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**LOCATING MEANING IN
ORGANIZATIONAL LEARNING: THE
NARRATIVE BASIS OF COGNITION**

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RAMKRISHNAN V. TENKASI
University of Southern California

RICHARD J. BOLAND JR.
Case Western Reserve University

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**LOCATING MEANING MAKING IN ORGANIZATIONAL LEARNING:
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Ramkrishnan V. Tenkasi
and
Richard J. Boland, Jr.

ABSTRACT

We call for a fundamental reorientation of our understanding of human cognition and its relation to organizational learning, a turn that sees the basic organizing principle of cognition as essentially narrative and not schematic or representational. A schema-based image of cognition has guided research in the organizational learning and change literature and is inherently limiting in addressing issues of change. We trace this limitation to the structuralist lineage of the widely used computer information processing model of the mind. We argue that this model fails as a theory of action because of its emphasis on invisible underlying structures, at the expense of actors' own descriptions of social life. Giddens' theory of structuration allows us to recognize the virtual nature of social and organizational structures; they exist only as constituted in the social practices and narratives of human actors. It is in narratives that we find cognitive structures and schemas being produced and reproduced. As our narratives change, structures change. Narratives are the generative process in cognition. What frames or schemas we do have are constructed through the primary cognitive activity of narrativizing our experiences. Implications of studying narrative forms and practices for understanding organizational learning and change are discussed.

INTRODUCTION

The 'cognitive turn' in psychology heralded a much desired relief from the tenets of behaviorism which had dominated the field for over half a century (Dennett, 1978; Gardner, 1985; Bruner, 1990; Varela, Thompson and Rosch, 1991). Behaviorism, with its emphasis on stimulus-response and its focus on observable behavior, biological drives and their transformations was inadequate to explain human behavior in meaningful ways. The cognitive turn was conceived as a way of bringing in the concepts of 'mind', 'intentionality' and 'meaning making' into the realm of human activities. As succinctly stated by Bruner (1990: pg. 2) "Its aim was to discover and describe formally the meanings that human beings created out of their encounters with the world, and then to propose hypotheses about what meaning-making processes were implicated". Further, per Bruner, the aim of the cognitive turn was not one of reforming behaviorism but in fact replacing it.

Though not until much later, the organizational sciences, also drew upon the cognitive framework to examine various organizational and institutional processes (for a general review see Sims and Gioia, 1986). A marked influence of this paradigm was on explaining processes of organizational learning and sense making, especially as it related to domains such as strategy formulation and organizational change (Starbuck and Hedberg, 1977; Starbuck, 1983; Starbuck and Milliken, 1988; Stubbart, 1989; Barr, Stimpert and Huff, 1992; Huff, 1990; Sims and Gioia, 1986; Fiol and Lyles, 1985; Weick, 1990; Gersick and Hackman, 1990; Cohen, 1991; Lyles and Schwenk, 1992; Bartunek and Moch, 1987; Louis and Sutton, 1991).

Drawing mainly from developments in cognitive psychology and artificial intelligence, concepts such as frames and scripts (Schank and Abelson, 1975) schemas (Bartlett, 1932; Taylor and Crocker, 1981), routines (Weiss and Ilgen, 1985; Gersick and Hackmann, 1990), cognitive and cause maps (Axelrod, 1976; Weick and Bougon, 1986; Bougon, Weick and Binkhorst, 1977; Boland, Tenkasi and Te'eni, forthcoming; Eden,

1992), and interpretive schemes (Ranson, Hinings and Greenwood, 1980; Bartunek, 1984) were invoked to understand the sense making and interpretive processes of organizational members. The objective was to understand how their experience was made meaningful by them, including their perceptions of their environments both internal and external, their learning and unlearning, change and resistance to change, and appropriate and inappropriate actions in the face of altered environmental conditions.

While the cognitive focus has added to our understanding of organizations in many ways, the predominant metaphor which has guided a major portion of our inquiry has been the "computer model of the mind" (Stubbart, 1989)- a metaphor which also underlies cognitive science as a whole. "The center or core of cognitive science is generally known as cognitivism. The central tool and guiding metaphor of cognitivism is the digital computer" (Varela, et al., 1991; pg. 7). It is our contention that while the computer model is an 'intriguing metaphor of the mind' (Stubbart, 1989: p. 330) in some ways, it is also limiting in other ways.

First, it confuses 'information processing' with 'meaning making' which are two different activities altogether.

Second, it overlooks and reifies the fluid, shifting, and often contradictory nature of human understanding to a fixed and static image (Varela, et.al, 1991).

Third, and most importantly, the 'computer model of the mind' is ill-equipped to explain the dynamics of conceptual change in human beings and organizations, either from an interventional standpoint or from an evolutionary perspective. This we suggest is based on the inherent limitation of the computer as mind metaphor. In the case of a computer, data is made to fit precisely into a format that is already given. Whenever a computer runs into inputs that do not fit its pre-given rules of format, the problem is solved for it by human agents who surface and modify the internal program appropriately. The question is, who solves the problem of an appropriate representation or program for human beings?

Even a cursory review of the literature on organizational learning and change will

show that the concept is characterized by the notion of an internal representation. The linkages to the computer metaphor are evident; organizational change is an outcome of changed mental representations or programs. However, while it is easy to surface the internal program of a computer the same does not hold true for humans. Questions such as, where these representations are to be found, and how to meaningfully uncover and modify them remain elusive issues and are thus left untackled.

We believe that the problems of explaining change are inherent in the computer model of the mind which in turn draws its inspiration from a structural-functionalist foundation. This tradition is based on the central idea of invisible underlying ordered patterns with rules for generating fixed responses from these patterns' (Giddens, 1979) or a deep structure which reflects basic operations and reveals the mechanisms of signification that lie beneath the conscious activity of the human subject (Levi-Strauss, 1966 cited in Giddens, 1979). Thus 'representation' as a reified underlying pattern becomes a thing to be unearthed and changed in this structuralist tradition.

