.

Streufert, S. & Streufert, S. C. Effects of failure in a complex decision-making task on perceptions of cost, profit and certainty. *Organizational Behavior & Human Performance*, 1970, 5, 15-32.

Dyad decision-making teams spent seven consecutive half-hour periods playing a complex international game containing tactical, economic, negotiation and intelligence components. Eighteen male undergraduates served as subjects in this simulation. Although the subjects assumed they were affecting their environment, the game was pre-programmed. Teams received seven informative messages per one-half hour period. Increasing failure was induced by increasing the proportion of failure to neutral messages over periods. After each one-half hour period, subjects indicated their present and anticipated cost, profit and certainty estimates on rating scales.

Increasing failure produced generally rising cost level estimates. A discrepancy between actually experienced and anticipated cost levels under low failure levels produced an optimistic outlook by subjects that expressed itself in initially steady profit estimates and initially rising certainty estimates. Under higher failure levels, profit and certainty estimates were inversely related to increasing cost estimates. It is suggested that under low failure levels, perceptions of psycho-economic conditions in complex environments may be multiply determined. However, as failure levels increase and optimism is absent, perceptions of psycho-economic conditions may be determined by the most salient environmental characteristic.

Streufert, S. & Streufert, S. C. Effects of increasing failure and success on military and economic risk taking. *Journal of Applied Psychology*, 1970, 54, 393-400.

The effects of success, failure and time spent in decision-making on the degree of military and economic risk taking was investigated. A complex experimental simulation technique (TNG) was employed as the research method to permit comparison of data obtained in a more "real world" setting with results reported by investigators using small-scale laboratory techniques. The subjects for this simulation were 88 male undergraduates from a state university.

The results indicate that risk taking increases with the length of time that decision-making groups spend in working on a task. After some time, risky decision making may become concentrated in one decision area at a time, even though risks could be taken in more areas. Comparisons to laboratory results suggest some commonalities as well as some differences with regard to risk-taking results.

Streufert, S., Streufert, S. C. & Castore, C. H. Leadership in negotiations and the complexity of conceptual structure. *Journal of Applied Psychology*, 1968, 52, 218-223.

This experiment analyzes the relationship of the leadership characteristics described by Stogdill's ten leadership scales to the complexity of conceptual structure in leaders, as measured by the sentence completion test (SCT) of Schrodes and Streufert (1963) and Schroder, et. al. (1967).

Dyad negotiations teams (homogeneous in the complexity of the individuals' conceptual structure) spent several hours attempting to solve a simulated international conflict situation. Every participant (N=350) repeatedly rated himself and the other participants on Stogdill's ten leadership characteristics. The dyad member with the highest overall ratings on all scales was considered the dyad's leader. The effect of simplicity and complexity of conceptual structure on the degree to which leaders display Stogdill's leadership characteristics was analyzed in an ANOVA design. The interaction effect for complexity and leadership characteristics was highly significant. Complex leaders were rated higher on tolerance for uncertainty, assumption of leadership role, consideration, and predictive accuracy. Simple leaders were rated higher on initiation of structure, production emphasis, and demands reconciliation. It is suggested that a study of the type of leadership required in a given situation would be of value in optimizing leadership and group performance.

Streufert, S., Streufert, S. C. & Castore, C. H. Complexity, increasing failure, and decision-making. *Journal of Experimental Research in Personality*, 1969, 3, 293-300.

Eleven dyads of simple and eleven dyads of complex conceptual structure participated in an experimental (controlled) simulation. Subjects were exposed to increasing failure levels. The proportion of failure messages per half-hour period of play varied from one out of seven during the first period of play to six out of seven during the sixth period of play. Decision integration by groups of subjects was measured by (1) calculating the number of decisions which were strategically related (a second decision was planned for the future when an original decision was planned as a pre-condition for the later decision), and (2) by calculating the number of decisions which were related to each other strategically and pragmatically (post hoc relationship).

It was found that the data generally support positions of complexity theory. In general, moderate failure levels produce more decision integration than either low or high failure levels. Complex dyads produce more integrations than simple dyads. One of the two analyses indicated that complex dyads reach optimum decision integration characteristics under higher failure levels than simple dyads.

Streufert, S., Suedfeld, P. & Driver, M. J. Conceptual structure, information search, and information utilization. *Journal of Personality and Social Psychology*, 1965, 2, 736-740.

The effect of changes in information load and complexity of subjects' conceptual structure on information search and utilization is measured. Specific attention is paid to three processes: delegated search for information, self-initiated search for information, and integrative utilization of information. A complex decision-making task was used to provide an opportunity for differences in information handling. Subjects included 185 male university students from an eastern university who were tested to determine their level of complexity in conceptual structure.

Differences in delegated information search for subjects differing in the complexity of conceptual structure were found for peak information load conditions. This finding could be explained as a consequence of lacking sensitivity of persons scoring low on conceptual measures to changes in environmental conditions. A significant interaction effect was also found between conceptual structures and information loads in self-initiated information search. This is consistant with previous findings showing that structurally simple persons respond more directly to environmental information.

Suedfeld, P. & Streufert, S. Information search as a function of conceptual and environmental complexity. *Psychonomic Science*, 1966, 4, 351-352.

Individuals operating at complex and at simple levels of conceptual structure (N=36) played a tactical game for three half-hour periods. The present study investigated both the amount and kind of information subjects requested. Results indicated a negative relationship between information input and subsequent information search. As predicted, simple individuals were more interested in receiving feedback about ongoing activities, while complex subjects searched for new and unexplored aspects of the situation.

Tafoya, D. W. The Motivation Game: Effecting social behavior in small groups. *Simulation and Games*, 1979, 10, 403-418.

The purpose of this article is to describe a game which affects individual performance levels within a group by systematically manipulating motivational rewards. Focal aspects of motivation theory, characteristics of incentives, considerations that managers should keep in mind when moving to incentive schemes, and the instructional utility of such an exercise are discussed in detail.

The Motivation Game is a simulation exercise designed to illustrate the effects of incentives on individual and group behavior. The game establishes two conditions typical of incentive schemes commonly used in business- and/or task-oriented small groups to stimulate behavior: Reward those who display potential through their performance, and reward those presumably possessing potential, even though the potential is not displayed. Examination of game-generated data suggests that the incentives affect both individual and group behavior. The game is also a potentially useful device for explaining more complex aspects of motivation theory.

Tallman, I. & Wilson, L. Simulating social structures: The use of a simulation game in cross-national research. *Simulation and Games*, 1974, 5, 147-167.

Interest in the use of game simulations as a research method derives largely from two fundamental assumptions: (1) games are a universal aspect of human existence, and (2) the structure of games is isomorphic to aspects of social structure. This paper explores the utility of game simulations in cross-cultural and cross-national research. The conclusions drawn from this analysis are based on one effort to use a simulation game, and so should be considered in heuristic rather than definitive terms.

The study was designed to explore the interplay between intrafamily behavior and social structure variables in influencing a child's capacity to adapt to social change. The game developed for this research was a modified version of the simulation game Life Career (Boocock, 1968). The data gathered pertaining to face validity and game utility indicate that simulation games can be a useful method in cross-national research. In the opinion of the authors, this method provides a much more flexible means for approximating solutions to problems of cultural appropriateness and conceptual equivalence than the common techniques of survey interviews or the classic form of experiments. At the very least, the simulation game seems to provide a new type of cross-cultural data -- allowing for the assessment of behavior in the process of solving problems closely linked to those faced in everyday life.

Tiede, R. V., Burt, R. A. & Bean, T. T. *Design of an integrated division-level battalion simulation for research, development, and training.* Alexandria, VA: US Army Research Institute for the Behavioral and Social Sciences, 1979.

