The systems paradigm in organization theory: correcting the record and suggesting the future *

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Two mistaken beliefs have appeared repeatedly in the organization theory literature concerning aplication of the systems paradigm to organizations. This paper identifies and corrects these beliefs. Three opportunities for using the systems paradigm to further the development of organization theory have been overlooked. The paper identifies these opportunities and suggests how they can be exploited. Finally, the authors note that recent advances in organization theory could enrich the paradigm, making it more useful for organization research.

The field of organization theory is characterized by multiple perspectives. Some of these are well enough developed to be considered as paradigms. In this paper the authors attempt to strengthen the field of organization theory by identifying mistaken beliefs and missed opportunities associated with the systems paradigm and its role in the development of organization theory.

The systems paradigm includes, but is much more elaborate than the rudimentary systems concept—that systems are composed of interrelated components and that the properties of both the system and its components are changed if the system is disassembled in any way. Two of the paradigm's most characteristic concepts are the classification-related concepts emphasized and epitomized in the classic works of Boulding (1956) and Miller (1978):

First, systems can be classified according to their common properties. Thus, by knowing the class (e.g., organizations) to which a system belongs, one can know many of the system's properties (e.g. relatively stable distributions of hierarchical authority) without having to observe the system itself.

Second, systems of any class possess not only the common properties of other systems at their level, but they also possess the properties of their component, lower-level systems, except as the properties of the components are modified through their relations with the whole. Thus if something belongs to a particular system-level (such as the organization level), it has all of the properties of organizations and also all of the properties of lower-level systems (e.g., humans), except as these latter properties (e.g., limited cognitive abilities) are modified by the relations that humans have with each other and with the organization.

In this paper, the systems paradigm is defined to include the rudimentary systems concept and the two concepts just noted. This in no way precludes discussing other concepts drawn from literatures that have enriched the paradigm [e.g., the general systems theory literature (*AMJ,* 1972; Boulding, 1956), the open systems literature (Emery & Trist, 1965; Katz & Kahn, 1966; Thompson, 1967), the living systems literature (Miller 1978; Sommerhoff, 1969), and the

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mathematical literature on general systems (Beer, 1966; Rapaport, 1966)].

The systems paradigm has gone out of fashion among organization researchers. Explicit recognition of the paradigm by organization scholars peaked in 1972 with the *Academy of Management Journal's* special issue on general systems theory. The paradigm that was referred to in 1972 as "vital to the study of social organizations and as providing the major new paradigm for our field of study" (Kast & Rosenzweig, 1972, p. 457) has certainly not received the kind of attention in recent years that might have been expected of a "major new paradigm". So why look back? Why reexamine an out-of-fashion paradigm?

There are three reasons to reexamine the systems paradigm: (a) to identify and correct mistaken beliefs that have been perpetuated by organizational scholars in their writings concerning application of the systems paradigm to organizations, (b) to identify missed opportunities for using the systems paradigm to further the development of organization theory, and (c) to identify missed opportunities for using developments in organization theory to enrich and update the paradigm itself.

Mistaken beliefs

The two mistaken beliefs discussed here involve the distinction between closed and open systems. Closed systems are, by definition, unaffected by their environments and include at a minimum Boulding's levels 1 and 2 (see Table 1). In contrast, open systems interact with their environments and generally correspond to Boulding's levels 3 or 4 and above (Pondy & Mitroff, 1979).

Mistaken belief No. 1: **early theorists incorrectly viewed organizations as closed systems**

Concurrent with the introduction of the systems paradigm to organization theory in the 1960s, organization scholars implied that earlier organization and management theorists (e.g., Taylor, Fayol, Weber, and others) incorrectly viewed organizations as closed systems: "Traditional organization theories have tended to view the human organization as a closed system. This tendency has led to a disregard of differing organization environments and the nature of organizational dependency on environment" (Katz & Kahn, 1966, p 29).