In contrast to this abstracted, disembodied view of human understanding, we adopt a structurational view (Giddens, 1979) and propose that the locus of meaning making as well as changes in meaning structures is found in the stream of organizational action. It is in action that we produce and reproduce the systems of signification, domination, and legitimation that define our organizational structures and our culture at large (Giddens, 1979). Further, such meaning making processes are embodied in 'narrative structures' which constitute the essential form of organizational action. In sum, as an alternative to the prevailing representational focus, we identify the making of 'narratives' by organizational actors as the site for understanding processes of sense making, learning, and change in organizations.

The rest of the paper proceeds in the following direction; we will review the foundations and premises of the computer model of the mind; point out the parallels in the burgeoning organizational learning and change literature to this computer metaphor; discuss

the inherent limitations of this metaphor derived from the structuralist tradition in addressing the processes of human meaning making; explain structurational theory and elaborate on the centrality of narratives in human cognition and in human meaning making, and conclude by discussing the implications of 'narrative forms' for organizational learning and change.

The Computer Model of the Mind

Cognitive science is a loose affiliation of many disciplines, the most important of which is artificial intelligence, thus making the computer model of the mind a dominant aspect of the whole field (Varela, et.al, 1991; Bruner, 1990; Gardner, 1985; Stubbart, 1989). The central dictum of this school, commonly termed cognitivism, is that intelligence - human intelligence included - so resembles computation in its essential characteristics that cognition can actually be defined as computations based on symbolic representations.

What exactly does it mean when we say that cognition can be defined as computation? A computation is an operation that is carried out or performed on symbols, that is, on elements that represent what they stand for. For example the computer is a physical device designed in such a way that a particular set of its physical changes can be interpreted as computations on a certain set of symbols. Similarly the human mind and cognition is thought to be a manipulation of symbols after the fashion of digital computers. That is, the mind is thought to operate by manipulating symbols representing features of the world. Further, under this metaphor the mind stands to the brain as the computer program stands to the computer (Stubbart, 1989). Just as changes in the physical, numeric operations of the computer are made possible through its programs, changes in behavioral states result from 'effective procedures', a specific set of instructions (or representations) which define a succession of mental states (Boden, 1988).

In its essence, cognitive science emphasizes the conjecture that intelligence in

humans or machines is equivalent to a computer program and is thus computational (Pylyshyn, 1986; Turing, 1950). Moreover, any useful cognitive theory should be able to be expressed as a computer program (Johnson-Laird, 1988; Simon, 1981). The key notion is one of representation, whether representation by the mind or the representation as embodied in a computer program (Stubbart, 1989). The argument is that intelligent behavior presupposes the ability to represent the world in certain ways. One therefore cannot explain cognitive behavior unless we assume that an agent acts by representing relevant features of his/her situations. To the extent that the representation of a situation is accurate, the agent's behavior will be successful or, alternately, to the extent the program in the computer as realized in symbolic code is accurate, it will result in a successful solution of the problem given to the system.

In other words, the nature of cognition and mind are entirely due to particular states or structures of the cognitive system, be they frames, schemas, scripts or routines. Then to every form of behavior and experience we can ascribe specific brain structures or representations (just as we can ascribe for particular operations specific computer programs) and conversely changes in the brain structure or representations manifest themselves in behavioral and experiential alterations, sometimes required for successful adaptive behavior. The cognitivist research agenda then is one of correlating ascribed representational states of the world with the physical changes an agent undergoes in acting, that is, how these representational states manifest themselves in particular forms of behavior, and how changing these internal representations can result in more adaptive behaviors (Varela, et al. 1991).

While the cognitivist hypothesis has its most literal proponents in artificial intelligence, its influence sphere ranges from psychology to neurobiology to psychoanalysis (Varela, et.al., 1991). For example, in neurobiology this doctrine is expressed in Barlow's (1972) "grandmother cell principle", where there is an assumed correspondence between specific concepts, such as the image one has of his or her grandmother, and specific

neurons.

Likewise in psychoanalysis, Erdelyi's (1985) interpretation of Freud's notion of repression/censorship provides an interesting case in point. According to this approach each individual carries a mental representation of acceptable accounts of anxiety. Repression or censorship thereby becomes a matching of information from a perception, idea, or event to this criterion level of acceptable amounts of anxiety; if it is above the criterion it goes to a stop processing/accessing information box, from where it is pushed back into the unconscious. If it is below the criterion, then it is allowed into the preconscious, and perhaps into the conscious, and after another criterion match in the decision tree, it is either allowed into behavior or suppressed.

Organizational Learning and the Computer Metaphor

The cognitivist charter has been well rendered in the organizational learning and change writings too. A considerable portion of this burgeoning literature rests on an assumptive domain of 'computation based on representations' as the foundation for organizational learning, sense making, and change. Further, the language of description of these processes is replete with computer imagery. A selective review will illustrate the point.

An early example of this orientation comes from some of the writings of Starbuck and colleagues. Starbuck and Hedberg (1977) in their explanation of organizational decline argue that organizations develop heuristic programs for dealing with recurring problems. Managers' strategic actions are programmed responses to an environmental fiat (Stubbart, 1989). However, as these 'programs' become entrenched, organizations tend to see situations as equivalent if the same program initially appears to fit. The result is that organizations come to focus only on very salient features of the environment which suggest the use of established programs and "programs remain in use after the situation they fit has faded away" (p. 250). Whetten (1980) similarly notes that organizations which habitually

use programs based on their previous utility tend to become desensitized to environmental changes and "organizations that were the most successful in the past tend to become most vulnerable to failure in the future" (pg. 355).

The alternative then is to develop new programs or representations or have multiple programs which can be invoked when appropriate. According to Simon (1991) the primary task for researchers on organizational learning is to understand how people acquire new problem representations for dealing with new problems. New problems need new problem representations because existing problem solving procedures are based on selective searches through a problem space defined by a particular problem representation. Changes in problem representations implies fundamental change in organizational knowledge and skills.

Organizational renewal requires that managers' mental models keep pace with changes in their environments. Mental representations that can no longer accommodate or explain occurrences in the environment must be altered and new understandings of the environment must be developed for effective organizational adaptation. (Barr, et al., 1992).