This technical report describes the structural framework of an Integrated Division-level Battle Simulation. It discusses and documents the critical trade-offs which need to be made in further development and implementation of the simulation and which underlie the numerous design decisions that have already been made. It discusses the applicability of the design to the three major areas for which such a simulation should be useful, namely: (1) behavioral science research on human performance in command and control; (2) combat developments for the analysis and evaluation of tactics and doctrine; and (3) as a training device for command groups/staff. Also discussed are the player tasks and roles in each of the modules, the general rules of play, the information flow required to support stand-alone and integrated play, controller requirements and functions, data to be obtained and evaluation criteria to be applied, and other aspects of the design necessary to allow for implementation of the simulation.

Tuggle, F. D. Theory content and explanatory power of simulation models. *Behavioral Science,* 1978, 23, 271-290.

A concise methodology for the efficient modeling of behavioral phenomena in living systems at the levels of organisms, groups, organizations, societies, and supranational systems is proposed. The methodology helps resolve questions such as: When is a model to be made more complex? What variables are useful ones to add? When should the model development process cease? The methodology is founded upon (1) the precise identification and delineation of the set of behavioral phenomena to be explained, and (2) the development of a meaningful metric of the content or "size" of alternative explanatory models. From these data, measures of explanatory power (relative amount of the phenomena explained) and explanatory yield (the average amount of explanation per unit of theory content) may be derived. Explanatory power is shown to be an increasing function of theory content, and explanatory yield is shown to be a decreasing function of theory content. The methodology is illustrated in detail in the context of six successive simulation models of the cognitive behaviors of a subject solving a job shop scheduling task. The success of the final model in providing a complete description of one large class of the subject's behavior corroborates the usefulness of the methodology.

Wagner, L. W. & Palola, E. G. The miniature replica model and its use in laboratory experiments of complex organizations. *Social Forces*, 1964, 42, 418-428.

This paper represents an extension in the search for methods of exploring and testing sociological propositions and organizations. This search has focused recently on the use of simulated organizations in laboratory experiments. Based upon their experiences with a unique laboratory experiment on organizations, the authors suggest that the advantages which normally accrue to experimentation cannot be generalized easily to experimentation with the miniature replica model of organizations. Following a report of the structure of their laboratory experiment, the authors discuss four critical problems associated with this form of experimentation: (1) the nature and combination of properties considered to constitute the miniature replica of an organization, (2) instituting system and measurement controls, (3) the provision of structural proof, and (4) randomization.

Wahba, M. A. & Lirtzman, S. I. A theory of organizational coalition formations. *Human Relations*, 1972, 25, 515-527.

A review of the literature reveals that the construct of coalition formation is receiving increasing attention as an important variable in organization theory. However, much of the research on coalition formation is scanty and contradictory. This paper argues that coalition formation theories and research will continue to have little or no value to the studies of organizations as long as organizational variables are ignored. It is proposed here that coalition formations should be placed in their proper organizational context to enhance the understanding of both social organizations and coalition formations. Coalition formations, like organizations, do not act in vacumo; they interact with their environment. Some of the environmental variables are controllable and some are not. Consequently, organizational coalitions, in their attempt to achieve their goals, are faced either with certainty or uncertainty and are continuously seeking certainty. This distinction between the conditions of certainty and uncertainty of success make it possible to propose a Coalition Expected Utility Theory (CEU) to predict, not only the coalitions that are most likely to be formed, but also the coalitions that are least likely to be formed. The hypothesis is postulated that coalitions with the highest expected utility are the most likely to be formed, while coalitions with the lowest expected utility are the least likely to be formed.

Two experiments were designed to test the hypothesis about the superiority of the CEU models. The first experiment tested for coalition under uncertainty, using 48 subjects in 16 triads. There was a total of 240 observations in each of the four triads. The results showed that the observed frequencies and the percentage of coalitions correctly predicted by the CEU theory were significant. The second experiment tested the situation of coalition under certainty. Again, there were 240 observation in each of the four triads, and the percentage of coalitions correctly predicted by the CEU theory was significant. This study lends support to the CEU theory, which states that the context of organizational coalition formation is crucial in determining which coalitions will be formed, and to the newer organizational theories, which propose environmental uncertainty as a primary variable in organizational structure and behavior.

Walther, H. J. *Catalog of war gaming and military simulation models.* Washington, DC: Studies Analysis and Gaming Agency, 1975. ADA012-803.

This catalog contains a brief description of 152 military simulations and models which are in general use throughout the Department of Defense. The models and simulations are categorized as to application. Thus, there are 46 Strategic Force models, 22 General Purpose Land Forces models, 14 General Purpose Air Forces models, 19 General Purpose Naval Forces models, 11 General Forces Combined Arms models, 32 Logistics models, 3 Personnel models, 3 Communications-Electronics models, and 2 Politico-Military simulations. All models are listed alphabetically by long and short title and model type. The description for each model includes: proponent, developer, purpose, general description, input, output, limitations, hardware, software, time requirements, security classification, frequency of use, users and point of contact for additional information.

Westen, T. E. & Buckley, J. J. Toward an explanation of experimentally obtained outcomes to a simple, majority rule game. *Journal of Conflict Resolution,* 1974, 18, 198-229.

The problem of so many solutions to n-person games is examined through the vehicle of a four-person simple, majority-rule game. Ninety-seven experimental triads were employed to demonstrate that three different solutions can be differentially predicted as one varies the structural characteristics of otherwise strictly identical games in characteristic function form. The three solutions were identified in conformity with the von Neumann and Morgenstern definition of a solution: symmetric, inflated and partitioned. Five structural, non-game-theoretic characteristics which the authors had observed in prior studies were operationalized. These, it was hypothesized, would predict the different game outcomes. These structural characteristics served as

independent variables: (1) size of payoff, (2) divisibility of payoff, (3) manner of play, (4) naming of player positions, and (5) communications employed. The 97 experimental games were then run with 98 volunteer subjects. Analysis of the experimental triads indicated support for the central hypothesis: some structural, non-game-theoretic characteristics are predictors of some solution types.

This study demonstrates that the problem of multiple solutions to an n-person game may simply be a reflection of the versatility of the mathematics of formal game theory. Accordingly, the authors suggest that a formal structural-behavioral model of conflict needs to be articulated and then mapped into the existing theory of n-person games (specifically to solutions). While the authors do not seem convinced that the variables chosen in this study are all meaningful in any coherent theoretical sense, they do believe that they have an impact in predicting outcomes.

Wolf, G. Effects of comparative information and decision complexity in a one-person game. *Simulation and Games*, 1973, 4, 145-157.

This article explores the relation of input complexity and performance criteria in a one-person game. The authors set out to determine the effects of output complexity on performance in situations of differing input information complexity. Three hypotheses for inexperienced decision-makers are posited: (1) lower performance and learning with several decisions as compared to one decision, (2) lower performance and learning with increased information about how another plays, and (3) an interactive effect of decreased performance and learning with both several decisions and increased information. The hypotheses were tested in a one-person game.

A computerized oligopoly business game was used to represent the organizational environment. Seventy-two students were randomly and uniformly assigned to the six experimental conditions. The results of this study showed comparative information, rather than number of decisions, to have the stronger effect on performance. The number of decisions and of comparative information influence on actual decisions showed only an interaction effect. The research question left by this study is: What is the relative effect of the relationship between the players as represented by a matrix of payoffs or markets compared to the perceived relationship based on behavioral contingencies and behavioral correlations? Suggestions for research to answer this problem are discussed.

Wolfe, J. Correlates and measures of the external validity of computer-based business policy decision-making environments. *Simulation and Games*, 1976, 7, 411-438.

Computer-based business games have demonstrated their internal validity as environments for teaching business policy and decision making. Little attention, however, has been paid to their external validity. This is unfortunate, for the ultimate test of any teaching method is the transferability of its lessons to the outside world. External validity would also support business games as assessment devices and organizational laboratories. This study tests the external validity of computer-based business games in one setting.

