Contrasting Linear and Nonlinear Perspectives in Contemporary Social Research

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The past 10 years or so have seen a rapid growth in the literature pointing, more or less loosely, to an association between the developing science of complexity and social and organizational sciences. This article critically examines the dynamical assumptions of organizational paradigms and compares more traditional approaches with those resulting from the application of complexity theory.

As has been well established, there are many different theoretical stances adopted under the broad banner of organization theory that have their origins in the alternative perspectives and methods arising from different disciplines of social science. Similarly, there is a growing body of literature of a more pragmatic kind. Somewhat more populist in character and drawing on an eclectic range of theoretical perspectives, it purports to offer directions for practitioners and claims relevance on the ground of practice, more or less rigorously interpreted. This "pluralism" within organization science (Reed & Hughes, 1992) has both its advocates and its detractors. As would be expected and consistent with social theory generally, the most fundamental area of disagreement arises from different assumptions about the nature of reality (ontology) and the nature of knowledge (epistemology). As with other social disciplines, the modernist-postmodernist divide is very evident in the theory of organizations. These differences give rise to a "contentious meta-discourse" (Cooper & Burrell, 1988) or "paradigm war" (McKelvey, 1997) within organization theory.

THEORETICAL THEMES

It is worth exploring some of these alternative approaches further and examining them in some detail, in particular to assess the degree to which they can accommodate dynamical explanation. In their seminal work directed at understanding and contextualizing the theory of organizations, Burrell and Morgan (1994) identify three theoretical roots to organization theory:

- managerialism—a focus on issues of organizational management with an emphasis on practical implications and propositions for action;

- sociology of organizations—deriving from Weber and having a significant influence on administration theory, these positions tend to be concerned with a wider range of social and organizational structures and their impact on those who comprise them and the broader societies they integrate;

- individual or organizational psychology—focuses analysis at the level of the individual and tries to understand organizational dynamics in terms of individuals' behavior and interaction.

All are important issues for organization theory:

- The managerialist root points clearly to functionalist analysis and description—focusing on outcomes and consequences.

- The second root, sociology of organizations, points to a concern with levels of social structure above that of the organization—the organization's social context—and focuses on understanding the implications of institutions for the emergence of broader social form.

- The third theme, individual or organizational psychology, looks at the level below that of the organization—examining how individual behavior may lead to the emergence of structure at the level of organization.

Both the second and third roots are concerned with understanding the relationship between microstructure and macrostructure. Each root, therefore, offers a distinct and potentially valuable contribution, consistent with Beer's (1985) assertion of the need for organizational analysis to proceed with an understanding of systemic layers both above and below that of the phenomena of

interest. In practice, however, advocates of these approaches may proceed from incompatible meta assumptions and this may preclude or limit development of a meaningful dialog and/or synthesis.

BURRELL AND MORGAN'S FOUR PARADIGMS OF ORGANIZATION

Burrell and Morgan proposed a model to help explicate these different meta assumptions. They categorize ways of thinking about society and organizations based on assumptions about the nature of reality and about fundamental dynamical characteristics of that reality. They label these the subjective-objective dimension and the regulatory-radical dimension (1994).

THE SUBJECTIVE-OBJECTIVE DIMENSION

In the sense that Burrell and Morgan use the term, the subjectivist position reflects those social theories that embrace a nominalist ontology and an idealist epistemology. Advocates operating from this position, while possibly accepting the existence of a reality independent of an observer, take as a defining position the stance that we cannot come to know that reality as it truly is. In other words, knowledge is viewed as socially constructed and at best will only correlate with reality.

The objectivist position reflects those philosophies that embrace a realist ontology and a materialist epistemology, possibly embracing the tenets of positivism. From this position, materiality or concrete reality is the basis of all knowledge.

THE REGULATORY-RADICAL DIMENSION

The regulatory-radical dimension concerns the relevance of knowledge to social development. It is concerned with whether societies tend towards stability (homeostasis) or conflict and change. As will be demonstrated, for much of social and organizational theory, homeostasis is seen as a "natural" state; that is, the state toward which a system will tend. The development of complexity theory has most to offer in understanding this dimension and its implications, although, as will be established, it inevitably also has epistemological and ontological implications.

SOCIOLOGICAL PARADIGMS

Working with these two dimensions, Burrell and Morgan identify four dominant theoretical paradigms of organization. The paradigms are:

- functionalist

- radical humanist

- radical structuralist

- interpretive.

It should be kept in mind that Burrell and Morgan regard these four paradigms as mutually exclusive. It is this postulated incommensurability between theories derivative of these alternative paradigms that has, to follow Hughes' (1992) argument, "plunged the field into relative chaos." From a more pragmatic perspective, however, Aldrich (1992) has argued that the various theories represent alternative perspectives, each of which can generate useful insights into organizational functioning. Theories "in use" (Argyris, 1990)—that is, those theories implied by the approach adopted by many organizational practitioners and managers— fall on a continuum between the extremes of Burrell and Morgan's fundamental dimensions. Some theories and many practical approaches may also contain inconsistencies, falling in a number of places within the space of those dimensions. Much of contemporary management theory is distinctly eclectic, drawing, sometimes uncritically, on a wide range of alternative and inconsistent perspectives. Most, however, as Burrell and Morgan argue, fall in the objectivist-regulatory quadrant. This quadrant corresponds with the functionalist paradigm.

THE FUNCTIONALIST PARADIGM

The functionalist paradigm rests on regulatory and objectivist assumptions and has become a dominant paradigm in both sociology and organizational theory. Burrell and Morgan note that, consistent with its modernist family, it is:

At its core, this approach reflects an attempt to apply the (Newtonian) methods of the natural sciences to understanding social processes. Consistent with positivist roots, the social world is viewed as comprising concrete entities and relations. These, advocates believe, can be studied using reductionist approaches in order to identify underlying cause-effect relations and derive laws governing behavior. Burrell and Morgan further differentiate this paradigm, suggesting that it embraces schools such as structural functionalism and systems approaches as well as approaches based on behaviorism. All of these schools appeal to scientific methodology to justify their approach and borrow heavily from the natural sciences in order to construct models of social behavior (Silverman, 1970). At the margins, theorists have adopted positions that, while still objectivist or regulatory, have attempted to incorporate or move toward a partial accommodation of subjective and radical theoretical elements. These are, however, in a minority.