Lyles and Schwenk (1992) reflect the notion of multiple representations/programs in their discussion of organizational knowledge structures. They posit that over time when organizations learn, experiences about certain events and instances are built up in knowledge structures. The 'storage' of these experiences become more complex and more abstract over time. And the complexity of knowledge structures influences the ability of organizational members to 'retrieve' the elements that have become embedded in a hierarchical structure. This will influence their ability to respond to environmental changes and new situations. However, they also suggest that since knowledge becomes nested within other knowledge, not all elements that are 'stored' will be easy to retrieve. Elements that are retrieved depend on factors such as hierarchic organizational proximity, frequency of use, and recency.

The concept of routines and sub-routines is another strong computer based imagery which appears frequently in the organizational learning literature (Gersick and Hackman, 1990; Cohen, 1991; Weiss and Ilgen, 1985; Louis and Sutton, 1991). Organizational response systems stress relatively constant response patterns called routines (Levitt and March, 1988; Feldman, 1989). Routines are viewed as basic building blocks of the organization and represent the tools designed to "transform variable inputs into less variable outputs through a standardized sequence of operations" (Weick, 1991: pg. 117). Routines encode what has been learned in the past, and individual routines are slow to change. Changes in routines are brought about by addition of new subroutines. Thus a portfolio of routines can be a useful image to understand organizational learning (Weick, 1991).

Drawing on Stinchcombe's (1990) ideas, Cohen (1991) suggests that organizational capabilities in the form of cognitive and motor skills of members are embodied in routines. These routines are like small computer programs with an activation condition, and when the condition is met, an action is taken. Routines encapsulate past learning and thus constitute a major form of organizational memory. This memory can be stored in a 'procedural' or 'declarative' form (Singley and Anderson, 1989 cited in Cohen, 1991). The difference between these two forms can be best illustrated by it's analogy to computer programs. Procedural memory is similar to machine level language. It is rapidly executable, but is difficult to repair and closely tied to a specific hardware environment. Declarative memory can be likened to a high level source code, which can be repaired or generalized to other environments, but entails a slow process of interpretation.

Building and modifying the repertoire of routines are fundamental activities in organizations. Dealing with uncertainties requires that organizations both build and modify the repertoire of routines, as well as actively switch among routines to invoke the one that is potentially relevant to the new context. In summary, improving the speed of routines and changing their detailed contents, with accurate switching among existing routines, are

major sources of competitive advantage, or other forms of organizational success (Cohen, 1991).

Why the Computer Model of the Mind is a Limiting Metaphor

The cognitivist charter has provided some useful insights about organizational learning processes, however, it is still a very problematic metaphor. Contrary to its original impulse of locating 'meaning making' in human understanding, the cognitive turn has evolved into a technicalized information processing description of human sense making and learning, based on an innately specified system of representations or a 'language of thought' (Fodor, 1975); a reification which is far removed from the lived day to day experience of being human in an inherently alien world (Taylor, 1971). A description which has dehumanized "the very concept of mind it has sought to reestablish in psychology" (Bruner, 1990: pg. 1).

To start with, a digital computer operates only on the physical form of the symbols it computes; it has no access to their semantic value. In a computer program every semantic distinction relevant to its program has been encoded in the syntax of its symbolic language by the programmers. Therefore its operations are semantically constrained. The syntax of the program mirrors or is parallel to the ascribed semantics. However, in human language it is far from obvious that all of the semantic distinctions relevant in an explanation of behavior can be mirrored syntactically. Further, while the programmers inscribe the semantic level of the computer's computations, we have no idea how the symbolic expressions supposed by the cognitivist encoded in the brain get their meaning and further where these ascribed meanings are located.

When a computer is programmed or when an experiment is conducted with a set of predefined visual stimuli the assignment of meaning is clear. The range of possible items to be represented is constrained and clear-cut. Each discrete or functional item is made to correspond to an external meaning, that is, its referential meaning- a mapping operation

that the observer easily provides. "Remove these constraints, and the form of symbols is all that is left and meaning becomes a ghost, as it would if we were to contemplate the bit patterns in a computer whose operating manual has been lost" (Varela, 1991; pg. 100)

In the cognitivist research program - the system interacts only with the physical attributes of the symbols and not with their meaning. Information is indifferent with respect to meaning. From a computational perspective, information comprises of an already precoded message in the system; meaning is preassigned to messages. It is not an outcome of the computational process and is relevant to computation only in the arbitrary sense of assignment. Based on instructions from a central control unit, information processing fetches or inscribes messages from an address in memory, holds them temporarily in a buffer store, and then manipulates them in defined ways. It lists, orders, combines, or compares precoded information. It is ignorant as to whether the data stored is "words from Shakespeare's sonnets or numbers from a random number table" (Bruner, 1990; p. 4).

According to classic information theory, the purpose of a message is to reduce alternative choices. This is made possible through a code of established possible choices. The categories of possibility and the instances they comprise are processed according to the 'syntax' of the system, which are its possible moves. Information in this dispensation can deal with meaning only in the dictionary sense by accessing stored lexical information according to a coded address. Other meanings like operations are possible such as permuting a set of entries to test the results against a criterion, as in anagrams or scrabble. Information processing is strictly governed by a program of elementary relationships. It cannot deal with anything beyond well-defined entries that cannot enter into specific relationships. It needs advance planning and specific rules. It cannot cope with vagueness, arbitrariness, polysemy, metaphoric or connotative connections. It cannot answer nor understand such ill-formed questions as; "How is the world organized in the mind of a Muslim fundamentalist?" or "How does the concept of Self differ in Homeric Greece and in the post-industrial world?" (Bruner, 1990; pg. 5)

Contrary to the "picture theory" of knowledge or "mind as mirror of nature" (Rorty, 1979), our knowledge of the world can never be a reproduction of it, nor is it fixed. Rather, it is made up of descriptions from particular points of view, language games within our forms of life (Wittgenstein, 1953), simplifications which abstract certain aspects, ignore others, and constantly evolves. As new understanding emerges, new questions arise. These questions may challenge all we thought we knew. There is no fixed or final interpretation, but only a process of sense making that can be more or less useful in our search for meaning (Gadamer, 1975).