The study population consisted of 74 senior business students and 31 middle-management executives. The two groups played in separate industries of a complex computer-based business administration game. Various nonobtrusive measurements were taken before and after play. Results indicated a great deal of agreement between the two groups as to what constituted effective and ineffective decision-making practices. The differences which were found can be traced to past conditioning. Further, despite the businessmen's comparatively poor results, each businessman's team performance was moderately correlated to his real-world business performance. From the inferential studies conducted here, it appears that complex business games may have high external validity as business policy and decision-making teaching aids.

Young, J. W. Behavioral and perceptual differences between structurally equivalent, two-person games. *Journal of Conflict Resolution*, 1977, 21, 299-322.

This research primarily examines the effects of "naturalness" of context upon (a) game-related trusting behavior, (b) cognitive predictors of trusting behavior such as the other's trustworthiness and perceived intentions, and (c) subjects' attributions of causality within the experimental gaming situation itself. Since reward level and trustworthy first impressions could possibly moderate the effects of context, a 2 x 2 x 2 (rich versus poor context x 83% versus 50% reward level x good versus bad first impressions) factorial design was used in which 60 male Yale undergraduates responded to a series of 12 games (N=40 for the rich; N=20 for the poor).

More trusting behavior was observed in the poor context. Negative first impression in the rich context only was a powerful inhibitor of initial, first-trial trusting behavior. A rich context produced more overall perceived trustworthiness and less bad intentions. High versus moderate reward and good versus bad first impressions produced more overall trustworthiness and more perceived good and less bad intentions. Subjects in the rich context perceived the experimenter to be biased against competitive subject behaviors; subjects in the poor context perceived the experimenter to be biased for cooperative behavior, in particular, and for any activity in general. Additionally, a context by reward interaction indicated that subjects alter their perceptions of the appropriateness of reward/betray responses depending upon the type of context. Several problems to monitor or control in future research are derived.

Zelditch, M., Jr. & Hopkins, T. K. Laboratory experiments with organizations. In Evan, W. M. (Ed.). *Organizational experiments: Laboratory and field research.* New York: Harper & Row, Publishers, 1971.

This chapter examines the possibility of experimenting with the properties of complex, formally organized social systems in the laboratory. It discusses, first, a few advantages of laboratory experimentation. It allows the researcher to: (1) maintain control over the empirical system being observed and of the results of the experiment, (2) precisely measure the results of the experiment, (3) simplify the essence of the experiment, (4) exercise greater freedom in the manipulation of treatments, and (5) regulate the flow of inputs into the system under study and thus keep the treatments from being affected by extraneous external and internal factors.

The authors define organizations in terms of four criteria: highly formalized, highly differentiated, integrated through strictly defined subordination, and structurally complex. Experiment groups are classified according to the degree of their complexity and the extent to which they satisfy the remaining three criterion properties. This double classification yields the following four types: (1) The miniature replica. The experimenter in this case creates systems having a complete minimum set of units and ranks as well as all three other criterion properties. (2) The part replica. This system satisfies the first three criteria, but contains less than the minimum set of units and ranks. In such a system, the experimenter may simulate the missing units or ranks so that subjects think of themselves as participating in a complex organization. (3) The "near" organization. The experimenter creates all or some of the minimum number of units and ranks, and at least one but not all three of the other criteria. (4) The simply structured unit. The experimenter creates a system consisting of only a single unit, and it exhibits none of the delineating properties of an organization. Laboratory experiments that have used each of these types are described in detail, and compared in terms of their usefulness in organizational research.

Allinson, C. W. Training in performance appraisal interviewing: An evaluation study. *The Journal of Management Studies*, 1977, 14, 179-191.

This paper describes a study of the effects of a training course in performance appraisal interviewing. The two-day course consists of a series of lectures delivered by a psychologist to a group of trainees and a role-play of the appraisal interview situation. Managers who attended the course were asked, by means of a postal questionnaire, to compare their pre-training and post-training interviewing performances. Three findings resulted from this course. First, the trainees had improved on almost every aspect of appraisal interviewing. Second, an understanding of the role of performance appraisal is equally as important as the skill of interviewing. Third, managers in mid-career may have most to gain from training of this type.

Argyris, C. Issues in evaluating laboratory education. *Industrial Relations*, 1968, 8, 28-40.

This paper assesses the Dunnette and Campbell study of laboratory education and T-groups. One of the major limitations of the Dunnette and Campbell review is that it attempts to evaluate T-groups by rules of scientific understanding. They fail to point out that there are limits to these rules when one attempts to generalize in the non-experimental world. This article discusses the implications of such an omission.

The first problem discussed is that of control groups. While control groups are critical in experimental research, they pose special problems for studies of organizational change in the field. Issues related to control groups in a non-experimental setting are discussed. The second problem is one of trust. While it is impossible to eliminate subject involvement in behavioral research, it is necessary to create research settings where the individual does not feel the need to distort his behavior and hence produce invalid data. Dunnette and Campbell express concern with this problem, especially regarding biases in self-reports. This study dispels some of these fears, and points out ways to guard against participant mistrust in laboratory education.

The third problem pertains to the role of the research critic. Dunnette and Campbell emphasize the competitiveness among scientists which has led to omissions and distortions of data in behavioral research. This study provides evidence suggesting that such competitiveness is not deleterious to the validity of T-group and other laboratory research. An alternative approach to the overall skepticism of Dunnette and Campbell regarding laboratory education is presented, which emphasizes the potential value of such techniques to effecting organizational change.

Argyris, C. On the future of laboratory education. *The Journal of Applied Behavioral Science,* 1976, 3, 153-182.

This paper attempts to identify some of the issues related to laboratory education which must be addressed in future research. Discussion focuses on the dependence of laboratory education on an understanding of the human personality. Factors such as self awareness, self-acceptance, interpersonal competence, group formation, and learning processes must be considered in the design of laboratory experiences. A review of laboratory designs indicates that most programs tend to emphasize one or two rather than all the learning targets available. The major emphases of current laboratory designs are discussed, and examples given. The paper concludes with a dsicussion of the unintended consequences of laboratory education on the effectiveness of educators.

Ashkenas, R. N. & Schaffer, R. H. Management training for bottom-line results. *Training and Development Journal*, 1979, 33, 17-22.

The purpose of this article is to suggest reasons for the failure of training programs to demonstrate a bottom-line results relationship, and to describe a training and development strategy that is geared directly to producing immediate bottom-line improvement. The failure of training programs to demonstrate bottom-line results is attributed to their focus on changes in specific elements of managerial knowledge, skills, or attitudes rather than on performance results. This observation is confirmed by Campbell (1970) and others. An alternative apporach is described which focuses on a specific "breakthrough" goal. In programs based on this approach, managers are taught not how to become better managers, but rather how to accomplish an urgent, important goal in a short timeframe. The focus is on specific, achievable goals rather than on management styles and techniques. Application of this approach to a variety of organizations is described and the advantages it offers for goal achievement demonstrated.

Babb, H. W. & Kopp, D. G. Applications of behavior modification in organizations: A review and critique. *Academy of Management Review,* 1978, 3, 281-291.

Behavior modification can be applied to a wide variety of areas, including human resources management, resocializiation of workers, management by objectives, personnel development, job design, compensation and alternative rewards, facilitating change by positively reinforcing behavior rather than attitudes, and organizational design. Despite numerous piecemeal applications, few attempts have been made to apply behavior modification on a total organizational basis. It is

here -- in combining organizational, departmental, and individual goals with applications of behavior modification -- that the real benefits might be realized. Without an accompanying body of field work, the recent surge of suggestions for possible applications of the operant model may go untested and unused.

The authors find it difficult to pass judgment on the utility of behavior modification in industrial applications. While it has had success in controlled environments, it is untried and untested in the uncontrolled environment of the organization. The few reported successful applications in organizations have been in problem situations which behavior modification remedied. Behavior modification has potential as an organization development technique but must be validated by field experiments. Apparently, its greatest, but not only, utility will lie in areas where tasks are routinized and programmable. Behavior modification is a tool -- not a panacea.