Methodologically, theorists operating within the functionalist paradigm commonly adopt the position of the "rational observer" rather than the "observed." This "observation from a distance" is justified in the appeal to claims of "objectivity" consistent with its realist ontological assumptions. It carries with it the assumption that the process of observation does not affect the processes observed and can be value free. Again, this reflects the classical stance of the natural sciences, although such claims are increasingly regarded as untenable in natural scientific fields. The approach is nomothetic, or aimed at isolating natural laws.

Another theme of functionalist theory is a focus on explaining what is, rather than what could be or will become. This is derivative of a longnoted characteristic of functionalist approaches in general—that theorists concentrate on understanding integrating mechanisms rather than sources and processes of change and contradiction; that is, on what can be controlled rather than on what might be uncontrollable (Merton, 1949, noted in Nagel, 1974). The approach is referential (see Cooper & Burrell, 1988: 102) and thus the locus of integration is externally defined or defined by a meta-position that establishes the "rational purpose" or function.

There are many reasons for the widespread adoption of the functionalist paradigm. Silverman (1970) argues that the popularity of functionalism is at least partly attributable to the fact that it is well suited to the needs of management—defining organizational problems in terms of elements over which management has control. Systems approaches have also gained wide appeal and many of these (but not all, as Burrell and Morgan assumed) fall into this paradigm, as will be discussed below. The claimed objectivity of functionalism also has undoubted attractions, appealing to a positivist stance and providing the basis for a set of supposed value-free assertions about the nature and implications of alternative organizational structures. Human beings typically approach the world as a relatively stable "facticity" independent of our presence, observation, and theorizing. It should be no surprise, then, that managers and organizational practitioners, confronted by practical everyday problems, build their understanding on the assumptions typical of functionalism. These assumptions accord most strongly with how we habitually engage with the world.

Organizations as systems

Scientific endeavor is concerned with more than just the pragmatic value of ideas, however. The concern of science is with the generation of an explanation of why something appears as we observe it. As Checkland notes (1988: 74), the problem of social science in particular has been how to deal with complexity and still contribute to the development of practical technologies. The application of systems theory has been a common approach to tackling this problem.

Systems theoretic approaches to organizations abound. Indeed, it is difficult to find contemporary organization or management theory that is not founded to some degree on systems concepts. This is no surprise, as systems theory held promise of an insightful theoretical basis for understanding social systems—embodying sufficient explanatory power to deal with the complex challenges faced by organizational theorists and practitioners alike. While much systems thinking has entered the social science vernacular, by and large it has fallen short in the area in which it once seemed to offer the most—the ability to explain and understand the complex dynamical behavior of social systems and the origins of organization. Recent extensions, particularly those of complex nonlinear or dissipative systems, are, however, addressing this limitation.

All systems approaches are of course functionalist, in the broadest sense of the term, in that the behavior of the system maintains certain outputs or classes of output constant (Nagel, 1974). In this sense, the system can be regarded as goal directed. It is imperative, however, to distinguish between functionalist argument, which implies externally determined or prescribed purpose (teleology), and tacit or apparent purpose (teleonomy), where the purposefulness or goal-directed behavior is emergent rather than designed in by an external agent (see Checkland, 1988: 74). With biological systems, some understanding exists of the evolutionary processes that give rise to self-producing and self-maintaining organization, which appears to us as observers as apparent goal-seeking behavior.

The field of biology has vigorously rejected attempts to imply teleology or grand (vitalist) purpose in organismic dynamics. In the social sciences, the situation is somewhat more problematic. Social systems can be "purpose designed" by another social actor or by those actors or agents who make up the system. They can also exhibit apparent goal directedness by virtue of self-

organizing properties that are not the result of any conscious purpose or intent by external or internal agents. Unfortunately, these aspects are all too often confused or there is a failure to make the distinction, so it is unclear what is being implied.

Silverman, an advocate of the action frame of reference (which Burrell and Morgan place at the subjectivist end of the functionalist paradigm), adopts many assumptions common of functionalism. He is, however, critical of systems approaches, in particular the common association of "purposefulness" to organizational systems. He notes that it is difficult to avoid reification when using systems concepts—particularly in the attribution of purpose and adaptation to systems. Thus he states:

> *To use the concepts of organisational needs and of a system's self regulating activities in any way other than as a heuristic device is inadmissible since it implies that the power of thought and action may reside in social constructs. (Silverman, 1970: 4)*

This view is supported by Thompson and Weeks, who state:

> *The central criticism of systems theories is that by framing their analyses in terms of organizational tasks or functions, they reify the organization as an entity, with characteristics independent of the social processes through which organizational members construct and construe social reality. (1980: 216)*

Silverman's concern has two aspects: first, he points to a tendency to anthropomorphism, in ascribing human qualities (such as conscious will and purposefulness) to social aggregates; and second, he points to a failure to distinguish between teleology and teleonomy. Silverman presents this as an issue of reification, and (in common with many sociologists) asserts that reification is necessarily a "bad" thing except as a heuristic. For his part, Thompson appears to be questioning the attribution of too great an ontological status to behavior that is emergent, a conclusion implicit in Silverman's concern for reification. Significantly, there is a growing argument that a multilevel ontology is necessary (see, for example, Emmeche *et al.*, 1997) to deal effectively with emergent phenomena. Such phenomena are not as ephemeral as is often assumed by advocates of positivism and cannot be reduced to the micro-processes that give rise to them, but rather, as Holland (1998) notes, may be very stable and may "satisfy macro-laws."

Burrell and Morgan note also that much of systems theory is applied to the search for social morphology and physiology at the expense of development—the processes by which organizations change and new social structures emerge. In other words, systems theorists tend to approach social structures as static and examine how they maintain stability (homeostasis), rather than how they demonstrate self-renewal and how alternative organization is generated. Thus, Burrell and Morgan write:

> *Systems theorists who base their work on mechanical and organismic models are not well equipped to explain situations in which the elaboration and change of basic structure are the essential features of the phenomena under investigation. (1994: 65)*

The authors acknowledge, however, that systems theory and cybernetics are not intrinsically restricted to machine and natural systems analogies, and do offer potential for generating a wider theory of social dynamics, particularly in the area of development. Their reservations about a tendency of systems theorists to ignore the dynamical, self-referential, and regenerative aspects of systems would also seem to be less relevant now, due to the expanding adoption of nonlinear approaches, than it was at the time they wrote their text—but only just.

