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Managing without Leadership

Towards a Theory of Organizational Functioning

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Edited by C.W. Evers and G. Lakomski
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Managing without Leadership

Towards a Theory of Organizational Functioning

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Australia

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Contents

Preface

There is no question mark after *Managing without Leadership*. This omission might strike some readers as inappropriately dogmatic and prematurely final. Yet the decision not to leave the issue of whether we can manage without leadership open was a simple one: we do. Organizations keep performing whether they have a strong leader, a weak leader, or no leader at all. Every one of us lives in some form of organization. We all know from everyday experience that organizational work takes many heads and hands, and that those at the top often do not know much of what goes on below, given the size and complexity of the organization. Goals ordered from above look different when they reach the shop floor and have to be de-coded and translated into the work contexts of those whose job it is to carry them out. In short, organizations are complex beasts whose functioning is poorly understood; no one person has a complete overview of what happens, and efficiency and effectiveness, where it is had at all, requires an army of interconnected brains, hands, and artefacts to accomplish.

None of this denies the existence of the exceptional Chief Executive Officer, the formal office holder who possesses what are identified as leadership qualities by some theoretical model. Of course these gifted individuals do exist, or the idea of leadership would not have got off the ground in the first place. What is at issue is the causal link drawn between individual abilities and organizational outcomes. It is this implicit but fundamentally misplaced acceptance that is the focus of much of the discussion in this book.

Our everyday experience tells us that organizational life is messy and complex and that those in positions of leadership are neither omniscient nor infallible. Why, then, do we quite readily believe that there is a *causal* link between organizational functioning and leadership? Why do we not believe our own experience that how things work in organizations is much more complicated? Where do we get the idea that "leadership" is the right explanation for the organizational phenomena we encounter? There is a discrepancy between the ways in which members believe that their work places operate and how theories of leadership account for organizational functioning. If I had to nominate one overarching objective for this project, it would be the development of a causal, bottom-up account of organizational practice, in place of top–down theories of leadership that are incapable of accounting for the specificities of individual experience, because these are always generated and bound by the nature and conditions of their contexts.

Such an enterprise is bold, but I argue that asking how organizations really work, and how we account for ongoing organizational practice, are questions broader in scope

than those concerned with the purported effects of leadership. Furthermore, they do not assume *a priori* that leadership is an answer, let alone *the* answer to effective organizational functioning. My claim is that it is not. My approach in this book is to re-describe what is termed "leadership" and to argue for better, theoretically and empirically justified ways of understanding organizational practice. By re-describing I have in mind a process common in the history of science where the description of an observed phenomenon is replaced by a better one, on the basis of the best currently existing knowledge. Such was the case when the idea of phlogiston (which did not exist) as a purported causal ingredient was thrown out and replaced by the modern theory of combustion as the better explanation of why and how things burn.

I propose that we consider the phenomenon of leadership in like manner, and conceive of it as part and parcel of organizational practice. In a naturalistic redescription of the phenomenon, we might view it as *an emergent, self-organizing property of complex systems*. There would then be no need for engaging in more leadership studies: instead, we could redirect our attention to the study of the fine-grained properties of *contextualized organizational practice*. A better understanding of how we do what we do in organizational settings, shaped by our interactions with tools and artefacts of our own making, holds the key to improving organizational efficiency and effectiveness. This I propose as the research program to guide organizational studies into the future. My contribution to such an enormous enterprise is to map out the theoretical contours that might help us get there, and to offer some suggestions on where to go "after leadership" in a discussion of some central current organizational topics.

Let me now place this book in context and sketch some of the philosophical–theoretical machinery that drives its argument. *Managing without Leadership* is part of a research program that Colin Evers (University of Hong Kong) and I have pursued in three original texts, *Knowing Educational Administration*, *Developing Educational Administration*, and *Doing Educational Administration*, as well as in various other publications. *Managing without Leadership* is conceived as an extension of the basic ideas developed in these foundation texts. Our purpose has been to develop a new post-positivist science of (educational) administration, *naturalistic coherentism*, that offers a naturalistic account of organizational-administrative theory and eliminates the dichotomy between theory and administrative practice that has bedeviled the study of administration from its logical-empiricist beginnings. Our philosophical roots derive in large part from the naturalism of Dewey. In fact, we have on occasion described our new science as an updating of Deweyan pragmatism by modern (neuro-)scientific means: drawing on the work of W.V.O. Quine, Dewey's major successor in American analytic philosophy, and above all on the brilliant neuro-philosophical works of Paul and Patricia Churchland, as well as the writing of Andy Clark, Edwin Hutchins and, more recently, Antonio Damasio. Their theoretical influence permeates the argumentation of this book.

Simply put, we thought that if administration theorists wanted their claims to be valid, these had to be supported by evidence. This turned out to be a serious problem for theorists of the first phase, whose work was characterized by adherence to logical positivism or empiricism, as famously represented in Herbert Simon's classic text *Administrative Behavior*. Claims made by empiricist science outran their own theoretical machinery to support them. But if claims cannot be supported by the theoretical

resources of the theory itself, they are null and void. Belief in epistemological foundations as the hallmark of science sanctioned the fact/value dichotomy and the other dichotomies that still haunt administration, organization and leadership studies, such as theory/practice; objective/subjective, tacit/explicit, knowing that/knowing how, and the so-called qualitative/quantitative distinction in research methodology.