Bass, B. M. & Vaughan, J. A. *Training in industry: The management of learning.* Belmont, CA: Wadsworth Publishing Company, Inc., 1966.

This book attempts to support two propositions about training. The first is that training and learning are intimately related; and the second, that the principles explaining learning behavior in the simple laboratory experiment can be extended to account for much of the complex learning and training industry.

Empirically based concepts and principles of learning which have special relevance for training are reviewed. Four basic concepts of the learning process are introduced: (1) the drive, which energizes the individual to respond; (2) the stimulus, which cues his response; (3) the response elicited; and (4) the reinforcer, which increases the likelihood that the individual will make the same response again if the same stimulus and drive reoccur. Classical and instrumental conditioning, as well as higher forms of learning, are discussed. The conclusion is reached that regardless of the training technique, the extent to which learning will occur depends upon optimal levels of drive, arrangements of cueing stimuli, schedules of reinforcement, readiness, and the ability of the learner to make the required response.

Training strategy is discussed in light of what is known about the learning process. It appears to follow three steps: (1) A clear statement of the training program. This includes a specification of the long- and short-range goals, and the means by which these will be achieved. In this framework, training is the means of producing the terminal behavior required for the organization's members to achieve its goals. (2) A statement of how and by whom the content of the

training program will be taught. On-the-job techniques are compared with off-the-job methods. Specific techniques are discussed and their adherence to the known principles of learning evaluated. (3) Administration of the training program and its evaluation. Specific techniques for both of these processes are discussed. The importance of evaluation to the continued success of a training program is emphasized.

Bunker, K. A. & Cohen, S. L. Evaluating organizational training efforts: Is ignorance really bliss? *Training and Development Journal*, 1978, 32, 4-11.

This article offers some possible explanations for the existing inadequacies in most training evaluations. Most of these explanations are rationalizations offered by the company based on ignorance of the importance of training evaluations. Two questions implicit in the evaluation issue, external and internal validity, are discussed in detail, with emphasis on the latter. Several methods for overcoming evaluation inadequacies in these areas are offered, including pretesting and extended control group designs. Finally, an outline is given of some of the implications and relative gains that can be associated with better-controlled evaluation designs.

Burke, W. W. The role of training in organization development. *Training and Development Journal*, 1972, 26, 30-34.

This article discusses training as it applies to behavioral or attitudinal change, rather than manual skill development. Included in this discussion is managerial skill development, i.e., learning to communicate interpersonally more effectively. The central thesis of the paper is that individual training programs which are not integrated within the context of an overall organizational improvement effort will have little if any positive impact on the organization. As part of an OD strategy, training can be used as a method for organizational change and improvement provided it is planned and conducted as a result of some diagnosed need for it and is based on sound educational principles. Training, therefore, is only one of several OD interventions. Thus, the same principles used to determine the appropriateness of other interventions should be applied for determining the suitability of training. The recommendation is made that persons responsible for training learn more about OD in general, and more about organizational diagnosis and consultation, in particular, than has heretofore been the case.

Campbell, P. & Dunnette, M. D. Effectiveness of T-group experiences in managerial training and development. *Psychological Bulletin*, 1968, 70, 73-105.

This paper is devoted to an analysis and appraisal of the application of T-group training to problems of managerial development. Research studies relating T-group experiences to the behavior of individuals in organizations are reviewed in depth. Attention is paid to summarizing the stated objectives of the method and its technological elements. In addition, speculation is offered about the nature and viability of implicit assumptions underlying T-group training.

Examination of the research literature leads to the conclusion that while T-group training seems to produce observable changes in behavior, the utility of these changes for the performance of individuals in their organizational roles remains to be demonstrated. It is also evident that more research has been devoted to T-group training than to any other single management-development technique; however, the problems of observation and measurement are considerably more difficult in T-group research than in most other areas. The authors lament the small number of studies using well-researched attitude measures and/or situational measures as criteria. If such criteria were more widely used, one might have a clearer idea of exactly what kinds of attitudes and skills are fostered by laboratory education. The assumption that T-group training has positive utility for organizations has been neither confirmed nor disconfirmed. The authors emphasize that its utility for the organization is not necessarily the same as its utility for the individual.

Ceriello, V. R. & Frantzreb, R. B. A Human Resources Planning Model. *Human Factors*, 1975, 17, 35-41.

The modern organization structure -- whether in the public or private sector -- is composed of a highly unpredictable resource: people. They enter the organization at different points and bring to it an almost infinite variety of skills. The staffing of an organizational entity, therefore, contains many uncertainties. To reduce the effect of these uncertainties, the authors have developed a sophisticated human resources forecasting system using computer-based modeling and simulation techniques. This model was designed and developed for use in a large branch banking system operating statewide. It is, however, applicable for use in other industries having different organizational structures.

The Manpower Planning Quotas model (MPQ) is a human resources planning tool which permits management to experiment with alternative staffing policies to achieve an optimum level of qualified personnel. The MPQ model generates recruiting and training quotas by use of a forecasting simulation technique.

Clement, R. W., Pinto, P. R., & Walker, J. W. Unethical and improper behavior by training and development professionals. *Training and Development Journal*, 1978, 32, 10-12.

In 1976, the American Society for Training and Development's Professional Development Committee sponsored a study to determine the competencies required for effective performance in training and development. This article reports the results of the portion of that study dealing with unethical and improper behaviors exhibited by training and development professionals. Seven major categories of "unethical" behavior emerged from surveys of training and development practitioners. They are: Lack of professional development, violation of confidences, use of "cure-all" programs, dishonesty regarding program outcomes, failure to give credit, abuse of trainees, and other improper behavior (e.g., lack of follow-up, etc.).

This article does not offer any solutions to the occurrence of such unethical practices, nor does it seek explanations for them. Rather, it exposes such behavior as a cautionary word to managers of trainers and training participants. The need for performance evaluation of trainers is emphasized.

DeCotiis, T. A. & Morano, R. A. Applying job analysis to training. *Training and Development Journal*, 1977, 31, 20-24.

Two of the more important objectives to be served through the training function are achievement of organizational goals and maintenance and improvement of the organization's human resources. Three basic components of the training function that bear an attainment of these objectives are: (1) identification of training needs; (2) design of training content; and (3) evaluation of the training process and outcomes. The purpose of the present paper is to illustrate the relevance of job and task analysis to the training function.

Job analysis is a process for systematically gathering job information. The information gathered during the process of analyzing a job is summarized in two basic products: a job description and a job specification. Most job analysis methods which yield necessary job information for creation of effective training programs include observation, interviewing, job diaries, and the critical-incidents technique. The uses of job analysis data for establishing training programs are discussed in detail.

Deterline, W. A. Credibility in training: Do training and development have a personality conflict? *Training and Development Journal*, 1977, 31, 22-28.

The author discusses the relative criticality and priorities of development and training needs within organizations. Based on the current literature, it is suggested that there might be too much emphasis on development and too little on the design and development of effective, relevant, and efficient training. The determination of how much emphasis is placed on training and development should reflect organizational needs.

Once these needs have been determined and the relevant programs implemented, it is important to determine whether the objectives of the training and development programs are being met. It is often difficult to determine the value of employee development courses because they are not designed to develop specific skills which can be objectively evaluated. Because of the difficulties involved, there is a tendency to skirt the evaluation issue. Although it is sometimes very difficult, if not impossible, to design evaluation methods in which all variables are carefully controlled, it is necessary to try to search for data which will help determine the value of training and development programs.

Dipboye, R. L. & Flanagan, M. F. Research settings in industrial and organizational psychology. *American Psychologist*, 1979, 34, 141-150.