Conclusion on the functionalist approach to organizations

Functionalism is derivative of a Newtonian natural scientific approach. It embraces a realist ontology and a materialist epistemology. This is reflected in the adoption of the reductionist method, concepts of linear causality, and the search for regulatory mechanisms. Functionalism represents a direct appeal to Newtonian scientific method, embracing the view that phenomena can be isolated for study and understood in atomistic terms.

Functionalism incorporates many systems approaches to organization, but is largely confined to linear systems perspectives. Within the functionalist paradigm, there is a common failure to distinguish between or to confuse tacit "purpose" (teleonomy) and conscious purpose (teleology).

Alternatively (following Silverman), it may be asserted that where purposefulness is implied it can only legitimately suggest teleology (at the micro-level), as to do otherwise is to reify organization. Both advocates and critics of functionalism have difficulty deciding how to deal with emergence. The reductionist and Newtonian underpinnings of the approach argue against attributing any ontological status to emergent properties. While organizational metaphors reflect some diversity, borrowing from machine, biological, and social fields as a source of meaningful comparison, none challenges the assumption of linearity to any significant degree. While some begin to draw in part on nonlinear concepts (principally the brain and organism metaphors

identified by Morgan, 1986), most adopt assumptions of purpose, control, and predictability, including simple cause-effect notions, which are consistent with linear systems approaches. The domination of linear systems assumptions restricts the potential to explain transient dynamics—dynamics that arise contrary to rational expectation or conscious intent—and offers little if any genuine insight into sources of endogenous change, self-organization and/or unanticipated outcomes. Functionalism concentrates on systems of order or homeostasis, and is therefore not well placed to explain change or transformational dynamics within organizations.

THE RADICAL HUMANIST PARADIGM

Radical humanism lies on the subjectivist half of the objective-subjective axis. Like interpretist approaches, it is postmodern in character. Unlike interpretist approaches, however, advocates of radical humanism seek to understand the basis of change or flux in social and organizational processes:

> *whereas the interpretive theorists are content to understand the nature of [the social construction of reality], the radical humanists subject it to critique, focusing on what they regard as the essentially alienated state of man. (Burrell & Morgan, 1994: 279)*

This school of thought has its origins in the philosophy of Kant and Hegel and is, at its roots, idealist. Early Marxian thought shares these roots (see Easton & Guddat, 1967), as does French existentialism (Macquarrie, 1973), anarchistic individualism, and critical theory (Kortian, 1980). It is significant that these philosophies are also essentially political, and advocate broad social change.

Critical theory draws strongly on Marxist philosophy. Principal theorists in this area are Lukács, Gramsci, Marcuse, and Habermas. Lukács was concerned, like the interpretists, with the problem of reification (Lukács, 1968), and in common with the early writing of Marx, with the observation that while reality is socially constructed, the reality once formulated and acted on becomes divorced from the individuals who together created it—it becomes "objectified." Berger and Luckman identify this phenomenon as follows:

> *The habitualisations and typifications undertaken in the common life of [person] A and [person] B, formations that until that point had the quality of ad hoc conceptions of two individuals, now become historical institutions … the institutions are now experienced as possessing a reality of their own, a reality that confronts the individual as an external and coercive fact. (1972: 76)*

According to advocates of this position, "objectification" leads humanity to experience alienation from self and from others and constrains social action. Thus, humanity becomes dominated and controlled by its own structures, by the needs of the economy, technology, and politics, all of which should be there to serve humanity and facilitate collective and individual fulfillment. While critical theory is idealist, it has as a root the Hegelian dialectic (Kortian, 1980). As with the philosophy of Engels and Marx (Engels 1974 [1934]), there is recognition of a dialectic between subjective and objective such that individuals act on society and society acts on individuals. Overcoming alienation was seen to be possible through achieving a synthetic resolution of the tension between the inherent opposites of the subjective experience and the objectified social world. Gramsci (1971) was also concerned with overcoming the apparent duality of the subjective and objective and conceived of a philosophy of praxis. This was concerned with the interpenetration of ideas and experience and the influence one had on the other. Accordingly, as well as being a philosophy, it was also a framework for action.

A central theme in much of the work of the critical theorists is the underlying assumption that there can be no "value freedom," that all theory reflects underlying values and is therefore political, in that it may promote the interests of one group in society over another.

Burrell and Morgan believe that the implication of the radical humanist position is to stand opposed to contemporary organization theory. They propose, therefore, the notion of anti-organization theory. The view here is that as reified constructs, organizations have "a very precarious ontological status." They go on to say of organizations that:

> *At best, they are allowed an existence as inter subjective, reified social constructs, by means of which individuals relate to the world in which they live … The critical theory perspective thus suggests … an antiorganisation theory on a number of counts. It is anti-organisation in that it stresses the importance of the mode of organisation reflecting a particular totality, rather than the importance of organisations as discreet middle-range units of analysis worthy of attention in their own right. It is anti-organisation in the sense that it views the reified social constructs labeled "organisations" as alienating "intermediaries" which serve to mystify human beings in their attempt to comprehend and appreciate the nature of the totality in which they live … It is also anti-organisation theory in the sense that it views functionalist theory as itself serving to mystify our*

Hence, humanist radicals such as Illich (1973) openly call for a "deconstruction" of social institutions. This would enable convivial and nonexploitive relations and remove the duality of manager-worker and, with it, its implicit conflict of interest. The mode of organizing would be concerned with the maximization of human creativity and wellbeing rather than with productive efficiency, and would support action based on value and ethical considerations rather than narrowly defined rational purpose.

Conclusions on the radical humanist paradigm

For radical humanism, emergent social structures, far from being ephemeral or of little substance, take on a dominating form. People behave "as if" these structures, to which they collectively give rise, are in fact outside their control. While, from the perspective of this paradigm, this attribution of concreteness may be undue, the social becomes at least as important as the individual. Through the Hegelian dialectic, the two are seen as reciprocally determinant. The power of ideas features prominently, as it is ideas that constitute the source of dynamics and change within social systems and organizations. By coming to understand their situation, people can undertake to change and transform their social circumstances. Homeostasis operates in the domain of ideas and action, maintaining patterns of ideational structures and habits of being that serve to constrain all social actors. These reified ideational macrostructures take on a dominating role and maintain the interests of sections of society, often over and against the interests of others. In order to achieve change, it is these macro-structures that must be deconstructed.