Applying two major results of modern epistemology and philosophy of science, the theory-ladenness of observation and the under-determination of theory by data, we developed a non-foundational theory of knowledge in which the criteria of coherence are accepted indices of good theory. The so-called super-empirical virtues – consistency, fecundity, simplicity, comprehensiveness, and explanatory unity, together with empirical adequacy – impose a tight discipline on the arbitration of competing theories, because they apply to each and every one of them. What we call our *coherence theory of evidence* requires no more than that any rival claim or theory engage in competition by employing the super-empirical virtues, a process from which the claims of naturalistic coherentism are not exempt. The new science, unlike logical empiricism, accepts a non-foundational theory of knowledge. This means that it does not claim any epistemological privilege, relying instead on proving its theoretical mettle as any other theory does. As a result, the new science, supported by the coherence theory of evidence, is in principle open-ended, and provides a flexible methodological tool for the arbitration of competing claims. This also means that it is possible to tell better from worse theories: the theory that is most consistent, that is, the theory that possesses more super-empirical virtues, is accepted as valid.

This epistemological analysis has yielded outcomes in many directions. One of the most important is that the dogged identification of empiricism with science, so dominant and all-pervasive in education and the social sciences, has been shown to be not only false but detrimental to the growth of (educational) administrative theory. Many of the models developed as alternatives to scientific "positivist" administration or organizational theory, including interpretivist and postmodern accounts, develop their counter-arguments against the foil of empiricism that is taken to be the correct model of science (some of the argumentation follows in Chapter 2). Possibly the most important outcome has been that, unlike many contemporary theorists, we have opted for science and against the many versions of subjectivism, interpretivism or critical theory approaches as the best way to explain the phenomena of our social and natural world.

In *Exploring Educational Administration*, we presented arguments and examples that strengthen the case for a natural science of (educational) administration, leadership and learning, administrative decision-making and policy analysis. By eliminating the fact/value split, which caused (and continues to cause) problems for administrative practice, a better understanding of human values and subjectivity had become part of the new science. As a consequence of such broadening of the province of science, better proposals for administrator training, for example, were made possible. Administrators' values and experiences could be accounted for within the framework of a naturalistic science that no longer separates facts from values, or relegates "learning from experience" to the realm of the mysterious.

Here another central theme is addressed. While *Knowing Educational Administration* was aimed at demonstrating the failures of traditional empiricist administrative science, and presenting an epistemological alternative, the third book, *Doing Educational Administration*, was more explicitly naturalistic, or in the more austere term, "physicalist". The basic premise was the simple yet far-reaching requirement that what we claim to know we must have been able to learn, given our naturally evolved capacities. Hence, theories of human cognition became a core issue, especially Simon's conception of *bounded rationality*, the most prominent account of cognition in empiricist administrative theory as well as traditional artificial intelligence.

Embedded in any theory of knowledge is a (usually unacknowledged) theory of how it is possible for humans to acquire such knowledge: in traditional philosophical terms, a theory of the mind. Empiricism contains a view of knowledge acquisition, or learning, that assumes the primacy of symbol manipulation, such as using words, mathematical symbols, or other notations. This view has a venerable history since it goes back to Descartes. It has dominated education and allied social and organizational sciences. It also underpins research in mainstream artificial intelligence. For naturalistic inquiry – finding out how humans think – is the province of natural science, especially that branch of it called cognitive neuroscience or connectionism. The properties of artificial neural nets, although still limited in scope, provide the most realistic insights yet into the architecture and functioning of biological brains. Given the properties of parallel distributed processing that characterize real brains, and the consequent ability to recognize and complete patterns at speed, the traditional account of cognition as symbol processing has been shown to be too narrow.

Human cognition has been partitioned into what we are able to express overtly and what we can demonstrate, practice, feel or experience. Pride of place in cognition has been usurped by the ability to process and reproduce symbols. In Western philosophy, the idea of what it means to be a human being is defined by this very ability. Because human cognition and intelligence have thus been equated with our ability to "crunch symbols" (Patricia Churchland's expression), all other things we are able to do, such as running a company, conducting an orchestra, making flutes, or wine tasting, count as non-cognitive activities, and are thus not part of intelligent behavior. This means that human practice, including leadership, which depends on hunches, insights, and simply on "doing", has been relegated to second place. Rather than considering human cognition as a broad band of capacities that range from symbolic representation to non- or sub-symbolic activity (the latter of which is by far the larger part of human cognitive activity), the part has been methodically and consistently misrepresented as the whole. What emerges from this is, first, that cognition is holistic; second, that there is no in-principle distinction between explicit and tacit knowledge, an assumption prevalent in Knowledge Management, and third, the so-called problem of tacit knowledge reduces to the problem of how it is to be represented. The issue is our ability to represent symbolically what we know how to do practically. Once the coarse filter of symbolic representation has been removed, aided by our knowledge of the pattern-producing abilities of our brains, both symbolic and non- or sub-symbolic activities can be recognized as neuronal patterns of activation.