Understanding involves what hermeneutics calls an "applicative" moment. Humans understand a text by appropriating it (or any other understandable thing) for themselves, by relating it to one's own context, by thinking of it in terms of examples with which one has had experience. Instead of the meaning a text had for its author, what concerns us when we truly try to understand a text, is the meaning for ourselves. And because we are necessarily different than the author, we will understand her differently than she could have understood herself. This implies that there is a 'creative' aspect to understanding and not merely a reproductive aspect (Thachankary, 1992; Lavoie, 1989).

Rather than recovering features of a pre-given world which can be specified before any cognitive activity, understanding is a "seeing" of things in terms of a background context. A background context which is not necessarily given at the outset but may need to be creatively found. Understanding is not a reproduction of some original meaning-in-itself somehow mysteriously contained in texts, but is always a mediation between a text and a reader. Not only is a context always needed to make sense of any given text, but there are always multiple contexts or perspectives involved.

Cognitive work is required of the reader to find a way to understand a text. It entails bringing a sense of the whole to a reading even the first words, yet remaining open to allow the sense of the whole to emerge from the words themselves. This continuous struggle between the overall and the detail in the making of meaning is called the

hermeneutic circle. It is fraught with paradox and indeterminacy. It involves different and divergent understandings which have to 'play off' one another in the process of gaining meaning.

Problems of Explaining Change in the Cognitive Charter - A Structuralist Tradition

The third and most serious difficulty with the 'computer model of the mind' is that it does not provide an appropriate metaphor to deal with issues of organizational learning and change. The metaphor is inherently limiting in explaining the dynamics of organizational change either from an interventional perspective, or an evolutionary stance. When the computer program is maladaptive with respect to processing a new set of information inputs, the computer can be opened and the 'inner representation' surfaced and modified to be 'adaptively isomorphic' (Rubinstein, Laughlin and McManus, 1984) with the requirements of the new informational environment. While the programmer solves the program in the case of the computer, the question is, how does the issue of appropriate representations get resolved in human beings and organizations. (Where is the program and who is the programmer?)

The focus to date in the organizational learning and change literature closely parallels this computer model; the emphasis is on needing to replace old problem representations with new ones (Simon, 1991) or surfacing and unfreezing old representations, and changing and refreezing with new representations (Bartunek and Moch, 1987). However, surfacing and changing the program is a relatively easy task with a computer, but this same metaphor applied to a human or organizational context raises a number of perplexing issues, such as where these innate representations or programs are to be located, and how one goes about identifying, surfacing and modifying them. We believe that since the computer model is an inappropriate analogy to understand organizational learning and change processes, many of these issues remain elusive and are thus left untackled in the organization change literature.

Reliance on the computer model is also limiting in understanding organizational learning from an evolutionary stance. Many of the discussions on the evolution of learning in organizations are abstract (Lyles and Schwenk, 1992) with a general explication of the 'triggers' of change such as novelty, performance discrepancy, or structural or leadership changes, (Weiss and Ilgen, 1985; Gersick and Hackman, 1990; Louis and Sutton, 1991; Starbuck and Nystrom, 1981; Weick, 1979). Such triggers can lead to a different coding of the environmental situation and thus to the development of new responses. Other discussions of the evolution of learning in organizations are merely descriptive (Barr, et al., 1992). There are no insights into the actual processes involved in such evolution. For example, Lyles and Schwenk (1992) simply posit that over time organizations learn, and the experience of events and instances is built up and stored in the form of knowledge structures. There is hardly any discussion of the processes entailed.

Likewise Barr, Stimpert and Huff (1992) based on an analysis of published annual reports, provide a descriptive mapping of the changes in mental representations of two railroad companies attempting to deal with a declining environment. Their conclusion was that organizational renewal requires that managers not only notice changes in the environment, but that the noticing must lead to new understandings and appropriate responses. However, as in the previous case, the organizational processes underlying the shifting understandings are not explained. How, we are left to wonder, do changes from one mental model to another take place.

We argue that the inherent problems in explaining change in organizations based on the 'computer model of the mind' is due to its inspiration drawing from a tradition of social theory emphasizing the notion of an underlying invisible structure as the fundamental basis for all human and social activity (Giddens, 1979).

This stress on 'structure' appears in two main bodies of literature; that of 'functionalism' and that of 'structuralism' which often in contemporary versions are joined and called 'structural-functionalism'. These two traditions have been the leading

intellectual streams in social theory for over forty years. The lineage of both can be traced back to Durkheim, as further developed by Radcliffe-Brown, Malinowski, Saussure, Mauss, Parsons, and Levi-Strauss (Giddens, 1979).

In essence, both these traditions emphasize the importance and separateness of an underlying invisible structure, whether social or linguistic, for explaining the observable social behavior. The underlying structure which can be expressed as defined relations among a set of elements, constitute the real stimuli behind social activity; observable phenomena result from the action of these laws which are general but implicit. However, one cannot understand structure by studying the surface of observable action such as 'norms' in a society, because such conscious understandings serve to perpetuate the phenomena and not explain them (Levi-Strauss, 1963). Structures have their own reasons, of which members know very little.

In summary, for the structuralist-functionalist school, structures have independent existence and are not directly visible in social activities or ideas. Structural-functional analysis then is a mode of delving below surface phenomena of social life to discover underlying relations wherein it is ordered. The aim is to recover this intelligible reality, "a methodological tactic of beginning the analyses by discounting agents' reasons for their actions (or what I prefer to call rationalization of action) in order to discover the 'real stimuli' to their activity, of which they are ignorant" (Giddens, 1979; pg. 71).

The difference between the functionalists and the structuralists is that the functionalist school assumes a world which is well ordered and patterned, and the stress is on unearthing and describing this 'fixed pattern' and how it is maintained over time. To study the structure of society is akin to studying the anatomy of an organism; to study its function is like a study of the physiology of the organism. The idea is to show how the structure works (Giddens, 1979); an analysis which is limited to a deciphering process (Jameson, 1974). There is no concept of transcendence or transformation in the functionalist conception of structure. As Giddens (1979; p.23) incisively comments; "For

the functionalist, structure is basically equivalent to something like a 'fixed pattern'. Structure has no connection with movement whatsoever; it is an arrangement of dry bones that are only made to rattle at all by the conjoining of structure with function. Function is the explanatory concept, the means whereby the part is related to the whole."