This implies becoming aware of their reified nature and value bias.

From the perspective of this article, critical theory points to the emergence of social structure as constraining individual behavior and thereby points to social structure (institution forming) as a damping agent of change. People subordinate themselves to structures that they both contributed to bringing about and participate in maintaining. The perspective points both to mechanisms of social physiology in the form of these reified constraining structures and mechanisms, and to those of social development in the form of the social constructionist argument regarding the origins of social order. In seeking the basis for change, advocates identify the origins and basis of social stability and consider it as a target. The attack on existing institutions (physical and ideational), as a trigger for change, is guided by values established by a meta-critique of the prevailing social order and an examination of its implications for members of that society. Both teleonomy (directed dynamics of the reified social structures) and teleology (the capacity for meta-critique to lead to deliberate and conscious social change) are pointed to by this approach. Significantly, teleonomy is seen as leading to stable structures and continuity with radical change, possible only through disruption of the homeostatic dynamics by deliberate conscious action.

Radical humanism can deal with circular causality to some extent (in the form of the dialectic) and does purport to explain the basis for and origins of endogenous change within social structures. There is confusion in this approach, however, as to the basis for, and origins of, the relationship between micro and macro levels and which, if either, has greatest "ontological" claim. While social constructions are seen to be dominating, this is because they are "misperceived." Rationality is not assumed in this paradigm, as is evident by the adoption of concepts such as "false consciousness."

THE RADICAL STRUCTURALIST PARADIGM

This paradigm is fundamentally objectivist and positivist, but concerned also to identify and understand fundamental oppositions or contradictions within society and the dynamics these generate. This theoretical position is characteristically Marxist, in its latter materialist guise, rather than the Hegelian idealism of the earlier period, and of subsequent Marxists such as Lucáks and Gramsci.

From the radical structuralist standpoint … structures are treated as hard and concrete facticities which are relatively persistent and enduring, and

which exist independently of men's consciousness of them. From this point of view organisations are structural facticities, but they represent only part of the wider structural facticity which constitutes the totality. Organisations are therefore structural elements of a wider structure which they reflect and from which they derive their existence and true significance. (Burrell & Morgan, 1994: 368)

The radical structuralist approach focuses on the "substructure" or "base" of society rather than the "superstructure"—seeing economic or productive activity as a fundamental shaper of people's lives and therefore beliefs. From the radical structuralist perspective, the social "superstructure," which includes political and cultural life, is seen as an artifact, which reflects fundamental differences of interest arising from the organization of "material production" (Bottomore & Rubel, 1963; Engels, 1975 [1892]). Social change is seen as inevitable through history, driven by people acting to address the unfolding

contradictions arising from the organization of economic life and resulting inequalities in access to and distribution of resources.

From this perspective, society and organizations are important only in that their structures are an expression of the stage of development of the underlying economic forces. They are the stage on which the contradictions of that period are enacted.

Men make their own history but they do not make it just as they please: they do not make it under circumstances chosen by themselves, but under circumstances directly found, given and transmitted from the past. (Marx, 1978 [1852]: 9)

Marx's own work, while placing great emphasis on the fundamental character and importance of the "base" of society, acknowledged, through the concept of dialectical materialism (Engels, 1974 [1934]), the mutual influence of the socially constructed "superstructure" and the organization of production. The two were seen as influencing and mutually constraining one another. Later theorists who moved Marxism toward a more mechanistic and economic determinist position, however, increasingly left behind this emphasis on the dialectical relationship between "superstructure" and "base." This is clearly evident by the time of Stalin's *Economic Problems of Socialism in the USSR* (1972 [1952]). This later position developed Marx's concept of historical materialism, with its emphasis on necessary stages of development of economic life, at the expense of an articulation of the relationship between material factors of existence and social constructs.

While the sociology of structural determinism is broadly reflective of the position outlined above, not all authors have been so rigidly deterministic. Althusser (1971), for example, was less committed to the overall dominance of economic factors in shaping social reality and change. He also supported the superstructural elements of politics, theory, and ideology. Which of these was causally dominant at any given time would depend on the historical stage of development of social and economic "contradictions." This is consistent with the other approaches of this paradigm, however, in giving no prominence to the role of individuals (Burrell & Morgan, 1994). The development and historical resolution of contradiction was a dynamic that arose inexorably from the social forces at work, individuals were in effect carried along by these forces, and no individual act could stop or control them. From this perspective, if a leader such as Lenin had not existed at the time of the Russian Revolution, history would have brought forth another individual to take up the role. When the times demand it, a leader will emerge to meet the need. The historical situation determines the leader, not the leader the historical situation. This position is, of course, strongly at odds with much contemporary management and organizational theory.

A further common characteristic of this paradigm is that the social transformations, which arise from the structural forces that are in contradiction, are considered to lead to rapid and comprehensive change. That is, the processes of transformation that resolve the contradictions of a given historical period will be sudden and far ranging, leading to major changes in all aspects of social and economic life. It is, perhaps, somewhat ironic that the most recent historical illustrations of the sudden phase transition within social systems predicted by this paradigm have been the string of collapses of socialist states in eastern Europe through the 1980s and early 1990s.

Burrell and Morgan (1994) note that theorists operating from the position of radical structuralism continue to criticize advocates of the functionalist paradigm for having an ideological bias and for ignoring or failing to develop a model for understanding processes of organizational transition. At the same time, little has been done to develop a theory of organizations from the radical structuralist standpoint. This is perhaps unfortunate, as it is arguably the failure of the administrative structures and institutions of modern communist states that have led to the failure of communism as an ideal, and as a sustainable political system. In particular, the democratic centralist state envisaged by Lenin (1970 [1920]) has not delivered, and from the perspective of contemporary administrative theory was never going to deliver, what was expected of it. It would never provide a democratic, responsive system of government (Held, 1990) that eventually would "wither away" (Lenin, 1976 [1917]).