This outline of naturalistic coherentism is no more than a thumbnail sketch, but I hope it provides sufficient background to "place" the discussions that follow. Two requirements act as a kind of theoretical pincer movement to establish the coherence or incoherence of the leadership claims made: evidence must be provided for claims, and features or skills supposed as characteristic of (or essential to) leadership or leaders have to be learnable. These two criteria will be applied to all of the leadership perspectives discussed in the following chapters.

Managing without Leadership is divided into two parts to indicate a clear division of intellectual labor as well as a shift in emphasis.

Introducing Part I with some of the intellectual–philosophical history of the leadership field, showing that its empiricist roots reach into the modern era, I then examine some contemporary approaches to leadership that reflect recent theorizing in the social sciences and the philosophy of science. These pay serious and detailed attention to the importance of (organizational) culture, practice and the social contexts for action. In this respect, the perspectives discussed represent the most advanced theorizing in leadership studies because they aim to update the philosophical foundations of older approaches, indebted to an empiricist conception of science and methodology that is no longer accepted as valid within contemporary philosophy. My aim here is to demonstrate that while such a broadening of contemporary leadership theories presents a considerable advance over previous positivist-empiricist approaches, it also comes perilously close to abolishing the need to speak of leadership at all.

Because, as is argued here, advocates for the existence and necessity of leadership assume more than they can deliver given their own theoretical resources, and given that organizations seem to manage perfectly well to accomplish their goals regardless of who is at the helm, the causal nexus between leadership and organizational practice is difficult to sustain. The move to studying how we think and act in practice, and how we learn, promises a better empirical understanding of how organizations accomplish their goals.

If leadership is a regressive research program, the conclusion reached at the end of Part I, and if indeed there may not be such a thing as leadership, given the theoretical, neuroscientific and epistemological arguments advanced, then the extension of these explorations takes us logically into examining the fine-grained details of how we think and act in the specific, local contexts of our work. This depends on understanding the embodiedness and embeddedness of human cognition, which includes the barely acknowledged importance of our created environments for our cognitive accomplishments. It is the purpose of Part II to map out this new direction.

Connectionist neuroscience provides the most up-to-date empirical knowledge on how we humans transport ourselves in our environments. Such exploration throws new light on how to understand organizational knowledge, on what it means to speak of "managing" knowledge, if it makes any sense at all, and on whether the standard way of conceptualizing the ebb and flow of organizational knowledge as knowledge transfer is defensible. These are issues of enormous complexity and scope. In so far as Part II of *Managing without Leadership* maps out some original considerations for developing a naturalistic theory of organizational functioning, in relation to some central current

issues in organizational theory, it breaks radically new ground: by proposing an explanation of human practice that is consistent with our knowledge of how creatures such as ourselves successfully maneuver in the environments of our own making, that is, in organizations as the quintessential manifestations of the out-sourced human mind. Leaders are just part of the bigger picture.

Gabriele Lakomski
Melbourne, June 2004

Acknowledgments

A book grows from many sources, and an author is indebted to many people, places, artefacts, scholarly disciplines and traditions. Some of these are conscious, many are not.

The most important source by far is the series of three books written with my friend and colleague Colin Evers. *Managing without Leadership* is the direct result of the theoretical direction we set in this work, and in writing this book I have attempted to maintain the standard of careful scholarship and concise argument that he brought to our joint projects.

During the preparation of this book I had discussions with many people, both in Australia, and while away at international conferences in Europe, Singapore, and the United States. Some colleagues thought it was high time to "deal" with leadership, others thought I was mad to do it. I owe much to the insights and critical appreciation of Viviane Robinson, Peter Gronn, and Jim Spillane, who have given me much to think about and to adjust in shaping this book. I would also like to thank Haridimos Tsoukas and Chris Argyris for their critical and sharp-minded attention to my ideas.

The material in this book has been taught in and shaped by my Masters and doctoral seminars at the University of Melbourne. I am much indebted to my Leadership and Knowledge Management students especially, who came with me on this journey. They helped me to clarify my thinking, challenged me, and generally kept me on my (intellectual) toes.

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I have presented my ideas on leadership, knowledge and its management, and how we think and learn at national and international meetings, which include the following:

– *Second International Conference of the Centre for Organizational Learning and Leadership,* Opening address "Knowledge Management: Organizational innovation or latest fad?". The University of Melbourne, Australia, January 22, 2002.
– *British Educational Leadership, Management & Administration Society* Annual Conference (BELMAS 2002). Invited address "Distributed leadership: An idea whose time has come?". Aston University Lakeside Conference Centre, Birmingham, England, September 20–22, 2002.