The authors analyze for content all the empirical articles from the 1966, 1970, and 1974 volumes of the *Journal of Applied Psychology, Organizational Behavior and Human Performance,* and *Personnel Psychology* to determine the types of organizations, subjects, and dependent measures studied. Contrary to the common belief that field settings provide for more generalization of research findings than laboratory settings do, field research appeared as narrow as laboratory in the actors, settings, and behaviors sampled. Indeed, industrial-organizational psychology seems to be developing in the laboratory a psychology of college students, and in the field, a psychology of the self-report of male, professional, technical, and managerial employees in productive-economic organizations. The authors suggest that coordinated strategies of research in both laboratory and field settings are needed to construct an externally valid industrial and organizational psychology.

Dunnette, M. D., & Campbell, J. P. Laboratory education: Impact on people and organizations. *Industrial Relations*, 1968, 8, 1-27.

Laboratory education combines traditional training features — lectures, group problem-solving sessions, and role planning — with T-group or sensitivity training techniques in order to promote personnel and organizational development. This article reports the behavioral effects of laboratory education by: (1) examining the difficulties of organizations in order to discover the major problems of interpersonal behavior; (2) considering these problems in the context of what advocates and practitioners of laboratory education claim to be their major behavioral goals; (3) reviewing and evaluating published research studies which have been done to assess the actual behavioral effects of laboratory education; and (4) calling attention to gaps in our present level of knowledge and offering guidelines for future research.

Major problems in the organizations examined involve apathy, overt belligerence, and impatience with analytical procedures for getting to know either problems or people better. These undesirable individual behavior patterns were related to broader patterns of organizational behavior including poor coordination, inefficient and inaccurate communication, and poorly defined and poorly transmitted organizational objectives. These broader organizational problems were attributed to extremely rapid growth and poor supervisory assignments, role ambiguity,

and loss of key managerial talent. Most self reports yielded highly favorable accounts of the effectiveness of laboratory training but due to the wide variety of biases associated with self reports, the authors made no attempt to review such reports. The authors conclude that there is little firm evidence of any significant change in attitude, outlook, orientation, or view of others as a result of T-group training. Evidence in favor of any claims that laboratory education can change interpersonal awareness, "self insight", or interpersonal sensitivity is very nearly nonexistent. In spite of the essentially negative results obtained from this review, it is concluded that individuals trained by laboratory education methods are more likely to be seen as changing their job behavior than are individuals in similar job settings who have not received training. These behavioral changes are in the direction of more openness, better self and interpersonal understanding, and improved communications and leadership skills.

Eggemeier, F. T. & Cream, B. W. Some considerations in development of team training devices. In Erwin, D. E. (Ed). *Psychological Fidelity in Simulated Work Environments*. Alexandria, VA: US Army Research Institute for the Behavioral & Social Sciences, 1978. AD A076-658.

The purpose of this paper is to describe and discuss a task analytic technique that has been successfully used in a number of applications, including design of a team training device for members of the fire control team of the AC-130E Gunship. The technique was developed to overcome two major weaknesses of traditional ISD processes: (1) the lack of sufficient specificity for actual design of training devices; and (2) the lack of an adequate means to address design of a device for team or crew coordination training. The intent of the device design technique is to provide only the levels of fidelity that are necessary to accomplish specific training objectives. The technique is based upon careful task analyses and represents a modification and extension of traditional ISD techniques (Cream, Eggemeier, & Klein, 1978). This paper provides a general description of the technique, a discussion of the crew coordination aspects of the technique, and the results of an evaluation of the Gunship team trainer which was developed using the technique. Finally, the applicability of the technique to "man-ascendant" and machine-ascendant" systems is discussed.

Fiedler, F. E. & Csoka, L. S. The effect of military leadership training: A test of the contingency model. *Organizational Behavior and Human Performance*, 1972, 8, 395-407.

Recent research based on the Contingency Model of leadership effectiveness (Fiedler, 1964, 1967, 1971) shows that the effect of leadership training and experience depends upon the interaction of the leader's motivational pattern and the degree to which the leadership situation is favorable, i.e., the degree to which it provides the leader with control and influence. Three different studies tested the hypothesis that leadership training increases the situational favorableness. The three studies included subjects from field artillery units, Naval aviation maintenance shops, and company commanders in charge of training new recruits.

The researchers conclude that training will improve the performance of some leaders but actually decrease the performance of others. These studies explain why previous research has failed to find that leadership training increases organizational effectiveness. The positive and negative effects of training tend to cancel each other out for leaders with task and relationship motivation.

Friedlander, F. The impact of organizational training laboratories upon the effectiveness and interaction of ongoing work groups. *Personnel Psychology*, 1967, 20, 289-307.

The impact upon four work groups (N=31) which participated in organizational training laboratory sessions is evaluated in comparison with eight similar groups (N=60) which did not participate. Criteria were six-factored dimensions, each composed of items gathered from earlier interviews which group members perceived as problems. The six dimensions utilized as principle variables in the research included: group effectiveness, approach to vs. withdrawal from leader, mutual influence, personal involvement and participation, intragroup trust vs. intragroup competitiveness, and general evaluation of meetings.

Significant changes occurred in training groups in the following three dimensions: group effectiveness, mutual influence, and personal involvement. No significant changes occurred in the other three areas. The relevance of a work unit participating in training as a total group, rather than each member participating in a separate session, is discussed.

Goldstein, I. L. *Training: Program Development and Evaluation.* Monterey, CA: Brooks/Cole Publishing Co., 1974.

This book is concerned with the systematic development and evaluation of training programs in a variety of organizational settings.

Part 1 presents an instructional systems approach that emphasizes the important interacting components in the development and evaluation of training programs. The necessary components for the establishment of any instructional program include: (1) Specifying objectives in direct relation to need-assessment, (2) establishing criteria that will effectively measure success, and (3) designing the program only after careful research that includes considerations of threats to validity and of the degree of control exerted by the various experimental designs.

Part 2 presents the theoretical and empirical bases of learning which provide the foundation for the design of instructional environments. The more basic principles of learning such as behavior modification and programmed learning and which serve as stimuli for innovations in the design of training programs are identified and discussed. Attention is also given to the more complex determinants of transfer of learning, including material on the components of practice and motivational factors.

Part 3 presents topics relating to social problems such as training the hard-core unemployed and training those looking for second careers. Study is made concerning individual differences in which investigators have attempted to match the aptitudes of the learner with a variety of instructional approaches. A discussion of various instructional approaches and summaries of the advantages and disadvantages of each is provided.

The author concludes that the literature presents only a few programs that give sufficient consideration to the factors that determine successful development and evaluation of instructional programs. Instead there has been an abundance of studies which focus on a favorite approach rather than the consideration of the relative merits and capabilities of different approaches for various learning behaviors. The following suggestions are offered as directions for future research activity: (1) Establish programs that systematically utilize empirical measurement techniques to determine whether the objectives specified by the need-assessment analyses have been achieved. (2) Investigations should not focus entirely on the consideration of single treatments. (3) Evaluation must be treated as an information-gathering process that cannot possibly result in decisions that categorize programs as all good or all poor.

Goldstein, I. L. *Training in work organizations*. University of Maryland, Department of Psychology: In press, 1980.

This literature review examines issues and topics concerning systematic modes of instruction designed to produce environments that shape behavior to satisfy stated objectives. In this context training is defined as the acquisition of skills, concepts, or attitudes that result in improved performance in an on-the-job environment. The author gives attention to the general systems philosophy of training including needs assessment, the instructional process, and criterion issues associated with evaluation methodology. A principal focus is on methods associated with sensitivity training, simulations, computer assisted instruction, and programmed instruction.

The majority of the research on training processes is criticized as being neither empirical or theoretical. The following suggestions are offered: (1) Attention should be given to the development of need assessment techniques that emphasize the type of information needed as input to the training process. (2) Evaluation models must be developed in order to assess the degree to which training programs are achieving their objectives. (3) The training process should be developed with the understanding and study of instructional and organizational systems. (4) Quality empirical investigations that examine the usefulness of training techniques should be emphasized.

Hamblin, A. C. *Evaluation and Control of Training*. London: McGraw-Hill, 1974.