Conclusions on the radical structuralist paradigm

Radical structuralism asserts causality from concrete social relations to ideas. In other words, the experience of individuals and the way they come to view and act in the world is primarily determined by dominating "objective" structures such as the relations of production. From this arises the tension that may constitute the endogenous source of transformation. Such transformation is seen as historically inevitable and beyond the conscious will of individuals. This position is distinctive, therefore, in implying the dominance of teleonomy (tacit goal directedness of social institutions, in this case directed at the resolution of internal contradiction) and downplaying the role of conscious intent. In addition, the approach conceives of the possibility of major phase changes, points of rapid transition between one social form and another, as a consequence of the normal teleonomic operation of the social system.

The paradigm again both embraces social physiology and, through conceiving of new social forms emerging from the "ashes of the old," also addresses bases of social development. The transformations are the result of aggregative processes, the coming together of people with similar "objective" interests against those with opposing "objective" interests. Ideas (ideology) play an intermediate role, but help explain the historical phase changes by temporarily restricting action while "false consciousness" of interests prevails. Once people "correctly perceive" their situation, they pursue social change. It is significant that the materialist and deterministic ideas that characterize this approach led to the formation of centralist states, command economies, and

steeply hierarchical and centralized political institutions (Held, 1990), reflecting a deeply Newtonian, linear conception of the world.

THE INTERPRETIVE PARADIGM

Burrell and Morgan's interpretive paradigm is associated with the subjectivist, regulatory dimensions. This approach carries the assumption that social action is predicated on socially constructed meaning and that social science needs to be concerned with "interpretation" of or coming to understand "the subjective meanings of social action" (1994: 230).

At the extremes, interpretive theories run up against the problem of solipsism, i.e., denying the existence of all but the "self." Most of the social theory within the paradigm, therefore, attempts a balance of the subjective and objective positions. At the same time, attempts are made to maintain the stance that the social world and all social phenomena are socially constructed and maintained, and can therefore only be understood by coming to know the meaning attributed by those who constitute and integrate that particular social reality. Major schools of thought within this paradigm include phenomenology, ethnomethodology, and symbolic interactionism. It includes also the school of constructivism, particularly radical constructivism.

It is a characteristic of the approach to organizations inherent in this paradigm that organizations, as such, are not considered to exist as concrete and independent "things."

> *the social world is essentially processual and emerges from the intentional acts of human beings acting individually or in concert with one another. The social reality "created" in the course of this process consists of little more than images of reality which can be understood in terms of a network of typifications. (Burrell & Morgan, 1994: 273)*

Advocates of this approach regard functionalist conceptions of organizations as reified, they are social constructs imbued with an undue ontological facticity:

> *concepts of organisational structure, job satisfaction, organisational climate, etc., are all reifications which are often confused with social reality. (Burrell & Morgan, 1994: 274)*

They assert, for example, that the idea of formal organizational structure is problematic. The existence of rules defining roles is not what is important, but rather the interpretation of these by the individuals who constitute the "organization."

Alfred Schutz has been a significant contributor to the development of interpretive approaches. He introduced the notion that meaning arises through reflexivity (see Thomason, 1982). For Schutz, reality and daily life are a sequence of lived experiences that in themselves carry no intrinsic meaning. The social actors attribute meaning through the process of reflexivity. The process of interpreting the experience of others is one of the "observer" generating "typifications" or generalized constructs from a stock of common-sense understandings. These typifications are social stocks of constructs, generated and maintained by the broader social context within which the observer is grounded. The world of everyday life comprises different domains of meaning or "multiple realities." From this perspective, the world of work and the world of family, for example, constitute different realities and therefore a different province of meaning. Hence, the approach of all of the interpretive theorists is to understand the meaning attributed to experience from the perspective of the individual actor, to enter their world. Burrell and Morgan note that these approaches have in common also "a perspective in which individual actors negotiate, regulate and live their lives within the context of the status quo" (1994: 255).

The most recent development of organization theory within the interpretive paradigm has been with the application of the theory of autopoiesis to social systems. Autopoietic social theory is not necessarily confined to the interpretive paradigm, however; its origins as a biological explanation of living systems gives rise to a relativist, if not a fully subjectivist, epistemology (Maturana, 1987, 1988). The focus on selforganization and regulation also places it within the regulatory category (Goldspink, 1999).

Conclusions on the interpretive paradigm

In this paradigm, purposefulness arises at the level of the individual and is ultimately self-referred. Society has no concrete existence, but is emergent from the intersection of individuals. As goal directedness is ultimately self-referred, the apparent dynamic of social aggregates is teleonomic, although it may be interpreted as other than this by some or all social actors. Contrary to the radical humanist position, the absence of a tangible external referent deprives interpretists of a source of intrinsic tension and hence a basis for endogenous transformation. The world, from the interpretist perspective, tends to self-regulate, to maintain a status quo. The approach provides no basis for explaining radical change.

For advocates of interpretism, all social structure is ephemeral, cocreated, and shared, arising through collective meaning creation. Meaning is attributed to experience by the reflexive action of those who engage in the experience. Ultimately, then,

social reality collapses back on to the individual, the only agent with some ontological status.

NONLINEAR APPROACHES TO ORGANIZATION RESEARCH

As evidence of the growing interest in the applicability of complexity to organizations and business, the March/April 1998 edition of the journal *Complexity* focused primarily on business applications. A special edition of *Organization Science* (1998, Vol. 5, No. 3) has also focused on the potential of this emerging field of research to influence organization science generally. More recently this journal, *Emergence*, has arrived, dedicated to exploration of the applicability of complexity to organizations.

Despite the potentially significant implications of complexity for the way in which organizations are seen to arise and self-maintain, relatively little substantive research has been directed toward this area. Advances in the field have tended to come from the more narrowly focused experimental work of simulation research. Here, some general attention is given to agent-based approaches, and approaches inspired by autopoiesis theory and those drawing on dissipative systems.

AGENT-BASED APPROACHES

An approach to modeling organizations (and social systems generally) that is attracting growing interest is that of multi-agent simulation (Conte *et al.*, 1997; Prietula *et al.*, 1998; Epstein & Axtell, 1996; Parunak, 1997; Carley *et al.*, 1998). Approaching organizations as systems comprising large numbers of agents has the perspective that "organizations are complex, dynamic, nonlinear adaptive and evolving systems" (Prietula *et al.*, 1998) and therefore provides an ideal basis for coming to terms with the implications of nonlinearity in organizations.