– *Knowledge Management Leadership Forum* (KMLF), "Knowing more than we can tell and telling more than we can know – Some critical reflections on the problems of tacit knowledge". Melbourne, Australia, May 16, 2002.
– 2*nd Symposium on Teaching and Learning in Higher Education* "Paradigm Shift in Higher Education", organized by the Centre for Development of Teaching and Learning. Invited address "How we think – Some implications of modern cognitive science for teaching and learning". National University of Singapore, Singapore, September 4–6, 2002.
– *Fourth European Conference on Organizational Knowledge, Learning and Capacities* (OKLC) "Moving knowledge: The problem of transfer and how to reframe it". Paper Presentation. IESE Business School of Navarra, Barcelona, Spain, April 12–13, 2003.

In preparing this manuscript I have made use of previously published material:

Chapter 1 incorporates sections of Lakomski, G. (2001). Leadership: Postscript and new directions. In: Wong, K.C., Evers, C.W. (Eds.), *Leadership for Quality Schooling: International Perspectives*. Falmer Press, London, pp. 116–134.

Chapter 3 is a revised and expanded version of Lakomski, G. (2001). Organizational culture, leadership and learning. *International Journal of Educational Management* **15** (2); edited by F. Crowther and S. Kagan, pp. 68–78.

I thank the publishers for permission to draw from these sources.

Last, and never least, when deadlines threaten, time races, and nerves begin to fray, what is required is chicken soup on tap and a level-headed editor. I am quite good at doing the former, and am most grateful to Anna Small for the latter. Her concise, thoughtful, patient and prompt work ironed out many wrinkles I created.

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Finally, my heartfelt thanks to my extended family, Coco, Gucci, and Astrid whose loyalty, love and continued support got me over the finishing line.

Part 1: Explaining Organizational Functioning: Leadership's Past and Present

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CHAPTER 1

Why We Can Manage without Leadership

1.1. Introduction

No modern concept seems more deeply entrenched in the collective mind than that of leadership, as attested to both by our strong habitual adherence to the idea on the one hand, and the existence of a truly voluminous and still growing leadership literature on the other. To question, in this context, the very existence and veracity of leadership, and to argue that we appear to get by quite nicely without it, if we free ourselves from the tyranny of habituated thought, seems to strain plausibility, if not lead to outright rejection. An enterprise such as this, then, is certainly ambitious, and in the eyes of many downright foolhardy. By the same token, critiques of leadership that push the boundary are not unknown, and my claim, provocative though it is, finds itself in rather good albeit limited company. One of the most radical contemporary critiques is offered by Alvesson and Sveningsson (2003), who speak of "the great disappearing act" of leadership and question whether leadership is in fact a real phenomenon that could be detected "beyond attributions or discourse (language use)" (Alvesson and Sveningsson, 2003, p. 363; also Alvesson and Deetz, 2000; Marion and Uhl-Bien, 2001; Wheatley, 1999).

Commenting on the results of case studies, Alvesson and Sveningsson state that managers' understandings of leadership "disappear" when they describe what they in fact do. Assuming only moderate criteria of coherence and clarity between the idea of leadership and managerial practice, they note that in their study at least "... it seems very difficult to identify any specific relationships, behavioral styles, a coherent view or set of values, or an integrated, coherent set of actions that correspond to or meaningfully can be constructed as leadership as important and intended" (Alvesson and Sveningsson, 2003, p. 377). Indeed, a host of other candidates for influencing processes in organizations can be found. The conclusion of their argument is that the presence of a strong leadership discourse may say something about leadership's popularity but is "no proof of anything". Whether or not leadership exists is subject to critical examination and should not be taken for granted. At the very least, the authors propose, a wedge should be driven between the idea of leadership and our unquestioned acceptance of its existence in order to make possible the rational examination of this purportedly real object. Of particular importance are the observations that there may well be other placeholders for what is commonly described as being changed or affected by leadership influence.

Looking back, the criticisms raised by Alvesson and colleagues had already been noted some thirty years ago by leadership theorists such as Miner (1975) and Calder (1977) in particular. However, none expressed them more lucidly and comprehensively than Pfeffer in his brilliant review of the state of the art, "The Ambiguity of Leadership", published in 1977.

Pfeffer stated bluntly that the concept of leadership was ambiguous both in definition and measurement; that the assumed causal link between leadership and organizational performance was difficult to detect empirically, and that the reasons for this might well be found in leadership selection processes with their built-in assumptions of leadership criteria that in turn determine and narrow leadership behaviors. As a result, it becomes methodologically problematic to detect the effects of leadership. In particular, Pfeffer offered some compelling reasons for why there is such a strong belief in the causal efficacy of leaders. For one, social reality is complex, and people need to make sense of it. In this respect "Leaders serve as symbols for representing personal causation of social events" (Pfeffer, 1977, p. 104). Locating causality in one person rather than attributing it to a set of complex inter-relationships makes for a simpler view and changeable model of reality. The upshot of this is that

> [T]he personification of social causality serves too many uses to be easily overcome. Whether or not leader behavior actually influences performance or effectiveness, *it is important because people believe it does*. (Pfeffer, 1977, p. 110; emphases added)

Pfeffer identified this kind of attribution as a case of "naïve psychology", and thus provided an early and striking example of what is now called "folk psychology" (Stich, 1983). His criticism, however, did not lead him to give up on leadership altogether. What we should give up rather is the "set of myths [that reinforce] a social construction of meaning which legitimises leadership role occupants, provides belief in potential mobility for those not in leadership roles, and attributes social causality to leadership roles, thereby providing a belief in the effectiveness of individual control" (Pfeffer, 1977, p. 111). It would be more advantageous to focus on leadership as a social influence process that always operates within constraints.