On the contrary, structuralism admits the possibility of transformation in social systems. The basis for such change rests in modifications in elements of the underlying structure. The transformational role of structure is well elucidated by Levi-Strauss (1963; p. 279); "A structure consists of a model meeting several requirements. First, structure exhibits the characteristics of a system. It is made up of several elements, none of which can undergo a change without effecting changes in all other elements. Second, for any model there should be the possibility of ordering a series of transformations.....Third, the above properties make it possible to predict how the model will react if one or more of its elements are submitted to certain modifications".

The parallels between the 'computer model of the mind' and the structuralist tradition are obvious. The definitional closeness of mental representations, models, or schemas to the structuralist's notion of an underlying invisible structure is striking; as is the idea of change as resting in fundamental alterations in the structure. Schemas are cognitive structures that consist of memorial representation of some defined stimulus domain. Schemas contain general knowledge about a domain, including a specification of the relationships among principle elements of the domain (Taylor and Crocker, 1981; Markus, 1977; Abelson, 1981). Since they operate at the preconscious level, they are often refractory to disproof and impervious to change (Ross, 1977). Organizational adaptation requires that organizations keep pace with changes in the environment. This requires fundamental modifications in the cognitive schemes and representations of managers through a process of surfacing and changing such cognitive structures (Bartunek and Moch, 1987; Barr, et al., 1992; Huff, 1990; Weick, 1990).

One of the strongest proponents of the structuralist tradition is Claude Levi-Strauss,

one of the most influential anthropologist of our times. His work is particularly relevant since it can be interpreted as an indirect lineage to the 'computer model of the mind', and concentrated on relating the structure of cognition to the structure of myth and society. As Levi-Strauss (1963; p. 283) comments on this connection; "Structural studies are an indirect outcome of modern developments in mathematics...are to be found in J. von Neumann and O. Morgenstern, *Theory of Games and Economic Behavior*, N. Wiener, *Cybernetics*, and C. Shannon and W. Weaver, *The Mathematical Theory of Communication*". Varela et.al (1991) similarly observe that the roots of present day cognitivism, that is cognition as internal representation, lie in cybernetics.

A brief exposition of the main features of Levi-Strauss's structural anthropology will illuminate the inherent difficulties in addressing change in this structuralist tradition also. Given the strong connections, it is hardly surprising that the predicaments expressed are very similar to the ones we observe in the organizational learning and change literature.

The chief object of Levi-Strauss's work is to identify what he variously calls 'unconscious psychical structures' or the 'unconscious teleology of the mind' that underlie human social institutions. The study of the unconscious which reflects basic operations in the structure of the brain reveals the mechanisms of signification that lie beneath the conscious activity of the human subject (Levi-Strauss, 1966 cited in Giddens, 1979). However, it is essential that one understands the importance and independent existence of the structure from events. Observable events, including actors' accounts of their behavior as manifested in conscious self-understandings, are not themselves structures. In fact such conscious models may prove to be a hindrance in isolating the structural organization; "the more obvious the structural organization is, the more difficult it becomes to reach it because of the inaccurate conscious models lying across the path which leads to it" (Levi-Strauss, 1963: p. 281).

A good example of this search for an internally defined structure comprehensible as pure form is well illustrated in Levi-Strauss's evaluation of Mauss's theory of gift

exchange (Giddens, 1979). Mauss proposed a theory of gift exchange among actors involving elements of a phenomenological nature. Levi-Strauss, however, strongly felt that to intelligently understand the gift exchange behavior one has to discard any experiences of a phenomenological kind; "We must not be deflected by the experience or ideas of participants in such exchanges themselves, but have to treat the gift exchange as a 'constructed object' governed by mechanical laws of reciprocity" (Levi-Strauss, 1969 cited in Giddens, 1979; pg. 25).

Giddens (1979) posits that this emphasis on trying to recover an innate structure at the exclusion of events, behavior, and actors' reflexive understandings of their action, led to nothing further than an attempt to disclose the operations of unconscious elements that govern cognition. This was consequently featured as a set of abstract categories of the mind and could not account for any sort of transcendence or change, either of the individual or the system.

According to Giddens (1979) structuralism failed as a theory of action because of its stress on attributing teleology, purposes, and motives to internal structures, with a particular emphasis on unearthing and apprehending this pure form, at the expense of actors 'valid descriptions' of their social life.

Structures can never be comprehended as pure form, as defined wholly internally, since structures only have 'virtual existence'. Structure enters simultaneously into the constitution of the agent and social practices, and only 'exist' in the generating moments of this constitution. This duality of structure, both as the medium and outcome of action, is the central idea behind Giddens's theory of structuration. As a viable theory of action, structuration addresses both evolution and change in social systems by locating human understanding and change in the stream of situated action.

Structuration does not refute the notion of an unconscious or submerged mental representation, but instead takes the view that the unconscious can only be explored in relation to the conscious. All actors have some degree of 'discursive penetration' of the

social systems to whose constitution they contribute. 'Discursive consciousness' involves knowledge which actors are able to express at the level of discourse; 'Practical consciousness' involves tacit stocks of knowledge which actors are not able to formulate discursively, but draw upon in the constitution of social conduct. "Practical consciousness is non discursive - but not unconscious, knowledge of social institutions" (Giddens, 1979; pg. 24). Unconscious motives also figure in social practices. However, they operate outside the range of self-understanding of the agent.

In summary, all structures, whether within the sphere of actors' understanding or not, are located in accounts and social practices, where these structures are produced, reproduced and changed. Structures exist because they are used in practice. It is only in the social practices, narratives, and conversations that constitute the stream of organizational action, that we can encounter underlying cognitive structures. Narrative is the basic cognitive activity to which we should look for understanding processes of sense making, learning and change in organizations. In the following section we will review the key principles of structuration as a theory of action and the narrative basis of cognition. Taken together, they will allow for the possibility of understanding purposive change and evolution in organizations.

Structuration and Narratives as Stream of Organizational Action

The basic units of analysis for structurational theory are social practices such as courtship, conversation, group decision making or religious and civil ceremonies (Poole, Seibold and McPhee, 1986). Social practices carry a fuller sense of action in social systems than the concepts of process or function. Social practices are analyzed by distinguishing 'system', that is the observable patterns of behavior and events, from 'structure', which is the unobservable rules and resources used to generate the system. Structuration is the process of producing and reproducing social structures through members' social practices.