This book is concerned with the evaluation and control of learning experiences, and it argues that learning should as far as possible be evaluated in terms of pre-defined objectives. It also argues that the objectives of training should be communicated to, and if possible agreed with, the trainees.

The plan of the book is as follows. Part I is a general discussion of evaluation and control of training. A number of types of strategies for becoming involved in the evaluation process are delineated in Part II. The difference between these types of strategy is the difference in the point at which activities start: the entry-point into the cycle of evaluation. Part III begins with a discussion of the problem of measurement and of the Hawthorne effect. The range of techniques at each of the evaluation levels is then evaluated in terms of their relevance to particular types of strategy. The book concludes with a discussion on the future of training, evaluation and educational technology.

Hand, H. H., Richards, M. D. & Slocum, J. W., Jr. Organizational climate and the effectiveness of a human relations training program. *Academy of Management Journal*, 1973, 16, 187-195.

This research study attempted to control the possible effect of organizational climate on the effectiveness of a human relations training program. The first phase of the study (reported earlier) evaluated changes in knowledge, attitudes and behaviors of participants in a middle management human relations training program, immediately and 90 days after training. It was found that 90 days after a human relations training program, little change in attitudes and behavior in managers was observed.

The purpose of the study reported here is to analyze the changes in attitude and behavior that occurred over a two-year period of time and to explore the relationship between these changes in attitudes and managerial effectiveness, with differences in organizational climate given specific consideration as a moderating variable. The field experiment was conducted in a specialty steel plant, where a human relations training program was being carried out for middle managers. An experimental and control group of line and staff managers were selected on a random basis from the third level in the organizations. The research used three separate measurements of the dependent variables: prior to training, 90 days after training, and 180 days after training. The dependent variables measured were: (a) attitudes of the two groups with respect to sensitivity to self and others, initiating structure and consideration; (b) the subordinates' perception of the behavior of the experimental and control groups; and (c) the ratings of managerial performance of the members of both groups. The independent variable, the effect of the human relations training program, was evaluated by studying the statistical differences between the pre-training measurement and those measurements taken 18 months after training. The findings indicate that 18 months after the training program, significant positive changes were observed in the control group. The manager's perception of the organization's climate moderated these findings.

Hinrichs, J. R. Personnel training. In Dunnette, M. D. (Ed.). *Handbook of Industrial and Organizational Psychology*. Chicago: Rand McNally, 1976, 829-860.

The area of personnel training in organizations is reviewed, with the conclusion that little systematic psychological knowledge about the field has been developed. An open systems viewpoint is employed to help clarify the nature of the training process. This analysis moves from a review of the skill acquisition system at the level of the individual trainee, to the suprasystem of the training department, and finally to the total organizational system in which the training department operates.

The signal and maintenance inputs, systems operator, outputs and feedback loops for each of the systems in an organization are discussed. A final section reviews various popular training methodologies, classifying them into content, process and mixed techniques. Content oriented techniques include lecture techniques, audio-visual techniques, and auto-instructional technologies. Process oriented techniques include role playing, sensitivity training, and modeling. Mixed techniques include: conference discussion techniques, case study/incident process analyses, simulations, and on-the-job training techniques. The chapter concludes with a discussion of research needs in the area of personnel training.

Ivancevich, J. M. A study of a cognitive training program: Trainer styles and group development. *The Academy of Management Journal*, 1974, 17(3), 428-439.

This study provides information on the process of selected phases of group development within two training groups and on the impact of two different trainer styles upon these phases. Two groups of managers involved in a cognitive-oriented training program were studied. Two different styles of training were used: a structured and a less-structured trainer style. The instructional and reading materials used in both groups were identical.

The results of this study indicate that structured style in the management and organizational behavior training program was more effective in achieving group cohesiveness, minimizing participant conflict, increasing communication, achieving group productivity, and encouraging a favorable attitude toward the trainer than was a less structured trainer style.

Jablonsky, F. & DeVries, D. L. Operant conditioning principles extrapolated to the theory of management. *Organizational behavior and human performance*, 1972, 7, 340-358.

The present article contains a predictive model of individual behavior based on both operant conditioning and management literatures. The behavior of an organizational member is seen as a function of the reinforcement contingencies applied by various groups in his environment and of his cognitive assessment of such contingencies. The present model suggests that an organization is most likely to cause behavioral change in its members if the multiple sources of contingencies are all reinforcing similar responses. Several characteristics of reinforcement contingencies are examined, e.g., positive vs. negative reinforcement, schedules of reinforcement, and immediacy of

reinforcement. The model provides a potentially useful schema for classifying environmental contingencies operating on a member of an organization and for predicting their varied effects on behavior. The model draws on both learning and instrumentality theory and recognizes that the final forces for behavioral change result from an interaction between the multiple reinforcement contingencies and the amount of value the individual places on the various reinforcements.

Kraut, A. I. Behavior modeling symposium: Developing managerial skills via modeling techniques: Some positive research findings — a symposium. *Personnel Psychology*, 1976, 29, 325-328.

This symposium deals with a set of innovations in supervisory training, broadly referred to as modeling techniques. The approach originally outlined by Goldstein and Sorcher (1974) consists of four major learning activities: (1) Modeling, in which trainees watch films of model persons behaving effectively in a problem situation. (2) Role playing, when the trainees practice and rehearse the effective behaviors demonstrated by the models. (3) Social reinforcement provided by trainer and trainees in the form of praise and constructive feedback. (4) Transfer of training is encouraged, to enable the classroom behavior to be effectively utilized on the job.

Behavior modeling is distinguished from behavior modification techniques which aim to modify specific behaviors by systematically changing a person's environment or social context, in line with explicit, research based principles. Behavior modeling, by contrast, is typically used in non-therapy settings with the well informed consent and voluntary practice of non-institutionalized adults, to effect changes they desire to help them be more effective.

Latham, G. P. & Saari, L. M. Application of social-learning theory to training supervisors through behavioral modeling. *Journal of Applied Psychology*, 1979, 64, 239-246.

The purpose of this research was to examine the effects of a behavioral modeling program developed by Sorcher (Goldstein & Sorcher, 1974) to increase the effectiveness of first-line supervisors in dealing with their employees. The nine training modules developed by Sorcher parallel the results of a job analysis (Latham, Fay & Saari, in press) identifying effective and ineffective supervisor performance.

Forty first-line supervisors were randomly assigned to a behavioral modeling training program or to a control group. The training was designed to improve supervisors' interpersonal skills in dealing with their employees. The training program produced highly favorable

trainee reactions, where were maintained over time. Moreover, the performance of the trainees was significantly better than that of supervisors in the control group on a learning test administered six months after training, on behavioral simulations collected three months after training, and on performance ratings collected on the job one year after training. After the control group received the training, they achieved significant improvement in their supervisory skills and did not differ from the trainees who had originally undergone the training on any of the measures. The modeling films, developed by Sorcher, were based primarily on Bandura's principles of social-learning theory.

This study supports earlier applications of this approach to training first-line supervisors and indicates that leadership skills can be taught in a relatively short period of time. It demonstrates that the integration of both cognitive and behavioralistic principles within the context of social-learning theory brings about a relatively permanent change in supervisory behavior.

Lippitt, G. L. & This, L. Implementing the organization renewal process (ITORP). *Training and Development Journal*, 1979, 33, 18-25.

Recognizing that renewal is a requirement is not the same as having the capability to initiate such a process. The authors have tested a model and method for helping organizations in this respect, and have named it Implementing the Organization Renewal Process (ITORP). The model is based on the assumption that the key element in organization renewal is the ability to respond appropriately to situations. It portrays the interdependence of the factors inherent in this ability: human resources, interfacing, organizational growth, and environmental response.