It is quite remarkable in the history of the study of leadership that so little serious discussion followed the challenges Pfeffer in particular laid out so eloquently for the field. This chapter is a contribution to the missing discussion on the core issues he raised. It accepts as a starting point where Pfeffer (1977, p. 111) ends his article: ". . . analysis of leadership and leadership processes must be contingent on the interest of the researcher. If the interest is in understanding the causality of social phenomena as reliably and accurately as possible, then the concept of leadership may be a poor place to begin." My interest is indeed in understanding the causality of social phenomena and because I do not begin with an *a priori* assumption of leadership's existence as a real object of our natural world, the concept of leadership is a rather good place to begin. Given the theoretical assumptions of this book, as outlined in the Preface, I am certain that Pfeffer would not object to this way of proceeding.

In the sections to follow I explore some of the central features and theoretical developments in the history of leadership studies, and then outline more briefly key issues

in the *New Leadership* following Burns' work, such as leadership and organizational culture, the idea of culture as cognitive process, and the concept of dispersed or distributed leadership. Such mapping is conducted to demonstrate some of the ongoing philosophical–theoretical and methodological difficulties of the field and to foreshadow more detailed examinations in Chapters 3 and 4, respectively. Although none of this story is new (see especially Evers and Lakomski, 1996, Chapter 6; Evers and Lakomski, 2000, Chapter 4), a certain amount of retelling is required to provide the necessary theoretical background for understanding the consequences emanating from theoretical commitments of leadership models, both early and post-Burns, especially regarding their claims to the essence of leadership. I argue that these claims are not well supported and that leadership studies, both in the first phase of their existence, and in the *New Leadership*, have been theoretically under-supported and empirically oversold.

What I call the third phase of leadership studies, developed by those theorists who aim both to update and to render more realistic traditional conceptions of leadership by taking into account culture, context and organizational practice, offer interesting new insights (e.g., Gronn, 1999, 2002). The perspectives of substituted, decentralized or dispersed leadership, discussed in Chapter 4, very nearly equate leadership with better organizational practice while at the same time wanting to "save" some essence of leadership in their notions of distribution. While these approaches are more differentiated and mindful of organizational contexts and functioning, their theoretical tools commit them to an incoherent account that surreptitiously maintains a notion of leadership as an essential human feature but wishes to mesh this essence with concrete organizational practice. The point to be argued here is that such tension undermines the claims made by advocates of distributed or dispersed leadership. In the next section, I take a closer look at some of the major developmental stages in leadership studies.

1.2. From leader behaviors to transformational leadership

There is little argument that the history of leadership studies is characterized by the ongoing effort to find more appropriate factors or variables that might help determine a leader's essential nature. If this were possible, so it was believed, we would be in a position properly to identify, and subsequently train leaders, and thereby, in the words of an early advocate, "... take adaptive steps toward controlling our own social fate" (Hemphill, 1949, p. 3).

Researchers attempted to identify a single trait that would account for leadership, and on failing to find one moved on to the identification of multiple traits deemed fundamental in leaders. Hence, the unitary trait theory was replaced by a constellation-of-traits theory (Gibb, 1959, p. 914). Because this approach did not yield substantive insights into what makes a leader either, increasingly complex interrelationships were postulated between such entities as organizational and group structure and environmental issues. The emphasis was thus shifted towards consideration of leadership with a focus on group performance or satisfaction, although personality characteristics continued to be an important aspect of leadership studies. To understand just why leadership became such a central occupation in organizational theory, it is instructive to be reminded

of what promise it was deemed to hold. In the words of Bowers and Seashore (1973, p. 445), leadership appears to have been guided by a "commonly accepted theorem":

> Leadership in a work situation has been judged to be important because of its connection, to some extent assumed and to some extent demonstrated, to organizational effectiveness. Effectiveness, moreover, although it has been operationalized in a variety of ways, has often been assumed to be a unitary characteristic. These assumptions define a commonly accepted theorem that leadership ... is always salutary in its effect and that it always enhances effectiveness.

Subsequent empirical and theoretical work has cast considerable doubt on such confident expectations (see especially Lawler and Porter, 1967; Perrow, 1986).