Table 1
Boulding's Scale of System Complexity

COMPLEX SYSTEMS
9 Transcendental Systems-Complex systems not yet imagined
8 Social Organizations-Collections of individuals acting in concert (e.g., human groups)
7 Symbol Processing Systems-Systems conscious of themselves (e.g., humans)
6 Differentiated Systems-Internal image systems with detailed awareness of the environment (e.g., animals)
5 Blueprinted Growth Systems-Systems with a division of labor among cells (e.g., plants)
4 Open Systems-Self-maintaining structures in which life differentiates itself from nonlife (e.g., cells)
3 Control Systems-Cybernetic systems which maintain any given equilibrium within limits (e.g., thermostats)
2 Clockworks-Simple dynamic systems with predetermined, necessary motions (e.g., levers and pulleys)
1 Frameworks-Static structures (e.g., employee roster)
SIMPLE SYSTEMS

Note. Adapted from Boulding, 1956, and Pondy & Mitroff, 1979.

Referring to the work of Taylor, Gulick, Urwick, and Weber, Thompson stated that: "since much of the literature about organizations has been generated as a by-product of the search for improved efficiency or performance, it is not surprising that it employs closed-system assumptions—employs the rational model—about

organizations'' (1967, p. 4). More recently Scott referred to the writings of the same early theorists: ''Thus in all these models, the variety and uncertainty associated with an organization's openness to its environment is assumed or explained away'' (1981, p. 129).

These statements and others like them suggest that the early theorists ignored the impact the environment has on organizations. To the contrary, however, although the early theorists did not use the terminology of later theorists to describe environmental influences, there is substantial evidence that the early theorists explicitly recognized the role of the environment. For example, Henry Fayol wrote that: ''the prosperity of an industrial concern often depends... on... a thorough knowledge of the market and of the strength of competitors...'' (1949/1916, p. 4). James Mooney and Allan Reilcy—whose classic book contains the most complete explication of the ''principles'' associated with the chain-of-command construct—made numerous references to the external environment. For example, in response to a question about the reasons for the success of American industry in mass production, they replied: ''Prominent among the other factors are the quality of the immigration America has received from Europe... the political institutions... and our enormous free-trading area'' (1931, p. 430).

Fayol and Mooney and Reiley used corporations as the primary units of analysis, and they noted that corporations are influenced by consumers, competitors, incoming employees, and political institutions—environments that interest today's open system theorists as well. In contrast, Fredrick W. Taylor focused on the shop, whose environment includes other corporate units as well as the corporation's environment:

> We, however, who are primarily interested in the shop, are apt to forget that success, instead of hinging upon shop management, depends in many cases mainly upon other elements, namely,—the location of the company, its financial strength and ability, the efficiency of its business and sales departments, its engineering ability, the superiority of its plant and equipment, or the protection afforded either by patents, combination, location or other partial monopoly (1947/1911, p. 19).

These writings and others like them make clear that the early theorists did recognize the influence of the environment (see also Henderson & Parsons, 1947, p. 40, and Koontz, 1980, p. 180). To perpetuate the belief that they did not is to do all parties concerned, including today's students, a disservice.

Just as the early theorists dealt primarily with internal variables, so do many of today's organization scientists. Many studies focus on structure or technology (cf. the reference lists of Fry, 1982, and Rousseau & Cooke, 1984), and portray the organization as closed in that they do not explicity account for environmental influences. Even in contingency theory studies, researchers tend to consider only one or two of the focal organization's many environments, and with rare exceptions, do not consider important variables such as organizational culture, strategy, politics, and attributes of key members such as CEOs and boundary spanners. Every study in the organizations theory literature uses simple models that do not include some important variables. ''Every model is inferior, a distortion, a lie. Why then do we bother with models? Ultimately, I propose we make models for their convenience'' (Ashby, 1970, p. 96).

The matter is straightforward—there is a difference between (a) believing that organizations are closed systems, and (b) using closed system models of (open system) organizations. To imply, through either ambiguity or intent, that it was wrong for early theorists to use closed system models (especially given the complexities of the organizational issues they addressed relative to the theory they had to build upon) ignores the constraint that causes even today's scholars to work with closed system models: ''Because of the limits of human intellective capacities in comparison with the complexities of the problems that individuals and organizations face, rational behavior calls for simplified models that capture the main features of the problem without capturing all its complexities'' (March & Simon, 1958, p. 169).

Critics of early theorists err when they do not recognize the difference between less complex systems shown in Table 1 (i.e., closed systems) on the one hand and closed system models of more complex systems (e.g., organizations and other open systems) on the other hand. When today's organization theorists focus, *in any specific writing,* on only a few fariables, this does not mean that they regard other variables as nonexistent or that their other writings do not address additional variables. The same is true for the early theorists.