From the point of view of organizational theory, however, multi-agent approaches are more a methodology than a theory. As such, agent-based techniques lend themselves to theory building and testing, facilitating experimentation with a wide range of different (and competing) theoretical assumptions. The approach has, however, begun to influence ways of thinking about organizations and processes of organization. It has given rise to an area of study known as computational organization theory, "the study of organizations as computational entities" (Prietula *et al.*, 1998: xiii). This is described as a "meso-level" theory of organization, as it is argued that it falls between the macro approach of organization theory and the micro perspective of organizational behavior approaches. As such advocates seek to "explain and predict macro-level behavior, such as overall organizational performance, from micro-level actions" (Prietula *et al.*, 1998: xiv).

Modeling organizations using computer-based multi-agent simulations derives from artificial intelligence (Gilbert, 1995), in particular distributed artificial intelligence (DAI). Applied to social science, artificial "agents" are designed to embody the individual actor assumptions characteristic of a chosen theory, and simulation is then used to see if the macro-level behaviors advanced by that theory could indeed be derived from such actors. This is by no means restricted to or even dominated by models informed by complex systems theory. There is, however, a natural affinity between complexity and agent-based modeling.

Computer-based modeling allows for controlled experimentation in a way not feasible in real environments. Computers can, for example, be made to simulate the effect of changing parameters within a systems parameter space, one at a time, in pairs, or any other combination, and the response of the system mapped to provide a broad knowledge of the systems response to such changes. In the field, no such control over parameters would be feasible, nor is it commonly feasible to change one real-world parameter completely independently of others. The degree to which the results of such experimentation may lead to valuable insights into the real world, however, is dependent on the validity of the model.

ORGANIZATIONS AS "COMMUNICATIVE ACTION"—AUTOPOIETIC APPROACHES

The concept of autopoiesis has attracted considerable attention among social and organizational theorists (Bednarz, 1988; Hejl, 1984; Jantsch, 1981; Luhmann, 1990; Mingers, 1995; Zeleny & Hufford, 1991). There are many parallels between complexity and autopoietic theory, with autopoietic systems arguably qualifying as dissipative systems. Some have attempted to build on concepts of social autopoiesis and to establish a science of organizations as autopoietic. In his *Metaphors of Organization*, for example, Morgan (1986) proposed several metaphors as alternatives to contemporary dominant views. One of these borrowed from the theory of autopoiesis.

Griffin *et al.* (1998) have noted that most approaches to organization, even some derivative of complex systems perspectives, reflect a logic of "change by design, intention and control." This implies that the theorist or manager can place themselves outside of the "object" of study and come to know it objectively. Autopoiesis, by contrast, urges adoption of an enactive or social constructivist perspective (Varela *et al.*, 1992). Here, we are compelled to view organizations as emerging from the coordination of behavior and linguistic exchange of all who mutually participate in some domain of action, including any observer.

Jantch (1981) in his paper titled "Autopoiesis: a central aspect of dissipative self-organization," demonstrated an early awareness that the potential marriage between autopoiesis theory and the theory of selforganization derivative of nonlinear

systems approaches remained to be consummated. That concern arguably still holds. At the time, he specifically noted that autopoietic systems must be seen as a subset of dissipative systems, and that the assumption of conservatism implicit in the earlier formulations was therefore misplaced. As Griffin *et al.* (1998) have shown, much of complexity theory still comes primarily from a modernist world view. Autopoiesis, due largely to its epistemological implications, appeals to advocates of postmodernism. It should be no surprise, then, that attempts to unite these two approaches confront many of the classical dilemmas and points of difference with which organizational theorists already find themselves enmeshed.

Roos and von Krogh (1995) and Lissack and Roos (1997) have set out a theory of organization as emergent from individual action and maintained through coherent linguistic interaction. This is consistent with Luhmann's (1990) concept of the social as communicative action and aligns with the practice described by Griffin *et al.* (1998), which is derivative of social constructionism. The work of Roos and von Krogh (1995) belongs very much with the interpretist paradigm, an essentially postmodern approach. It represents a further exploration of the relevance and applicability of autopoiesis for organizations. Lissack and Roos state:

> *Organizations must not only act but their understanding of those actions—their sensemaking—must be coherent if identity is to be preserved. (1997: 5)*

Note that Lissack and Roos attribute "sensibility" to higher-order emergent structures. This is because, from their perspective, units of sensemaking are organized recursively. Sensemaking occurs at distinct levels, at the level of individuals, workgroups, and organization. Sensemaking implies both acting and construing the act—it recursively links doing and knowing—implying thereby an enactive philosophy (Varela *et al.*, 1992). This sensemaking occurs in language and if "organizations are systems of language," as is proposed, then words become important. Lissack and Roos state, "We suggest that word choices are both the delimits and expanders of possibility space within organizations" (Lissack & Roos, 1997: 8). Thus, from this perspective it is the unfolding of language that places the organization within an overall space of possibilities. As the linguistic dimensions change, so too do the space and the position of the organization within it. The proliferation and open-ended nature of meaning creation continually expand the space of possibilities. At the same time, the development of coherence and convergence of meaning serve to stabilize and give form to the location in that space. In the words of Lissack and Roos again, "Emergence demands coherence if the growth of possibility space is not to be received/perceived as destabilizing" (1997: 14).

The emphasis placed on language in this approach contrasts with that placed by Maturana (1988) on emotioning. The role of emotions is more directly dealt with in the approach described by Griffin *et al.*, even though these authors make no explicit appeal to autopoiesis, drawing instead on social constructionism and the practices of depth psychology. They state, for example:

> *when human agents in the network that is a group relate with each other in language and in feelings, a matrix, an evolving relational pattern of meaning and feeling, emerges and this is the reality into which human agents act and in so doing change themselves and their context. (1998: 331)*

Autopoiesis theory posits social structures as emergent self-producing linguistic structures. Such an approach may be argued to be distinct from, or a part of, broader complex systems perspectives (Goldspink, 1999).

QUASI-NATURAL ORGANIZATION SCIENCE

In contrast to the postmodernist appeal of organizational theories derivative of autopoiesis, McKelvey sets out an approach that is influenced by complex systems thinking and is more modernist in character. Responding directly to the perceived dominance of linear approaches and drawing on a range of theoretical approaches from sciences that have progressed beyond Newtonian models, McKelvey (1997) argues for what he calls a "quasi-natural organization theory." He argues that such an approach has the potential to collapse many of the current and competing paradigms within organizational science. He posits that organizational behavior is the result of an intersection between natural (developmental and chance) phenomena and the intentional behavior of individuals.