The many early empirical studies of leadership were conducted mainly by quantitative methods and consisted of operationalizing variables by means of designated observable administrative behaviors documented in surveys or questionnaires (e.g., Stogdill and Coons, 1957). By far the most prominent instruments were the *Leader Behavior Description Questionnaire* (LBDQ), developed by Hemphill and Coons (1973, pp. 6–38), and the *Leadership Opinion Questionnaire* (LOQ), a leader self-assessment instrument. In addition, the two-factor theory of leadership characterized by (1) "consideration" (C), and (2) "initiating structure" (S) (Halpin and Winer, 1973) became the stock-in-trade of empirical leadership research. These instruments continue to be part of contemporary administrative-managerial folklore. Their popularity notwithstanding, the bad news was that these two variables turned out to possess less predictive power than was ascribed to them (Korman, 1966).

The general methodological procedure applied in the above instruments involved analyzing the variables thus compiled by means of increasingly complex statistical-quantitative methodology, which, researchers believed, provided solid empirical support to make generalizations about leadership across organizational contexts. The hope was that such generalizations could serve as a sound basis for the training of good leaders and the creation of efficient organizations. As history subsequently showed, this aim was not achieved.

Failure was in part due to the fact, amply attested to in the literature, that there is no agreed-on definition of leadership, and that whatever we know about leadership is fragmented and open to different and often contradictory interpretations (Alvesson and Sveningsson, 2003). Furthermore, it is generally conceded that there is no unambiguous knowledge base (e.g., Bryman, 1986, 1997; Howe, 1994; Hunt, 1991) on which to build a robust account of leadership. It was also reported that different organizations facilitate or bring forth different leadership effects, and that comparisons were practically unreliable and misleading (Perrow, 1986). The upshot of these studies was that leadership, like beauty, could be said to be in the eye of the beholder, and that it has not been possible to determine anything like an essence of leadership that is clearly identifiable and beyond doubt.

As for the *New Leadership*, the term coined by Bryman (1986) to designate the new period of leadership studies emanating from Burns' seminal work of the 1970s, there remains a close interrelation with the older single- or multiple-trait approaches. Bryman (1997, p. 282) notes that the *New Leadership* "ties in with the great appetite

for stories about heroic chief executives". Although he excludes the work taken from Bass's initial transformational leadership research, he maintains that the *New Leadership* nevertheless "can be accused of concentrating excessively on top leaders" (Bryman, 1997, p. 282). This comes out clearly in the emphasis on the so-called transformational qualities of leaders. Among these are the creation of organizational visions or missions, the motivation of staff and the engendering of extra effort, as well as the changing of basic values and beliefs (Bass, 1985; Bass and Avolio, 1994; Bresnen, 1995, pp. 496–497).

Given the continued emphasis on the role of the formal leader, now conceived as *transformational*, the *New Leadership* perpetuates some of the shortcomings of the approaches it was designed to supersede. It continues to study the heroic and formal leader and thus almost exclusively examines leadership *at the top*. Continuing to focus on the individual to the exclusion of the group or groups makes the study of *informal or other leadership processes and practices* almost impossible. Hence, the application of quantitative research methodology on issues of, say, school principal or CEO leadership still dominates empirical work in the field. The suggestion that qualitative case studies might be more appropriate in their attention to local conditions and the interplay of subtle relationships not captured by surveys or other statistical means is only slowly gaining recognition.

A point closely related is the paucity of research dedicated to the "situational factor", traditional leadership studies' black box. Indeed, one of the advocated strengths of the transformational leader is the ability to transform people and incite them to perform "beyond expectation" and to redefine problematic situations so that they appear manageable and less threatening by subordinates (for a fuller discussion of transformational leadership as conceived by Bass and associates see Evers and Lakomski, 1996, pp. 72–77; Yukl, 1999). There is no indication that the organizational internal or external environment has a substantive role to play in determining or shaping leadership. The emphasis remains on the personal characteristics of the leader, as defined in the various approaches. This observation is not new and has been made forcefully by Perrow (1986, especially Chapter 3; see also the studies conducted by Bryman et al., 1996 and Leavy and Wilson, 1994).

The final point to note relates to *causal attribution* (Evers and Lakomski, 1996), which is far from clear in that writers advocating transformational leadership also acknowledge the complexities of implicit leadership and attribution theories, and follower perceptions. This is a difficulty to which I will return later.

1.3. Empiricist science and leadership

The most important link connecting otherwise differing leadership models from the early days to the *New Leadership* is the scientific framework in which leadership was studied. The motivation of early leadership theorists to study leaders and leadership scientifically is an honorable one, because it is science that lets us know whether phenomena in our social and natural environments exist. Thus, it is not the *scientific* study

of leadership that is the problem, but rather the model or conception of science employed to do so. It is important to note that adopting a specific conception of science brings with it certain conditions and theoretical commitments, all of which differ given the model's fundamental assumptions. For example, what is considered to be evidence differs markedly between an empiricist account of science and that of naturalistic coherentism. One size most certainly does not fit all. The model of science that prominently underwrote early and late leadership studies is that of (logical) empiricism (especially Feigl, 1953; for discussion see Evers and Lakomski, 1991, pp. 48–59).