Mistaken belief No. 2: **open systems thinking has guided research on organizations**

Many writers have argued that open systems thinking has guided organization research. For example, Pondy and Mitroff stated, "for the last decade, thinking and research in the field of organization theory has been dominated by a point of view labeled as open system models" (1979, p. 10).

It appears, however, that though the open system model has been widely used to label and legitimize organizational studies, it has seen little use as a research guide (Cooper & Wolf, 1980). In particular, although open systems have several propierties that are important to organization research (see Table 2), very few organization studies have been guided by formal recognition of these properties *as properties of open systems.* The conspicuous exceptions are studies dealing with the sixth and eighth of Katz and Kahn's (1966) properties (information input and feedback and differentiation). However, studies of information input and feedback (e.g., studies of organizational intelligence, boundary spanning, and adaptation) and studies of differentiation (e.g., studies of specialization and coordination or integration) undoubtedly would habe been performed without formal use of the open system view.

Also, although a large number of the studies that include considerations of the environment mention *open systems,* it is rarely apparent that the studies were purposefully designed around open systems properties. Instead, it seems that the studies were shaped by the common-sense idea that organizations are affected by their environments. Perhaps the studies were labeled by their authors as *open system* studies because the phrase is fashionable even today. What caused researchers, beginning in the 1970s, to focus rather suddenly and with such fanfare on organizational environments? Was it the emergence of the sharply articulated open system view?

Table 2
Properties of Open Systems

1. Importation of energy	Open systems import energy from the external environment.
2. Through-put	Open systems transform the energy available to them.
3. Output	Open systems export some product into the environment.
4. Systems as cycles of events	The pattern of activities of the energy exchange has a cyclic character.
5. Negative entropy	To survive, open systems must move to arrest the entropic process.
6. Information input, and	Inputs furnish signals to the structure about the environment and about its own functioning in relation to the environment.
negative feedback	Negative feedback enables the system to correct its deviations from course.
7. Steady state, and	The importation of energy to arrest entropy operates to maintain some constancy in energy exchange.
dinamic homeostasis	At more complex levels the steady state becomes one of preserving the character of the system through growth and expansion.
8. Differentiation	Open systems move in the direction of differentiation and elaboration.
9. Equifinality	A system can reach the same final state from differing initial conditions and by a variety of paths.

Note. Adapted from Katz & Kahn, 1966.

Probably not. To the contrary, it appears that the association between (a) the widespread interest in the open systems paradigm, and (b) the acceleration of research on organizational environments was not causal, but rather it was temporal. Both events coincided temporally with a recognition of the rapidly changing nature of organization environments, as documented at the time by Toffler (1970) and Bell (1973), and in the 1980s by others (cf. Huber, 1984; Naisbitt, 1982). Du-

ring the periods observed by the early organization and management theorists, environmental factors generally were of much less significance than internal variables. In particular, during the first third of the century the laissezfaire philosophy of the United States toward business and the rapidly growing and relatively protected domestic markets prompted early theorists to view organizations as only loosely coupled to their environments. In contrast, during the 1960s and 1970s, organizational environments became much more complex, turbulent, and demanding of attention (Bell, 1973; Toffler, 1970). During this same period empirical studies involving organizational environments became more frequent (cf. Aguilar, 1967, Duncan, R., 1972, 1973; Lawrence & Lorsch, 1967).

Labeling studies that include one or more environmental variables as *open system* studies may have become a dysfunctional distraction for organization scholars. In 1972, Kast and Rosenzweig noted: "Unfortunately, there seems to be a widely held view (often more implicit than explicit) that open-system thinking is good and closedsystem thinking is bad" (p. 454). Thus, rather than empirically examining the properties of open systems, or instead of recognizing the usefulness of studies employing closed system models when this was not harmful given the researcher's goals and conclusions, some writers have become sidetracked with labeling studies and making value judgments about the studies based on the labels.