Fundamental to this process is the duality of structure; structures are both the medium and the outcome of action. They are its medium because members draw on rules and resources to interact within and produce practices. They are its outcome because rules and resources exist only by virtue of being used in a practice. Three basic types of structures are instantiated in situated practices which Giddens (1976) terms as the 'modalities of structuration'. They are the orders of 'signification' or meaning structures, such as language, symbols, and interpretive schemes; the orders of 'domination' or the operation of relations of power, such as resource allocation and privileges; and the orders of 'legitimation' or moral persuasions, such as religion, ethics, and law. The types of structures are more of an analytical distinction, since all three elements intermingle in each social act. Whenever a structure is employed, the activity reproduces it by invoking and confirming it as a meaningful basis for social action.

Structurational theory shifts the focus from systems or structures to their dynamic interrelationship in interaction; "to study the structuration of social systems is to study the conditions governing their continuity, change, or dissolution" (Giddens, 1981;

p. 27). An important theorem of structuration is that since social systems are chronically produced and reproduced by its participants, change or its potentiality is inherent in all moments of social production or reproduction.

Action and changes in action, and hence social systems and structures, are governed by two critical interdependent processes; the agent's reflexive monitoring of conduct and rationalization of action (Giddens, 1976). Closely woven into the process of reflexive monitoring and rationalization, as experienced by an individual actor is the 'interpenetration' of structures. When structures 'interpenetrate' they mediate or contradict each other, which can become a strong motive force for change.

The process of reflexive monitoring is one where actors intermittently monitor ongoing actions and their setting. That is, we take stock of our goals, plans, interactions, conversations, reactions, and surroundings, including their emergent retrospective meanings (Poole, et. al., 1986). Based on what meanings are made in the situation, plans are deviated from, new goals are made, new narratives invented, or perhaps one proceeds as planned. Goals are not measured against prespecified standards as some sort of cybernetic measurement of progress, nor are they viewed as unchanging targets. "The reflexive monitoring of behavior operates against the backdrop of rationalization of action" (Giddens, 1979; pg. 57). Our reflexive monitoring of action is impelled by and involves giving narrative accounts of our actions to ourselves and others. "We rationalize - make our conduct "rational" - in discourse in socially prescribed terms" (Poole, et al., 1986; pg. 249). However, rationalization entails more than simple account-giving; it is a process of seeking on-going coherence of actions and practices. It is a process of narrativizing our experience in a way that makes it believable and livable within the canons of signification, legitimation and domination that is our culture.

A second set of structural conditions which influences action and the process of organizational change are the relationships among structures themselves. Action, in any system draws upon multiple structural features, which can often be in contradiction,

meaning that "The operation of one structural principle in the reproduction of a social system presumes that of another which tends to undermine it" (Giddens, 1974; p. 141). It is a situation where actors are faced with a variety of conflicting rules of conduct, all legitimate and plausible, but, often, none with any obvious superiority (Whittington, 1992). When structures interpenetrate in a contradictory way, choice that can result in significant change becomes possible.

Earlier, in discussing the inability of the 'computer as mind' metaphor, with its reliance on change in structures or schemas, for explaining organizational learning and change, we criticized its failure to discuss how schemas changed. Structuration theory, with its focus on action and the reflexive monitoring and rationalization of conduct as it progresses, provides such an explanation. The reflexive monitoring and rationalization of conduct takes place through the continual process of constructing narratives of our experience. In situations where contradictory structural modalities are drawn upon, the challenge for constructing a livable, believable narrative are all the more greater, but even in the absence of clear contradiction, we are constantly explaining to ourselves how the canonicity (or culturally valid patterns of structuration) are being tested, maintained or modified. It is to narrative, and in particular how actors make meaning through narrative of their organizational experience, not to schemas or frames, that we must look if we are to understand the process of organizational change.

The importance of narrative has not gone unnoticed in organizational research. Clark (1972) explored the importance of narrative as it is manifest in organizational sagas. He noted the importance of organizational sagas for making sense communally of significant events in an organization, and for enabling individuals to rationalize dedicating so much of their lives to organizations. Mitroff and Kilmann (1976) recognized the primacy of stories for humans, declaring them to be "natural, born storytellers," who tell stories in order to give meaning to their experience and to themselves as persons. But Clark, as well as Mitroff and Kilmann, focus attention on the saga or the myth - the grandest

overarching type of story to be found in our organizations or our culture. Structuration, in contrast, is concerned with the stream of ongoing interaction and narrative making.

Myth and saga are important, but they distract our attention from the structural way that human cognition operates principally in a narrative, story telling mode. Our position is to emphasize the way narrative, as a fundamental innate capacity of humans (Bruner, 1990) is the basic and determining process for the construction, maintenance and change of all understanding in an organization. Schemas, representations, paradigms and frames are a product of story telling as much as they are a medium for it. If we wish to understand organizational change, it is to the process of story telling, the process of making narrative, that we should look.

More recently, the role of stories and story telling in the day to day functioning of organizations has been addressed by Boje (1991). The dynamic, constructive, changing quality of stories documented by Boje in his focus on situated practice is a major step toward the position we argue for here. He moves beyond the mythic view of the story as an 'object', found in Clark (1972), Martin (1982), Martin and Meyerson (1988), McConkie and Boss (1986), Gabriel (1991), and Wilkins (1979), and turns our attention to the context dependent process of producing the story. Boje, however, was concerned with the performance of story telling as but one tool of sense making for the individual.

We instead argue support for Bruner's (1990) restatement of psychology as being fundamentally based on the human narrative capacity for making meaning. We join with Bruner in arguing that the organizing principle of cognition is narrative, and not conceptual or schematic. Once this turn is made in our understanding of cognition, the role of story telling and narrativizing of experience generally, shifts from a secondary role as a way of dramatizing concepts to a primary role as the generative process in cognition. What frames or schemas we do have are constructed through narrative. Schemas are secondary, derived, or residual to the primary cognitive activity of making sense of our experience (and ourselves) by narrating it.