McKelvey expresses concern about what he calls the postpositivist strands to organization theory—these are the subjectivist approaches, in particular those falling in Burrell and Morgan's interpretive paradigm— criticizing them in particular for a lack of testability. This he sees as leading to the proliferation of paradigms, making elimination of alternatives impossible due to the inability to falsify competing claims. McKelvey advocates, first, that organization science recognize that organizations comprise both natural and intentional phenomena; and, second, that the "transition phenomena" marking the interplay between these aspects should become a focus. He argues this because, in his view, "This is where most of the interesting choices and problematic errors are made and where many managerial difficulties may lie" (1997: 6).

McKelvey asserts that most contemporary approaches to organizational research adopt a realist epistemology. The tendency by an increasing number to adopt "postpositivist" approaches is due to the obvious and significant influence of "idiosyncrasies" in organizations. By this he means the random events that continually occur, are distinctive to a particular situation, and unlikely ever to be repeated. Such events can and do have a significant impact on the dynamics of an organization. This is due to path

dependence and sensitivity to initial conditions. McKelvey proposes several approaches that would allow the application of realist approaches of incremental refutation, and hence retain some claims to scientific validity of derivative theories. The approaches are:

- idealized models

- translation into rates

- direct analysis.

Idealized models imply "ignoring or assuming away" idiosyncratic microstates. McKelvey points out that all through the development of natural science, this approach has led to useful models, which, even if subsequently refuted in the detail, proved advantageous and of pragmatic utility. He argues that the relationship between contingency and law-bound behavior has been increasingly recognized as a critical developmental factor, particularly in biology, and is the focus of much developmental work in the science of complexity. Complexity helps us to identify under what conditions a "law" will control dynamics and when contingency may enter the picture. The interpretists and associated methodologies, McKelvey suggests, focus on increasing levels of detail, attempting to come to terms with complexity by understanding the contingent details. By contrast, he suggests that there is a need for organization theorists to identify means for "distancing themselves" from detail. It should be noted that this is a contentious issue, even for those working with complex systems. The challenge is in deciding what detail can safely be put aside.

The "translation into rates" approach involves identifying important rates or change vectors within an organization. McKelvey gives examples including rate of convergence on "best practice," rate of return on products, etc. These rates will be influenced by both deliberate action and contingency. The establishment of such rates provides a basis for comparing an organization's performance over time, or for comparing different organizations in very different situations. Collapsing performance on to such rates ignores the deliberate, idiosyncratic, and contingent microstates that contribute to the performance: "It recognizes that predicting individual events in organizations is seldom possible—predicting probabilistic distributions of events and event rates is much more realistic" (1997: 19).

The final approach, direct analysis, adopts a complex systems approach directly. McKelvey provides several examples from the literature, which can be reinterpreted in complex systems terms. He notes that one of the conclusions that can be drawn is that overall organizational change can be achieved by reducing (undesirable) attractors, rather than increasing desirable ones, as this allows self-organization to move the organization to a desired attractor. Too many possibilities, too much innovation, too many communication links, etc. may lead to chaos. While showing how complexity may be used to interpret organizational events and hinting at its potential value and some of the implications, McKelvey falls short in suggesting methods that may be used in practice.

DISEQUILIBRIUM MODELS OR "DISSIPATIVE SYSTEMS"

A number of authors have drawn on the work of Prigogine and Stengers (1985) as inspiration to reconceptualize aspects of organization. Such theory is directed at better understanding processes of change and transformation in organisations. Much of this predates the most recent work inspired by the broad popularization of chaos and complexity. Maruyama noted the potential importance of "dissipative systems" approaches for the social sciences as early as 1978, observing, "It will take a few more decades for the main body of the scientific community to recognize that an epistemological change is in progress" (1978: 453).

Maruyama differentiates systems logic prior to dissipative systems approaches into three categories: mechanistic and hierarchical; closed equilibrium; and homeostatic. Commenting on the latter, she describes it as including:

reciprocal causal processes, but only in the sense of negative feedback loops which counteract change from a given pattern. This is the universe of homeostatic systems, in which the pattern of heterogeneous elements is arrived at regardless of the initial conditions and is maintained by reciprocal interaction. It converges to a fixed heterogeneous pattern. (1987: 454)

Note that this accords strongly with dominant conceptions of autopoiesis, including that of Maturana. By contrast, Maruyama describes the logic of the dissipative systems approach as:

heterogenistic and non-hierarchical. Reciprocal causal processes can generate differentiation, heterogeneity and interaction patterns among heterogeneous elements, raise the level of sophistication of the system and increase the amount of information. (1978: 454)

These are not so much homeostatic as able to increase order by selforganization and to increase complexity and dimensions of interaction.

Authors who have applied this thinking to organization science include Gemmill and Smith (1985), Goldstein (1989), and Leifer (1989). Recognizing that equilibrium models, while useful for understanding incremental development, are of little value for understanding processes of transformation, Gemmill and Smith advocate a dissipative systems approach because "it appears especially relevant to many organisations that do face turbulent or highly uncertain environmental and internal conditions" (1985: 753). These conditions serve to "push" the organization away from the "limited" parameters that allow for equilibrium.

The change dynamic that Gemmill and Smith argue flows from the application of the logic of dissipative systems echoes Lewin's (1947) unfreeze-transform-freeze cycle. For Gemmill and Smith, the process involves the system first becoming unstable, i.e., entering disequilibrium. This may occur as a result of external or internal "forces." The authors reflect an awareness that the amount of "force" necessary will vary depending on the state of critical parameters and the history of the system. They note also that the system may have the tendency to selfcorrect, to return to "equilibrium." Assuming that the disequilibrium persists, the system will next "break symmetry." The authors discuss this symmetry breaking in a way that clearly points to bifurcation and a temporary chaotic state, one that presents many possible options for restabilization. They label this the "experimentation" stage. Finally, the system will "select" a new configuration and "reformulate."