The statements of respected authorities about the views of early organization and management theorists are misleading, and researchers in the field of organization theory have not been doing what conventional thinking says they have. Thus this section attempts to discredit what is *known,* because what is *known* is contradicted by the facts. The current absence of organization studies that formally use the systems paradigm suggests tha it is also *known* that the paradigm has been fully exploited. To the contrary, opportunities for using the paradigm to further the development of organization theory have been missed, and are being missed. Drawing on the paradigm as a guide to conducting research on organizations would be a useful way of operationalizing Pondy and Mitroff's advice: "For the sake of maintaining organization theory's adaptability as an inquiring system (Churchman, 1971; Mitroff, 1974), we need to discredit what we know, to change for the naked sake of change to prevent ossification of our ideas" (Pondy & Mitroff, 1979, p. 11).

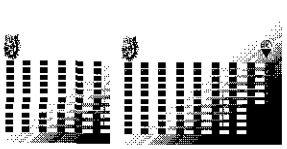
Missed Opportunities

Despite over half a century of effort, the study of organizations has produced disappointing results; generally findings have low explanatory power and seldom are associated with welldefined domains. McKelvey (1982) is correct when he argues that the major reason for this is that the lack a precise and widely applicable classification scheme impedes the comparison of studies, and thus thwarts the cumulation of knowledge. In contrast to organization theory, the systems paradigm includes precise and widely applicable classification schemes (e.g., those of Boulding, 1956, and Miller, 1978). Not drawing upon them means missed opportunities. Organization scholars should determine if the shortage of precise and widely applicable classification schemes in organization theory can be alleviated by borrowing from the systems paradigm.

Missed Opportunity No. 1: **The features of living systems have not been exploited**

Although components of a living systems theory were discussed as early as 1950 (Sommerhoff, 1950, 1969), a discussion of the living systems paradigm as it applies to organizations (Miller, 1972) did not appear until 1972, the same year as the *Academy of Management Journal's* special issue on general systems theory. (*AMJ,* 1972) was published. This major subparadigm of the systems paradigm contains three useful features for organization researchers.

One of these features is an elaborate and precise typology of subsystems or components possessed by *all* living systems (see Table 3), wherever they may be situated in the seven-level hierarchy of the living systems paradigm (shown in Table 4). In his 150-page discussion of organizations, Miller (1978) explains in depth the function, the structure, and the processes of each of these components as they occur in organizations. Examination of Table 3, however, makes clear that the typology is considerably richer than many of those used by organization researchers. Not only is it more detailed than classification schemes such as (a) research and development, production, marketing, (b) line and staff, and (c) strategic level, middle management level, operating level, but also the relationships among the subsystems can be readily hypothesized. For example, hipotheses about the relationship between transducer



(e.g. market research department) behavior and associator (e.g., CEO) effectiveness come readily to mind, as do hypotheses concerning the competitive or cooperative relationships between input transducers (e.g., technical personnel attending vendor promotions) and ingestors (e.g., budget and procedurally bound purchasing personnel), or the differences in subsystem functioning at various system levels: "The deciders of a system's subsystems and components satisfice shorter term goals more than does the decider of the total system" (Miller, 1978, p. 101).

Table 3
Miller's Universal Subsystem of Living Systems

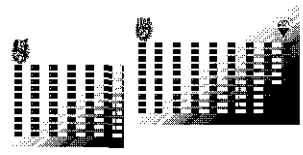
Subsystem that process information only	Subsystem function	Examples in organizations
Input Transducer	Receives information from the system's environment.	Market research dept. Complaint dept.
Internal Transducer	Receives information from other subsystems about alterations in their status.	Bookkeeper; payroll dept.
Channel & net	Transmits information to all parts of the system.	Switchboard operator; gossip
Decoder	Alters the code of information received by input transducer into a system code.	Signal officer
Associator	Carries out first stage of learning process, forming associations among items of information.	Intelligence analyst; chief executive officer
Memory	Carries out second stage of learning process, storing information.	Filing dept.; data input operator.
Decider	Receives information inputs from all other subsystems and transmits information outputs that control entire system.	Board of directors; executive
Encoder	Alters the code of information input from subsystems, changing "private" code to "public" that can be interpreted by environmental components.	Advertising dept.; public relations expert
Output Transducer	Changes information into other matter-energy forms that can be transmitted over channels in environment.	Salesperson; publication dept.