The conception of empiricism determines, *inter alia*, how the alleged phenomenon is to be studied (methodological prescription of hypothetico-deductive procedure); it stipulates what counts as *evidence* (observational adequacy); and it implies a conception of the *human mind.* This assumption is not commonly noted, and may come as a surprise. Its importance, however, is not difficult to appreciate, resting on a simple point that has far-reaching consequences and implications. Because, in Patricia Churchland's lovely phrase, we are card-carrying members of the animal kingdom, whatever we claim to know, or to have found out about our universe, must be compatible with our natural abilities to investigate and to acquire the information. We cannot find out things for which we do not have the physical wherewithal. Putting the matter the other way round, we can only know what our minds/brains make it possible for us to know. Such is the self-referential nature of human knowing (Quine, 1969; Churchland, 1987). And here it is important to specify exactly what kind of mind/brain we are talking about.

Traditionally, the model of the human mind has been assumed to be akin that of a symbol processor, a computer-like engine that allows us to manipulate successfully a range of symbols of which language is deemed the most significant. (See Clark, 1997; Dreyfus, 1987; Hutchins, 1996; Norman, 1993; and Evers and Lakomski's (1996, 2000) extensive discussion of the symbol processing view as represented by Simon and colleagues.) This view of the human mind is very limiting because it assumes that what we know, and are able to know, is expressible in symbolic form only. Everything else that humans do, like leading organizations, playing the piano, teaching a class, or being "good with people", remains in the realm of the inexplicable, the practical domain we cannot find the words to explain. The worry for leadership studies here is quite considerable because transformational leadership in particular has been imbued with just such intangible qualities for which there are no appropriate methodological measurement tools. Methodologically, then, the narrow view of cognition as symbol processing misses important features of transformational leadership, because intangibles cannot be captured in the grid of such symbolic representations as questionnaires or surveys. It might rightly be pointed out that there are qualitative means of assessing transformational leadership in terms of interpreting certain leader behaviors, or by applying leader self-reports. These are imbued with their own problems because of the inability of differentiating between competing interpretations, a core problem of interpretive social science and hermeneutics (Lakomski, 1987), and by the endemic unreliability of self-reports (e.g., Nisbett and Wilson, 1977).

Given what I have just said about the model of the human mind inherent in empiricist science, how to create such outstanding transformational leaders thus remains in

the realm of the mysterious because this model cannot account for its origins. More precisely, there is no indication of how leaders become leaders, because they must have learnt whatever are deemed relevant skills sometime in their careers. In the following, let us consider the empiricist model in a little more detail to make quite clear where it breaks down, and what the consequences are for the study of leadership.

What is also described as the *hypothetico-deductive* account of scientific theory and practice postulates that empirical evidence consists of singular observations. To be more exact, it consists of observation reports of behaviors that are hypothesized to be representative of whatever leadership construct is being tested. These individual claims, expressed in observation reports, are at the bottom of the hierarchy where they form the *foundations* for claims to leadership at the top of the hierarchy. Through the process of deduction and testing empirical claims are examined, and it is this very process that defines the *hypothetico-deductive* account. Because it is a core feature of empiricist theory that its foundation is based on indubitable observation reports, every claim made has to be able to be defined empirically. This stipulation also holds for theoretical objects, and in order to deliver such invisible objects into the realm of the observable, the very important concept of *operational definition* has been introduced. For example, because it is not possible to see a theoretical object such as democracy, for instance, it is assumed that its presence can be deduced from observing certain behaviors such as voting, attending political meetings, or writing newspaper articles critical of government immigration policy. These behaviors are considered as tokens for the existence of the concept or theoretical entity.

However, as pointed out by interpretive social science, hermeneutics and recent philosophy of science, what we observe is always laden with some kind of interpretation or theory. As a consequence of the thesis of the theory-ladenness of observation, the empiricist conception of evidence, the principle of *empirical adequacy*, is unable to determine the facts of the matter (for philosophical discussions on these issues see Williams, 1977; BonJour, 1985, especially regarding foundations of knowledge). This is because (1) more than one interpretation may fit the data; (2) it is incapable of ruling between competing interpretations, because recourse to empirical adequacy would involve it in a vicious circle; and (3) the evidence gathered for the existence of leadership, in whatever conception, is mainly based on questionnaires and quantitative-statistical methodology.

The main problem with these issues is that the empirical methodology of mainstream leadership studies is not able to separate out what people *implicitly believe* about leadership anyway from what they report as having observed in a specific situation by filling out a questionnaire (e.g., Gronn, 1995; Pfeffer, 1977). Only observation is admissible in the empiricist approach, not interpretation. However, because people always see things differently, there is no clear way to determine whether the observations people report are empirical phenomena, or simply attributions/interpretations on their part given their own understandings of what leaders look like and what they do. These difficulties have led some theorists to argue that leadership is thus merely a *socially constructed* category (e.g., Chen and Meindl, 1991; Smircich and Morgan, 1982) that wrongly and misleadingly reifies an abstraction, that is, makes into an object something that does not really exist. The upshot of this is that the answers reported on questionnaires can be considered as after-the-event rationalizations of people's subjective views of leadership rather

than the objective measurement of what a "real" formal leader did in some specified context and time-frame. There is thus a built-in, endemic uncertainty about empirical claims to leadership in the empiricist framework.