The remainder of the article describes an ITORP program. In the first session, the participants analyze the six stages of growth through which their organizations have passed and relate these to the fundamental management functions. The focus of the second session is the process of renewal. Three phases of this process are discussed in detail: (1) confrontation, (2) search, and (3) coping. An emphasis of this session is the criticality of teamwork in the renewal effort. The final session deals with the skills required to analyze and cope with change. The focus on this discussion of the ITORP sessions is the rationale, rather than the specialized methods, of learning in the program.

Mass, N. J. Managerial recruitment and attrition: A policy analysis model. *Behavioral Science,* 1978, 23, 49-60.

High turnover rates of skilled personnel and instability of employment are problems confronting many industrial and research companies. This paper deals with inputs and outputs of personnel in systems at the organizational level. A dynamic simulation model of managerial recruitment and attrition is designed to explain some of the generic sources of these difficulties. The model also provides a vehicle for testing policies designed to enhance organizational behavior. In particular, model simulations show how many isolated policies, such as increased effort devoted to training new managers, exert a roughly neutral influence on organizational performance. A combination policy, which deliberately lowers managerial recruitment efforts in periods of low organizational training effectiveness and involves slower allocation of managerial time between training and production, proves much more effective in lowering turnover and decreasing instability. The model is intended to suggest improved policies for recruiting, training, and absorbing skilled personnel in specific organizations.

McFann, H. H. *Training for the military.* Alexandria, VA: Human Resources Research Organization, 1976.

This paper presents selected information and trends in military training and comments on the methodology, techniques, and status of the major categories of training. The training categories discussed include: Recruit Training, Officer Acquisition Training, Specialized Skill Training, Flight Training, and Professional Development Education.

A major concern of the impact of an all-volunteer army was that there would be a reduction in the quality of input. Research was designed to investigate more efficient and effective ways of training lower ability personnel. Literacy remediation programs were initiated to deal with this problem. Job-oriented literacy programs with skill training are suggested as a first step in a career-oriented literacy program.

Specialized skill training is conducted at two levels — initial skill training and skill progression training. This formalized training varies in complexity and subject matter. Simulators are being increasingly used for skill acquisition, maintenance of performance, and evaluation of performance. Simulation is becoming a primary instructional medium rather than an auxiliary one to supplement practice on operational equipment.

McGhee, W. & Tullar, W. L. A note on evaluating behavior modification and behavior modeling as industrial training techniques. *Personnel Psychology*, 1978, 31, 447-484.

The authors searched the training literature (1969-1976) for research evaluation of behavior modification and behavior modeling as industrial training techniques. No reported scientific evaluations of behavior modification were found. Four reports (1976) of scientific evaluation of behavior modeling used in training managers were located. The research designs used in these studies were analyzed for possible threats to internal validity. Enough threats to internal validity were discovered in the designs used to question the reported results of behavior modeling training of managers. This article points out some of the difficulties which competent psychologists encounter in this kind of research, including determination of equivalent control groups and the random assignment of subjects.

Morano, R. Determining organizational training needs. *Personnel Psychology*, 1973, 26, 479-487.

This article emphasizes the role of diagnosis in organizational training and development programs. While many organizations have adequate classroom facilities, equipment, and instructors, they fall short in fulfilling real organizational training needs because they do not diagnose the "illness" before recommending a cure. Three methods of assessing training needs are discussed: (1) surveys, (2) manpower analysis, and (3) organizational analysis. Each is discussed in detail as a necessary precursor to any training program.

Moses, J. L. & Titchie, R. J. Supervisory relationships training: A behavioral evaluation of a behavior modeling program. *Personnel Psychology*, 1976, 29, 337-343.

Research was conducted at A.T. & T. designed to help line supervisors interact more effectively with one another. A.T. & T. developed a behavior modeling program known as Supervisory Relationships Training (SRT) following the approach used by Sorcher (1971) and Goldstein and Sorcher (1974). This program addresses issues which confront supervisors managing a work force composed of women and minorities. A special behavioral assessment center was established in order to evaluate the effectiveness of a supervisor's ability to respond to a series of problem discussions. An assessment staff was trained in both behavioral observation and the use of a rating scale constructed especially for the evaluation process. They evaluated how effectively

the trained supervisors could transfer and apply training concepts to materials that had not been specifically covered in training.

The results indicated that trained supervisors were significantly more effective than untrained supervisors in being able to solve supervisory problems. Since the trained and untrained supervisors were carefully matched prior to the study, the observed performance differences are seen as resulting from the SRT training.

Myers, D. M. Employee development: A synthesis of systems theory, quantitative analysis and behavioral concepts. *Training and Development Journal*, 1970, 24, 34-38.

This article represents an effort to implant in one area of training and development, the efforts of social scientists as well as some concepts of systems theory and quantitative methods. The authors content that organizations are not effectively utilizing the potential that employees possess. Employee achievement, f(X,Y,Z), is a function of skill level, X, plus motivation, Y, plus human capacity, Z. An employee development system is a shared-responsibility program aimed at maximizing employee achievement. Management must provide the vehicle for the system, an environment that facilitates development, and a stimulus that motivates employees to achieve the highest levels of personal growth and advancement. To accomplish this requires top management support, professional technicians and an efficient system that is self-regulating. Employees, on their part, must make the necessary sacrifices to achieve their occupational goals.

Nord, W. R. Beyond the teaching machine: The neglected area of operant conditioning in the theory and practice of management. *Organizational Behavior and Human Performance*, 1969, 4, 375-401.

This paper maintains that the work of B. F. Skinner has not been recognized in the administrative and management literature to the extent that it deserves. The work of Skinner is highly consistent with that of many widely accepted students of management except that Skinner's work deals specifically with scheduling reinforcements, does not require acceptance of the metaphysics of many of the humanistic psychologists, and is based on considerable empirical evidence. The power of positive reinforcement, the unanticipated consequences of punishment, and the value of partial reinforcement are stressed. Finally, the operant view is applied to some managerial problems. It seems clear that the conditioning approach can meaningfully integrate much of the behavioral science literature and serve organizations in the areas of personnel development, job design, compensation and alternative rewards, and organizational design.

Odiorne, G. S. A systems approach to training. *Training and Development Journal*, 1979, 33, 42-48.

Implicit in every management training approach is some concept of "system". This article describes eight different notions of system often found as the basis for training departments. They include: (1) a static system; (2) a clocklike system; (3) a cell system; (4) a cybernetic system; (5) a plant system; (6) training as an organism; (7) the training department as a social organization; and (8) training as a social movement. Training practices typifying each of these systems are described.

The system considered most conducive to a successful training department/program is the cybernetic system. It represents a communication theory which treats organisms and organizations as being very much alike in that they both display behavior. Since the subjects of the training department's efforts are organisms (employees), it is argued that the training process can be treated as a feedback or cybernetic process. The advantages of this perspective are discussed, in particular its emphasis on training from the top down.

Olmstead, J. A., Elder, G. L. & Forsyth, J. M. *Organizational process and combat readiness: feasibility of training Organizational Effectiveness Staff Officers to assess command group performance*. (Interim Report IR-ED-78-13). Alexandria, VA: US Army Research Institute for the Behavioral and Social Sciences, 1978.

This report describes the results of the first phase of a project concerned with research on the relationship between performance, certain critical organizational process, and combat readiness of US Army units. The research in Phase I was devoted to (1) analysis of the relationships between process performance of battalion command groups and the combat outcomes of battle simulations in which the battalions participated, and (2) determination of the feasibility of training Organizational Effectiveness Staff Officers (OESO) to observe and assess the process performance of TOE unit battle staffs and to feed back their observations so improved performance would result. The data used in this study were collected on 12 battalions of the 8th Infantry Division in Europe. Data was collected on (1) EOSO ratings of command groups process performance, (2) ratings of combat outcomes by opposing force controllers, and (3) interviews with OESOs and selected battalion commanders.

A significant correlation was obtained between overall command group process performance and overall combat outcomes across the four modules of the battle simulation. This confirmed the expectation of a strong relationship between the quality of organizational process performance and combat outcomes. Correlations between the seven separate processes studied and overall combat outcomes were in the expected direction and were significant for five of the seven.