Systems that process matter-energy only		
Reproducer	Gives rise to other systems similar to the one it is in.	Member of organization who sets up a subsidiary
Boundary	Located at perimeter; holds components together, protects, permits entry	Personnel office; purchasing dept.
Systems that process both information and matter-energy		
Ingestor	Brings matter-energy across boundary.	Recruiter; receiving dock
Distributor	Carries inputs from outside or transports outputs around the system.	Fork lift operator; elevator operator
Convertor	Changes imputs into functional form.	Training dept.; heating plant operator
Producer	Forms stable association among inputs or outputs for purposes of growth, damage repair or replacement of components.	Maintenance worker
Storage	Retains deposits in the system.	Stockroom or file cabinet
Extruder	Transmits matter-energy out of system in the *form of wastes or products.*	Shipping dept.; hospital *discharge unit*
Motor	Moves system in relation to its environment.	Executive jet pilot
Supporter	Maintains proper spatial relationships among components of system.	(No living supporter at this level) office building; aircraft carrier

Note: From *Living Systems* (pp. 606-607) by J. Miller, 1978, New York: McGraw-Hill. *Copyright 1978 by McGraw-Hill. Adapted by permission.*

Table 4
Miller's Hierarchical Levels of Living Systems

HIGHER LEVEL MACRO SYSTEM	
System Level	Definition
Supranational System	Two or more societies, some or all of whose processes are under the control of a decider that is superordinate to their highest echelons.
Society	Large, living system with organizations and lower levels of living systems as subsystems and components.
Organization	System with multiechelon deciders whose components and subsystems may be subsidiary organizations, groups and single persons.
Group	Set of single organisms which, over a period of time, relate to one another face-to-face, processing matter-energy information.
Organism	Organized multicellular structure that has single decider.



Organ	Cells aggregated into tissue which carries out the processes of a given subsystem of an organism.
Cell	Simplest level of living systems, consisting of atoms, molecules, multimolecular organelles.

LOWER ORDER MICRO SYSTEMS

Note. From *Living Systems* (p. 80) by J. Miller, 1978, New York: McGraw-Hill. Copyright 1978 by McGraw-Hill. Adapted by permission.

Miller's typology of subsystems has been neglected as a guide for designing and interpreting empirical studies on organizations. In addition, the typology's broad applicability as a descriptive schema for organizations (see Miller, 1972) indicates that it could greatly facilitate formal comparisions of research findings across studies, including literature reviews and meta-analyses, and thus would respond to McKelvey's (1982) criticisms and concerns.

The second feature of the living systems paradigm that is of potential use is its rich descriptions of the additional properties possessed by each higher-order level in the living systems hierarchy. These descriptions could have guided and helped to integrate, and could still guide and help to integrate, research on organizations. For example, Miller (1978, pp. 548, 642) and Gharajedaghi and Ackoff (1984, pp. 292, 293) noted that organizations have multiple deciders, while lower-level systems have single deciders. Investigating how multiple deciders relate to one another would have led rather directly to research on conflict, coalitions, politics, and use of power, and to research that compared these phenomena at various levels in the living systems hierarchy. Investigating how organizations deal with the outputs of multiple deciders might have led to enriched studies of responsibility assignment, authority delegation, loose coupling, coordination, and related (within the multiple decider property) constructs, and to alternative theoretical integrations of such studies. Sharper recognition and increased utilization of this feature of the living systems paradigm would not only enable organization scholars to develop theory more swiftly, but it also would avoid some of the pitfalls encountered when relying on biological analogies (cf. Keeley, 1980).

The third feature of the living systems paradigm of potential usefulness to organization scientists is that much of what is learned about one living system level is also found to hold for higherorder living system levels. This is, of course, a special case of the fact that generally systems possess, in modified form, the properties of their subsystems. This is of sufficient importance for developing organization theory that it is treated here as a second missed opportunity:

Missed Opportunity No. 2: **Cross-level hypotheses have not been employed**

Living systems theory "is a general systems theory of the organization because it utilizes a conceptual framework which is applicable across several levels of systems and it seeks to identify and support cross-level hypotheses which describe system behavior" (Duncan, D., 1972, p. 518). [Cross-level hypotheses are hypotheses that hold at more than one level in a hierarchy of systems. In contrast, "cross-level inferences" or "multi-level analyses" (cf. Mossholder & Bedian, 1983) refer to associations between variables drawn from different levels.] This latter feature offers the potential for organization scientists to benefit more directly from the research findings of biologists, physiologists, and psychologists who study lower-order systems and from the research findings of sociologists, economists, political scientists, and historians who study higher order systems. As is noted in the examples of the next several paragraphs, in some instances more structured use of parallel theories and findings from other disciplines could result in identifying relationships that otherwise would not be considered. In other instances, more structured use could result in ascertaining relationships more precisely. In either case, it could speed up theory building.