Gemmill and Smith argue that this conception of organization links to existing ideas about organizational change, mentioning specifically Weick's emphasis on the importance of "play" (experimentation), described as "patterned voluntary elaboration or complication of process where the pattern is not under the control of goals" (Gemmill & Smith, 1985: 760). They suggest that the discontinuous change is reflective of Argyris's double-loop learning, noting in particular that Argyris conceives of this transition arising from an internal dialectic, i.e., as endogenous. They conclude with a set of propositions for future examination. The last of these warrants specific mention because it factors in that element not present in natural dissipative systems: reflexivity. Gemmill and Smith propose that awareness of the dissipative process increases the chances of the organization creatively reconstructing itself rather than deteriorating into "entropy."

Simply having this understanding could add inherent stability to an organization, not in the sense of providing a complete map of exactly where the process is going, but at least offering a context within which the inevitable frustrations and inconsistencies of such a process can be viewed. (Gemmill & Smith, 1985: 763)

Leifer (1989), while drawing on the work of Gemmill and Smith and also advocating a dissipative systems view, places greater emphasis on exogenous change as the source of disorder. As environmental demands mount, organizations respond in order to maintain "requisite variety" (Beer, 1985) by becoming more complex. Leifer argues that from the perspective of the equilibrium paradigm, this increase in complexity makes control possible, but by increasing the number of degrees of freedom, it also increases the possibility of organizational failure. From a dissipative systems perspective, by contrast, the possibility exists of moving to a higher level of organization. He sees the transformation stage as involving a reconceptualization rather than reorganization, placing an emphasis on cognitive rather than organizational principles. The "resynthesis" stage reflects this also. Leifer states, "once the transformation has caught on, deterministic processes then take over to produce macroscopic order" (1989: 911).

Note that there is a considerable intermixing of where conscious and natural/tacit directedness is being invoked in this work. Leifer points to analogous processes between natural and organizational systems, but struggles to develop the analogy in the context of purposeful/reflexive institutions, leaving the reader to guess at the mechanisms and processes being implied.

Goldstein (1989) presents a case for viewing organizations as both autopoietic and "dissipative" in order better to understand the existence of "resistance to change" within organizations. Goldstein notes that conventional response by management to resistance to change on the part of employees is to push back harder by mandate, coercion, etc. Maturana and Varela's (1980, 1988) thesis of autopoiesis, taken here as implying constitutional conservatism as per their original conception (1980), is used to explain how organizations can become self-referential and focus only on sustaining identity in opposition to external stimulus. Goldstein is clearly suggesting that organizations are autopoietic, but does not seek to justify this stance . He uses his appeal to autopoietic organization to argue that while resistance to change may appear "willful," it is in fact a consequence of the operation of the system.

Again, we see an intermixing and confusion of conscious and nonconscious organization. Contrary to Jantch's (1981) argument that autopoietic and dissipative systems concepts should be reconcilable, Goldstein sets them as opposites or alternatives. For him, the undesirable "autopoietic resistance" can be overcome by creating far from equilibrium conditions in an organization (1989: 22). This may be achieved not by "pushing back" from outside, which simply triggers more compensatory behavior, but

by inducing "the system itself to generate more information about itself" (1989: 23). The technique proposed is that of asking "difference questions"; that is, by encouraging internal reflection and reconceptualization, reflecting in particular on how things are kept the same. What is being suggested is the need to disrupt the convergence, the sense of homogeneity that occurs in social systems. Amplification of difference and encouraging diversity of perspectives generates greater dynamic and raises alternative possibilities. While Goldstein does not make the connection, this is reminiscent of Argyris's (1986, 1990) approach to challenging "organizational defensive routines."

Kelly and Allison (1998) argue for a similar approach, but point to the importance of managing emotional and ideational structures for this to work. Without trust and common understanding, creating difference may lead an organization to self-organize in directions inconsistent with the interests of owners and participants. While using self-organization (teleonomy), conscious intent cannot be ignored, lest the organization organize itself in undesirable ways.

CONCLUSION

Theories of organization are diverse and are founded on a number of mutually exclusive ontological and epistemological positions. The dominant paradigm is that which Burrell and Morgan refer to as functionalist. Drawing on a basic systems theory, these approaches focus on damping or regulatory processes (negative feedback) and fail adequately to explain discontinuities in system operation. These assumptions are overwhelmingly those of linearity and of teleology, and the epistemological underpinnings are predominantly cognitivist, embracing a representationalist view of knowledge. The modernist/postmodernist debate is alive in organization theory and has influenced most schools, including those researchers drawing on complexity theory. The dominant schools that most affect day-to-day institution forming and management are quintessentially modernist.

Systems approaches have found wide appeal in many areas of social science. As Burrell and Morgan note, these have most commonly led to conceptions of organization that have failed to distinguish clearly between teleology and teleonomy in system dynamics. Most theories within this paradigm assume teleology as dominant. While systems approaches clearly identify emergence as a characteristic of system operation, evidence suggests that many common approaches fail adequately to come to terms with the emergence of higher-order structure, either theoretically or methodologically. In other words, the relationship between macro and micro levels of structure remains problematic in most contemporary organization theory.

The approaches adopted within functionalism are of limited value in assisting with the development of a dynamical understanding of organizations and processes of change, including the basis of the origins and lifecycles of social institutions. They fail to identify how structure can emerge from lower-order processes and how radical transitions can occur as a part of system operation at the same or higher levels. The same is arguably true for approaches that draw on autopoiesis and focus on the constitutionally conservative elements of that theory.

Alternative theories to functionalism adopt a macro-perspective that limits their value for "managerial" purposes and tends to confine them to explanations of broader social and political phenomena. They do, however, provide a better framework for understanding developmental processes and deal more explicitly with micro-macro transitions. While recent developments in management theory, in particular due to the influence of postmodern approaches, have led to theories of a more nominalist persuasion, the field remains essentially divided, with no theoretical stance proving informative and applicable across the range of social issues that organization theory could and should in principle inform.

Applications of complexity to organization science are relatively limited. Those that do exist struggle to break free from the modernist/postmodernist dichotomy and/or to break free of limited metaphorical exploitation of complexity concepts. The approaches do, however, suggest ways in which organization theory can be advanced to better come to terms with endogenous change and dynamical self-organizing properties of organization. Importantly, many of the insights tend to run counter to more traditional managerial approaches. They advocate encouragement of heterogeneity—difference and disorder, rather than homogeneity— control and order.

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