"The typical form of framing experience (and our memory of it) is in narrative form. what does not get structured narratively is lost in memory" (Bruner, 1990; p. 56).

Bruner, synthesizing studies of child development, language acquisition and concept formation, proposes an innate narrative capacity as the 'engine' for our cognitive activity (p.92). He identifies four constituents of this innate narrative capacity (p. 77):

1. A sense of human agency in which actions are taken toward goals by agents.
2. A sense of sequential order in which events occur in a linear fashion.
3. A sense of canonicity or how things should occur in a 'normal' story.
4. A sense of a narrator's perspective.

He argues that our primary cognitive mode is to make narratives with the exceptional (anticanonical) in our reflexive monitoring of events or experiences. We do employ a logical or paradigmatic mode of cognition, but only to repair a breach on the canonicity of a narrative. Logical or paradigmatic thinking is a part of our cognitive repertoire, but only a part. A narrative in our reflexive monitoring and rationalization of conduct is not ruled by an abstracted logic. The reasons that work in a narrative do so not only because they are logically acceptable, but also because they are life like and fit the culturally bound demands of the story we are constructing to make our experience meaningful (p. 94).

"The object of narrativizing our experience is not a match with a reality or a predefined system of logic, ...but achievement of coherence, livability and adequacy." (p. 112).

Bruner in parallel with Giddens' structuration theory emphasizes that an important part of narrativizing is the exploration, construction, and validation of the self. The narrator's perspective as a constituent of our innate narrative capacity assures this. The self is always at stake in the individual's narrativizing of experience (p. 111). The self is

at least the narrator (recognizing the canonical, indicating and explaining the anti-canonical, determining how the world should be) and often part of the story (being herself delineated as a causal agent with motives, intentions and values).

An Example: Planned Parenthood

We take as an example an organizational change that is currently in progress. Planned Parenthood is being transformed from an agency concerned with family planning and reproductive health, and especially with abortion rights, to an agency concerned with providing total health care for women. We could imagine that several years from now, if the transition is successful, a researcher might explain the change as a shift in schema from a "reproductive rights crusade" schema to a "one-stop health care" schema. Or it might be seen as a shift from a "narrow bureaucratic health care" schema to a "Dr. Welby-like health care" schema. Either way, the researcher would point to the change in schema as an explanation for the organizational change, but would be at loss to explain the change in schema. Which ever initial schema is identified, its elaboration will not provide a basis for explaining the change. Each initial schema is self-contained and closed, an essentially stable image. If there are problems that can be identified within one of the initial schemas, the solution would be a repair or modification of it. There is nothing within one of the initial schemas to provoke or even allow for a change to the second one. For that engine of change, we must look to the making of narrative by the principal actors.

In the case of Planned Parenthood, we can look to the way the new President of Planned Parenthood, Pamela J. Maraldo, narrativized her experience. Ms. Maraldo is a Registered Nurse who after several years of nursing practice, spent 10 years as the head of the National League for Nursing prior to accepting the Presidency of Planned Parenthood in February, 1993. A interview with her appearing in the New York Times (Lewin, 1993) gives a good example of how the narrativizing of experience, and especially the construction of the self, is the engine of change for this shift in schema, however we

characterize the schemas involved.

When first approached about the new position, Ms. Maraldo did not want to be considered. The Times reports that she did not feel she was an expert in reproductive health which was the focal effort of Planned Parenthood. At the National League for Nursing, she had advocated advancing the active role of nursing in the total health care process. Health care policy on a broad scale and the role of nursing in it had been her life. "People like me have had a gradual blurring of the line between personal life and vocation." (Lewin, 1993; p. 7).

But, later she did allow herself to be considered as a candidate and eventually accepted the Presidency of Planned Parenthood. The narrative she makes of this situation in her interview is as follows:

" We know that 70 percent of the women who enter the health-care delivery system come in with reproductive health issues, like contraception or Pap smears," she said. "Most patients want one-stop shopping. If they come in for a breast exam or a Pap smear, they'd really like the person who examines them to help them to take care of their flu, too.

"Planned Parenthood is in a good position to do that, with nurses or physician's assistant who will be the Marcus Welbys of the future, doing primary care and really getting to know their patients."

"A lot of women come to us as young adults, and we want to retain them," said Ms. Maraldo. "But we are going to have to convince them we are capable of serving women who are not young and poor." (Lewin, 1993; p. 7)

For us, an intriguing aspect of this narrative is how it takes Ms. Maraldo's self identity as a developer and empowerer of nurses and makes the narrative of Planned Parenthood congenial to it. In her narration of this setting, entering a Planned Parenthood Clinic is entering into the world of her primary concerns. She wants to see nurses in an expanded role in the total health care process, performing as Nurse Practitioners and Doctor Assistants, establishing long lasting relations with patients, following patients over

time, as health care needs evolve. The majority of women enter health care for reproductive reasons, and the entry to a Planned Parenthood clinic for reproductive concerns thus is their entry into health care generally. So now, the narrative goes, they will enter into a complete health care relationship in Planned Parenthood with the Nurse as a central clinical figure.

Notice also that the agents who are in the narration (the women seeking health care) are endowed with motivations and intentions that control the outcome. Some motivations fit nicely with the canonical form of health care being valued; "Most patients want one stop shopping." Other motivations are anticanonical, such as the desire for a private doctor if means permit, and need to be attended to with corrective action that will be part of the new strategy she is narrativizing.

Whether this particular narrative of Ms. Maraldo is the "origin" of the new identity for Planned Parenthood is not the issue. Search for an origin would be misguided. It is the ongoing structurational process of making narrative with the situation at Planned Parenthood that is important to understanding the change that ensues. There is never a first or a last narrative. Structuration and its narratives are ongoing and multiple. In fact, it is important that others (in this case the board of directors) find the narrative as congenial, livable, and not new or foreign, if it is to become part of their narrativizing of the situation as well.

"We were terribly impressed with how she articulated the direction in which this organization should be moving as an established network of providers of women's health care," said the board's chairwoman, Jacqueline S. Jackson, "which was exactly where we had thought we should be going, too." (Lewin, 1993; p. 7).