As an example of how cross-level hypotheses might have been useful and still could be useful, consider the large number of studies that during the 1960s and 1970s examined the relationship between organizational size and either the administrative ratio or the staff-to-line ratio. Many of these studies seemed exploratory, used simple correlational analyses, tested only for linear relationships, and found that the measured degree of association between the variables was not great. In addition, the definitions of *staff* or *nondirect* workers varied from study to study. Swifter and more

informative results would have been obtained if the researchers studying the administrative ratio had begun with the following cross-level hypothesis: "Increase in the number of components in a (living) system requires a disproportionately larger increase in the number of information-processing and deciding components" (Miller, 1978, p. 109). This cross-level hypothesis (a) highlights the need to test for a nonlinear relationship, (b) more precisely delineates how the administrative component might be operationalized, and (c) has been validated at several living system levels.

Moving from an "old" research topic to one not yet developed, the present authors note that the organization literature contains very little information concerning the materials/energy distribution or logistical components of organizations, even though these components greatly affect organizational efficiency and certainly add to the staff-to-line ratio. Development of descriptive theory concerning these components (called "distributors" by Miller, 1978, pp. 613-616) undoubtedly would be speeded up if organization researchers drew from work in other disciplines, perhaps through testing the applicability of cross-level hypotheses such as: "The hierarchical structure of the distributor is arranged so that there is a geometric progression from the size of the region of the total system served by an average unit of its lowest echelon to the size of the region served by its highest echelon" (Miller, 1978, p. 94).

Even though organization scholars enjoy a fairly extensive knowledge of information logistics (cf. Huber, 1982), the relationships tend to be expressed less precisely than are those derived from a broader base of disciplines, such as: "The structures of the communication networks of living systems at various levels are so comparable that they can be described by similar mathematical models of nonrandom nets" (Miller, 1978, p. 95). (Miller goes on to describe one such mathematical model.)

It may be that organization scientists will not find the testing of hypotheses found valid by scientists working at other system levels interesting, or they may be unable to validate the more precisely formulated hypotheses borrowed from such scientists. It seems likely, however, that more rapid advances in organization theory could be made if the knowledge of other disciplines were drawn upon in the structured manner associated with the use of cross-level hypotheses.

The idea of cross-level hypotheses is not limited to the living systems paradigm; it also pertains to the general systems paradigm. This fact introduces the notion of system properties.

Missed Opportunity No. 3: **The properties of open systems have not been studied**

Table 2 lists nine properties that distinguish open systems from closed systems. Because very little actual use has been made of these properties by organization scientists, organization researchers may be missing an opportunity. Although these properties are postulated as characterizing all open systems, it would be interesting to determine whether (a) the extent to which the properties are important, or (b) the degree to which the properties characterize different organizations are variables that could enrich organization theory.

Consider, for example, the open systems property of "importation of energy, matter, and information" (Katz & Kahn, 1966; Miller, 1978). With respect to each of these three elements, organizations vary in how tightly connected they are to their environments; recognition of this fact led to the now-familiar phrase *loosely coupled.* "Consider a world that is mainly 'empty'—in which most events are unrelated to most other events; causal connections are exceptional and not common. . . 'unrelated' is perhaps too strong a term, 'loosely coupled' is a more appropriate one" (March & Simon, 1958, p. 176).

The field of organization theory could benefit from much more empirical exploration of the circumstances and consequences of the degree of an organization's connectedness to its environment. The beginnings of this can be seen with the development of the resource dependence perspective (Pfeffer & Salancik, 1978; Ulrich & Barney, 1984; Zammuto & Cameron. 1985), but relatively little empirical work has been published. Much more knowledge would be available now if organization researchers had studied this open systems property when it was first brought to their attention (Glassman, 1973; Katz & Kahn, 1966; March & Simon, 1958; Meyer & Rowan. 1977; Weick, 1976, 1979). How long will it be until other open systems properties are investigated?