Three general conclusions are drawn: (1) The quality of command group performance of the organizational processes included in this research is strongly correlated with unit combat effectiveness, as reflected by the outcomes of battle simulations. (2) Feedback of process observations by OESOs appears to exert a positive effect upon the effectiveness of command groups. (3) OESO who are qualified in the combat arms can be trained easily to assess and constructively feed back observations concerning the process performance of command groups and battle staffs.

Owens, J. Organization conflict and team-building. *Training and Development Journal*, 1973, 27, 32-39.

This article reports on a simulation exercise conducted in many governmental and industrial organizations, which demonstrates to participants how and why destructive conflict thrives within organization-oriented teamwork. The simulation is based on the contention that competition within an organization is often a destructive force. The "Blue-Green" game establishes a live situation involving cooperation and competition opportunities for participants in such a way that participants can experience, and then analyze, the results of their own behavior. The results of the simulation exercise indicate that, through an OD program, it is possible to convert organizational conflict into teamwork. Several concrete actions toward this end are suggested, including an outline for the initial steps to be taken in designing a useful OD program.

Parry, S. B. & Robinson, E. J. Management development: Training or education? *Training and Development Journal*, 1979, 33, 8-13.

A distinction is made between the notions of training and education as they pertain to management development. While training is specific, measurable, and generally task-specific, development is often ill-defined and largely synonymous with education. This does not imply that training is useless, but rather than organizations must devote far more time and energy to determining the goals of the management development program so that the right combination of training and education can be achieved.

There are several tools and techniques available to organizations to assess the needs of and establish instructional objectives; among them, Needs Inventory, Critical Incident, and Climate Survey. Analysis of the data from these surveys should enable top management to discern the degree to which specific skills are needed (management training) and the degree to which concepts and philosophy are called for (management education). In this way, the appropriate combination of both aspects of management development can be executed.

Pieper, W. J., Catrow, E. J, & Swezey, R. W. Automated Apprenticeship Training (AAT): A systematized audio-visual approach to self-paced job training. Air Force Human Resources Laboratory, Lowry Air Force Base, Colorado. Technical Report No. AFHRL-TR-72-20. April 1973.

The purpose of this project was to develop, administer, and evaluate two Automated Apprenticeship Training (AAT) courses for Air Force Security Police Law Enforcement and Security specialists. AAT is a systematized audio-visual approach to self-paced job training which employs an easily operated, portable and reliable teaching device. The AAT course was developed, administered, and evaluated in the following manner: (1) A task analysis was performed and behavioral job descriptions developed to identify training requirements and learning objectives. (2) A job performance test was designed and developed to measure the policemen's ability to perform necessary tasks identified in the behavioral job description. (3) A systematized, job-specific ourse for both the Law Enforcement and Security Specialist was designed and audio-visual training materials prepared for use by both high and low aptitude trainees. (4) The training courses were administered in an on-the-job training environment at a representative sample of Air Force bases using Air Force trainees and training supervisors. (5) Graduates of the AAT course were compared with graduates of the conventional technical school and on-the-job training courses including a comparison of man-hour requirements.

Evaluation criteria included the job specific performance test, an apprentice knowledge test, and the supervisor's ratings. Results indicated superior scores for the AAT graduates on the job performance test, and apprentice knowledge test and supervisor's ratings. Results also indicated superior scores for the AAT graduates on the job performance test, and no differences among training regimes on the other criteria. A significant aptitude effect was also obtained on the job performance test. The AAT course was considered superior to other training regimes in terms of man-hours expended. Training supervisors also expressed a preference for the AAT technique.

Reddin, W. J. Effective international training. *Training and Development Journal*, 1978, 32, 12-20.

This article discusses the need for a general theory of organization and training in order to overcome the cultural contingencies constraining organizational development practices. While an OD program must be tailored to certain culturally-specific aspects of the organization in which it is being practiced, the OD specialist should seek to work within a general enough framework to be relevant to all organizations. The author contends that current organizational theory is not general enough. Psychologists are concerned only with people, sociologists with roles, economists with cost curves, and systems people with input/transformation processes.

The alternative general theory of organizations proposed is one which is concerned ultimately with effectiveness and outputs. From this core, it is hypothesized, solutions will emerge to such issues as how to design organizations for effectiveness, how to motivate for effectiveness, how to train for effectiveness, etc. Such a general theory of organizations requires a value-free management training technique. Several existing ones are discussed: organization design, management by objectives, and managerial effectiveness. The article concludes with a discussion of the multidimensionality of an effective training program in this context.

Robertson, I. & Downs, S. Learning and the prediction of performance: Development of trainability testing in the United Kingdom. *Journal of Applied Psychology*, 1979, 64, 42-50.

This article distinguishes between the work sample approach to personnel selection and a trainability-testing approach. Trainability tests are chracterized by the inclusion of a structured and controlled period of learning and are used to select personnel for training rather than to choose people who are already competent. Work conducted on trainability tests over the past decade is outlined and shows that such tests can be successfully used for semiskilled manual tasks, including areas in which existing written, psychometric tests are poor at predicting trainability. Illustrative examples of parts of tests are provided and design and validation procedures are discussed. This approach to selection is linked with theoretical ideas advocating point-to-point correspondence between predictor and criterion, in which the relevant aspects of training content, method, and environment are incorporated into the test to ensure correspondence between the training criterion and the selection test.

Siegel, A. I. & Federman, P. J. Communications content training as an ingredient in effective team performance. *Ergonomics*, 1973, 16, 403-416.

The pattern and content of the communications within a working unit is of interest to those concerned with work efficiency and productivity, partly because of the existing relationship between information transfer and team effectiveness. The communications within and between the units of a work force can serve as an indicator of the cohesiveness among the members and communications analyses can yield insights into, among other things, variables affecting critical decisions, conceptualizations of problem areas, team coordination, peer relationships and areas for needed training.

In the first study, the relationship between helicopter team performance and the content and flow of communications within the team during simulated problem solution was investigated. Communication variables found to be correlated with an objective performance criterion were factor analyzed. The four emerging factors were named: probabilistic structure, evaluative interchange, hypothesis formulation, and leadership control.

In a second study, involving a different helicopter simulator, geographic location, and sample, the first study was replicated. Three of the four previously isolated communications factors were recovered. A training program emphasizing the employment of the communications factors was developed, administered, and evaluated. The results indicated that, in terms of a performance criterion, team proficiency was affected in the proper direction, but the differences between the course trained and a control group were not statistically significant.

Weick, K. E. Amendments to organizational theorizing. *Academy of Management Journal*, 1974, 17, 487-502.

A reexamination of the methods and subjects of organizational theory is proposed. Organizational scholars are urged to avoid big business organizations and to examine, instead, everyday events, places and questions, microorganizations, and absurd organizations. In these sites, organizationally relevant phenomena are more visible and available for hypothesis generation than in complex organizations.

Williams, P. N. Organization self-development. *Training and Development Journal*, 1978, 32, 42-47.

A frequent criticism of most management training concerns its relevance to real time problems, its transferability, and as a consequence, its assessability. Organization development, on the other hand, is criticized as being a hobby for human resource personnel or training managers, or at best, the providence of internal or external consultants. By designing a management training program around OD principles, a kind of unique synergy is produced which, if appropriately applied, can: (1) Make OD available to managers at all organization levels with minimum use of consultants. (2) Allow management training to focus on real time problems and opportunities. (3) Develop first-line supervisors through the use of a training program equally applicable to middle and top management. (4) Afford human resource and other staff planners a programmable training system which can help to integrate career planning, organization priorities, problem identification and interdepartmental communication and planning.

The training strategy and program design elaborated in this paper represents the outgrowth of a series of management training programs on the one hand and OD consulting contracts on the other. The resulting design is in one sense a logical outcome of coping with the limitations of each. It is currently being developed as a series of training programs for the upper middle management of a major oil company.