As for the possibility that the change at Planned Parenthood might be explained as a shift to new schemas of "one-stop shopping" or "Marcus Welby-like care giving", we can see from this narrative what the role of these metaphors are. They are important metaphors to be sure: they will play a significant role in shaping the understanding of this narrative.

But they are here because of the way the situation is being narrativized, not the other way round. They are powerful metaphors because we are looking through the eyes of a patient with a particular set of values and motives, dealing with a nurse whose job is being redefined in particular ways. The whole narrative is a complex web of metaphorical references, of which these two stand out. But it is the narrative that determines their appropriateness and dominates the reasonableness and livability of the understanding that results from their use. These potential schemas are residues of the narrative process, sedimentary remains that might be picked up as explanatory by future researchers. But an appreciation of how cognition is a narrative capacity, helps to avoid confusing such structural artifacts with the narrative structural process that provides the engine of change.

Conclusions and Implications

In this chapter we have called for a fundamental reorientation of our understanding of organizational change as it is related to human cognition; a shift that appreciates the organizing principle of cognition as essentially narrative and not schematic. This implies a move away from the mind-as-computer metaphor which is currently a popular explanation of organizational learning, and thus a move away from structuralist forms of explaining change in organizations. Giddens' structuration allows us to recognize the virtual nature of structures; that they exist only as constituted in the social practices and narratives of organizational actors. It is through narratives that cognitive structures and schemas are created. As our narratives change, structures change; narratives are the generative process in cognition and schemas are the residual.

This fundamental turn in our understanding of cognition opens up a number of interesting and useful possibilities for addressing issues of organizational learning and change. We can stop our search for locating, surfacing, unfreezing, and changing those elusive schemas, representations, and programs. What makes sense for the computer does not make sense for humans; computers are after all artifacts of human cognition. Instead, as researchers and change agents we can start paying attention to the narrative streams in organizations, which is the locus of meaning making and the engine of change in the meaning structures of organizational actors.

Specifically, we call for empirical research on the day to day, ongoing structural processes of narrativizing organizational experience. The reflexive monitoring of conduct and the rationalization of action is carried out through such narratives. The centrality of meaning making in organizational learning and action has been receiving increasing attention with the emergence of knowledge intensive organizations and functions (Purser and Pasmore, 1992; Starbuck, 1992; Tenkasi, Boland and Purser, 1993; Purser, Pasmore and Tenkasi, 1992). In knowledge intensive work settings, such as

research and development and strategic planning, the work process is characterized by indeterminacy, ambiguity, and uncertainty. Work is emergent, exploratory and often moves through multiple pathways with understandings being developed and changed as the work proceeds. Success in these settings is often times dependent on creative meaning making (Nonaka and Kenney, 1991; Brown and Duguid, 1991; Henderson and Clark, 1990; Weick, 1979).

Knorr-Certina (1981) in her book *The Manufacture of Knowledge* has convincingly argued that science and hence scientific products are first and foremost the result of a process of social construction. If we want to understand how scientists produce the knowledge that manifests itself in new products and processes, we must examine the meanings which scientists impose on ongoing events, the shifts in such meaning structures, and the resolution of rival meanings so that coordinated action among disparate 'thought worlds' (Dougherty, 1992) is possible. Tracking narratives and changes in narrative forms is a viable way of approaching the examination of meaning making and thereby learning in organizations.

From an interventional perspective, locating of narratives and making them available for discussion among organizational members can aid in breaking cycles of routine reproduction. It is in narratives that we can locate organizational defensive routines (Argyris, 1985). Stories and narratives are embodied forms of cognition (Varela, et. al, 1991) and constitute the basics of lived day to day human experience. They are more amenable to inquiry than abstracted notions such as cognitive maps, which as derivatives of narratives, are once removed. In fact, our experience with Spider (Boland, Tenkasi and Te'eni, forthcoming; Boland, Schwartz, Tenkasi, Maheshwari and Teeni, 1992) a software system which enables users to create cognitive maps of their understanding of a situation, suggests that only one-third of the managers are comfortable with making maps.

In a related vein, encouraging and surfacing multiple narratives can be a powerful

inducement for change. Bringing together different narratives from different levels of the organization through methods such as search conferencing (Weisbord, 1987, 1992) can reveal what is canonical in a culture's patterns of signification, legitimation, and domination, and what is non-canonical. New ways of narrativizing a familiar experience can reveal the non-canonicity of the previously familiar.

Engaging multiple narratives also permits the interpenetration of structures in contradictory ways and generates choices that can make significant change possible. Bruner (1990) argues that many bureaucracies do not learn or change because they stifle narrative complexity; they are "where all except the official story of what is happening is silenced or stonewalled" (p. 96). For example, in a research project the first author was involved with in a Research and Development organization, the narrative employed by the project leader in response to one scientist's feelings that they had to stop any further development of the product before they could find answers for some critical uncertainties they were facing was; "In this company we fix things; if something goes wrong, we can always fix it later". On the contrary, the scientists argued for "doing, the right thing" or understanding the science before going ahead with the development of the product. Predictably, the scientists' narratives were discounted by management before this author's intervention. However, once this counter-narrative was given voice the anti-canonicity in the management narrative could be examined. The intervention led to insights and consequently a redefinition of the way they decided to go about doing science. Interestingly, it was in these differing narratives that the conflicting schemas of doing research were encounterable.

As we can see from the Planned Parenthood example, individuals are not just constructing organizations through narrative, they are also importantly constructing selves. By narrativizing their experience, individuals define not only how things work, but who they are and what role they play (economic, social and moral) in the patterns of causal action that are the world. Understanding the patterns of narrativizing organizational

experience gives us a powerful way to study elusive issues of how a leader's vision is transformed to organization learning and change.

Organizational schemas are ghosts. They are phantasmagorical. No wonder they have proved so elusive to study and to track how they change. Narratives are real, every day experience. They are the fundamental process of cognition and organizing. Perhaps it is because they are so immediate and obvious that we have failed to take them seriously enough. Preferring instead to search for the more esoteric underlying schema which will explain organizational change. We believe the time for a turn toward narrative is now, and that the potential for rewards in improved understanding of organizational learning is great indeed.

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