Another open systems property worth empirical investigation is equifinality, if for no other reason than that such investigation would force a deeper understanding of what equifinality means in the context of an organization. Equifinality is associated with the con-

cept that "in an open system, the final state may be reached from different conditions and in different ways" (Shibutani, 1968, p. 332). Bertalanffy (1962) and Katz & Kahn (1966) presented this as an open system property, but subsequent work on organizational stories and myths (Pondy, Frost, Morgan, & Dandridge, 1983) suggests that organizations attaining equifinal states on certain objective measures may have different views and memories of how they got to these states (but see Martin, Feldman, Hatch, & Sitkin, 1983). So, are the organizations actually in equifinal states? It seems that manifestations of organizational memories, such as stories and myths, require a broader conceptualization of equifinality. Confronting this apparent incongruence (between viewing organizations as open systems that possess the property of equifinality, on the one hand, and viewing organizations as learning systems with different memories or interpretations of how they achieved their otherwise observably-equivalent states, on the other hand) might enrich both our understanding of organizational learning and memory and also our understanding of the open systems property of equifinality.

The three missed opportunities discussed up to this point center on the idea that examination of certain open systems properties (such as equifinality) could lead to useful developments in organization theory. The last missed opportunity concerns ways in which development in organization theory could, in turn, be drawn upon to refine the systems paradigm (including reexamining the definition and domain of equifinality).

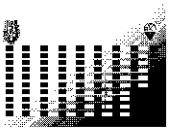
Missed Opportunity No. 4: **Relevant advances in organization theory have not been used to enrich and update the systems paradigm and thereby to make it more useful to organization scholars.**

Since the glory days of the paradigm (late 1960s, early 1970s) research on organizations has led to new knowledge and insight. However, there has been no attempt to transfer this new understanding into the systems paradigm, and thereby to enrich an adjacent field of study. Here, two developments in the organization theory literature are used as examples of how the paradigm could be enriched and updated; (a) the roles of myths, stories, and other forms of organizational memory, as these are portrayed in the organizational culture literature, and (b) the notion of strategic choice. Undoubtedly, there are others.

The organizational culture literature at first seems far removed from the systems paradigm, but in a few particulars it is not. For example, the construct has led to a heightened awareness of the importance in organizations of myths and stories (Martin, Feldman, Hatch, & Sitkin, 1983) and similar notions of organizational memory. Such notions are important both in attaining organizational stability (Peters & Waterman, 1982; Pondy, 1983) and in creating organizational change (Orwell, 1945; Toffler, 1985; Tunstall, 1983). Given the importance of these notions and beliefs, it is appropriate to reconsider the established systems paradigm concept that "when open systems reach a steady state and show equifinality, the final state will be independent of the initial conditions" (Kramer & de Smit, 1977, p. 40).

Is the systems paradigm valid for organizations? Are organizations that "look the same" actually the same if they "remember" that they arrived at their current state via different paths? If Apple Computer becomes an IBM, will it ever forger its roots? Such questions raise interesting issues beyond the scope of this paper, but clearly suggest that the open systems property of equifinality (Katz & Kahn, 1966, pp. 25-26) must be reconsidered. It may be, in fact, that equifinality does not apply to systems that have memories (i.e., systems at the higher end of Boulding's ordinal scale of system complexity or at the higher end of Miller's hierarchy of living systems). If the equifinality property does not apply to systems with memories (e.g., animals, humans, societies), either (a) the property must be dropped from its long-established position in the properties of open systems (Bertalanffy, 1950; Katz & Kahn, 1966, pp. 25-26), or (b) the class of systems called open systems must be redefined and not applied without qualification to organizations and other systems having memories. Whatever the consequences, determining how organization theory's recognition of organizational memories or cultures should affect the conceptual association between equifinality and open systems will enrich the systems paradigm.

The notion of strategic choice (Child, 1972) also can and should be used to enrich the systems paradigm. Familiar as this notion was to executives (cf. Barnard, 1938; Sloan, 1946), it held an element of surprise for many organization scientists because it did not fit comfortably within the dominant paradigm of



the time—the systems structural perspective (Astley & Van de Ven, 1983). The strategic choice notion (Child, 1972) certainly did fit, however, within the systems paradigm with its elaborated and rigorous treatment of deciders (Miller, 1978, pp. 548, 642) and purposeful systems (Ackoff, 1971; Sommerhoff, 1969). Since the early 1970s, organization scientists have made significant advances in their understanding of organizational decision making and strategy choosing (cf. Fredrickson, 1986; Mintzberg, Raisinghani, & Theoret, 1976; Nutt, 1984). An examination of systems theorists, writings on decider behavior in purposeful systems (see especially Ackoff, 1971, pp. 665-666, 670-671 and Miller, 1972, pp. 60-85) makes clear that some of the empirically based knowledge generated by organization scientists could be used to enrich the systems paradigm with regard to multiple deciders in organizations and, via cross-level hypotheses, in higher-level living systems as well.

Conclusion

Examination of the organization theory and systems literatures revealed two mistaken beliefs that have been prominent in the organization theory literature and that require correcting lest they be perpetuated and cause future scholarly actions to be based on incorrect information or inferences. The examination also identified several concepts and frameworks offered by the systems paradigm that have not been exploited by organization scholars but that seem potentially fruitful, and some developments in organization theory that seem to show promise for enriching the systems paradigm itself.

In 1972, Kast and Rosenzweig, looking back on the progress of systems thinking, quoted the psychologist Murray:

> I am wary of the word 'system' because. . . 'system' is a highly cathected term, loaded with prestige; hence, we are all strongly tempted to employ it even when we have nothing definite in mind and its only service is to indicate that we subscribe to the general premise respecting the interdependence of things (p. 455).

Review of the recent organization theory literature indicates that the word *system* is no longer loaded with prestige and that the systems paradigm is receiving little attention. At the outset of this work, the present authors might have hypothesized that the reason for its low visibility was because the paradigm itself lacked substance. However, a closer examination revealed features and components of the systems paradigm, such as the properties of open systems and the universal subsystems typology of the living systems paradigm, that offer potential for enriching future organization research. Exactly why organization researchers and scholars have made so little formal use of the paradigm is unclear, but three possible explanation follow from our examination of the literature.

The first is that some of the paradigm's most characteristic and potentially useful concepts are associated with the rigorous classification of systems and their components and, at the same time and as pointed out sharply by McKelvey (1982), organizational researchers are not prone to engage in rigorous classification. This latter propensity is likely to change as the field matures (Kuhn, 1970).

A second explanation is associated with two facts: (a) organizational researchers are clearly attracted to conducting empirical studies and, as a result, the ease of operationalizing the constructs of a theory or paradigm becomes a factor in whether the theory or paradigm is employed; and (b) by its nature, the systems paradigm, because it is intended to be highly generalizable includes constructs described in rather abstracterms (Glassman, 1973; Kast & Rosenzweig, 1972; Melcher, 1975), and, in addition, aspects of the paradigm are sometimes described with words and mathematical representations unfamiliar to organizational researchers. The propensity of organizational researchers to study constructs that are operational is incongruent with describing constructs abstractly and in unfamiliar terms (Astley, 1985; Weick, 1974). This obstacle would be removed if the constructs were described in more operational terms, as they are in column three of Table 3. These more operational forms of the constructs in column one of Table 3 lend themselves to inclusion in empirical studies and thus may contribute to the development of the middle-range theories called for by Weick (1974) and others (cf. Pinder & Moore, 1980).

A third possible explanation for the fact that the paradigm has seen relatively little formal use is that it was (e.g. Miller, 1972) and is (e.g., Morgan, 1986) so frequently used as a metaphor and language for talking about organizations that other instrumental uses of the

paradigm may have been obscured—blocked from our view by the highly visible and vivid analogies that we frequently encounter. This situation could change, and the perception of the paradigm's potential uses could change quite rapidly, if the paradigm were explicitly and successfully used to guide a few empirical studies. If this occurred—if, for example, some of the missed opportunities noted earlier were explited, and especially if McKelvey's (1982) call for more rigorous classification were heeded within these efforts—organization theory would be advanced.

Each of these explanations is compatible with the conclusion that follows from the preceding pages, that, in order to most fruitfully utilize the systems paradigm of organizations, scholars in the field must reexamine their beliefs about the paradigm and, perhaps, reeducate themselves about how they should think about and study organizations as systems.

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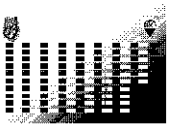

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