As a result of these criticisms, leadership appears to be established mainly through the eyes of those who *interpret* a given set of behaviors as such. Leadership on this account remains a subjective interpretation with no warrant for scientific status. And yet, the objection goes, we do encounter people who seem to fit various descriptions of leaders, and we also encounter effective, good organizational practice. If the empiricist account of leadership is not the right account to explain how this is possible, then, in the eyes of some, perhaps there is no scientific explanation of the phenomenon to be had at all. Some people simply end up being leaders, others don't. We "learn through experience", and some do it more effectively than others, and that is all there is to it. Fortunately, we do not have to trade in science for experience for the latter is amenable to explanation by the former – on a more satisfactory account of science and of learning.

But before we get there, it is instructive to explore briefly two related developments in the (organizational theory) leadership literature that emerged in the wake of the *New Leadership*, and of which they are variants. The reason for doing so is that these perspectives attempt to consider the "situational factor" not simply in an additive manner in terms of factor analytical variables that can be added to the personality factors deemed relevant to the leadership model under discussion. Rather, the "situational factor" is explored (1) in the context of the study of *culture and leadership* (e.g., Hallinger and Leithwood, 1996; Hatch, 1993; Heck, 1996) and (2) by considering leadership as a *dispersed* feature rather than an individually owned category made up of personality traits.

Methodologically, these approaches are more holistic and thus offer a more appropriate way of studying interconnected phenomena in their naturalistic settings. They open up avenues of research not previously considered valid for the study of the leadership phenomenon, and thus considerably broaden what is taken to comprise the legitimate domain of leadership studies. The overview presented in the next sections serves to focus on some central issues that will be expanded in Chapters 3 and 4.

1.4. Leadership and organizational culture

The recognition that an organization's *culture* is an important phenomenon that contributes to the understanding of its functioning has emerged relatively recently in organization theory (Jelinek, Smircich and Hirsch, 1983; Smircich, 1983; Meek, 1988). More specifically, the emphasis on organizational culture denotes a development away from structuralist-functionalist explanations of the workings of organizations to an emphasis on language and the creation of meaning, and how organization members *interpret* their reality. The many advantages of employing the conception of culture in the study of organizations are outlined brilliantly by Weick and Westley (1997, p. 442):

> First and foremost it [culture] is embodied in the language, the words, phrases, vocabularies and expressions which individual groups develop. Secondly, it is embodied in artifacts, the material objects a group produces, from machines to decorative objects, from

> buildings to paintings. Lastly, and most ephemerally, it is embodied in coordinated action routines, predictable social exchanges from highly stylized rituals to the informal (but socially structured) convention of greetings with acquaintances. Thus culture as theoretical construct meets all three . . . criteria for social science of organizations: the invisible (social relations) made manifest in the tangible (artifacts as models); the middle-range concepts which offer experiential reference points; and an option of approaching the phenomena with methodologies which build on empathy and empathize feeling (such as literary analysis, ethnographic analysis and ethnomethodology.

Given this description, it is not surprising that a basic tension emerges in the study of organizational culture. On the one hand, organization theorists of culture are concerned with its explicit features such as order and stability, and on the other they want to find out about what is implicit. It is only to be expected that this concern surfaced in contemporary studies of organizational culture since it denotes a fundamental tension in the parent discipline of cultural anthropology itself where it is discussed as the "paradox of culture" (Strauss and Quinn, 1997). This tension will be discussed in some detail in Chapter 3.

A second shared trend is also evident, especially in the popular management literature such as the writings of Deal and Kennedy (1982), Peters and Waterman (1982), and Schein (1992). In these works, culture is generally considered as a tool of management used to mould the beliefs and behaviors of organization members so that the organization's purposes may be reached satisfactorily. (For critiques of culture-as-control see Angus, 1995; Willmott, 1993.)

A common theme that unites studies in organization theory is the assumption of leadership as culture creation and of the leader, often through his [!] vision, as the creator of culture. This conception is evident, for example, in the writing of Peters and Waterman, as well as that of Schein (1992) whose work is most prominent amongst management and organization theorists interested in culture. Because leaders in the New Leadership mould are also entrusted with transforming their organizations, a related element of culture creation is also that of culture change when an existing culture has become maladaptive and no longer serves to fulfill the goals and purposes of the organization. Hence the aspect of change is explicitly related to culture, and Schein's model presents a good case in point. While his conception does not stand for all in this genre (also Hofstede, 1984, 1991), it nevertheless is a prominent example of thinking on the issue of leadership and culture. Schein is especially concerned to explain the apparently non-rational reactions of organization members in the face of required change and believes that the dynamics of culture hold the key to understanding this widely observed phenomenon in terms of group differences, and why their attitudes are so hard to change.

According to his view of culture (Schein, 1992, p. 10) as "the accumulated shared learning of the group", culture is considered to allow leaders to get at the "taken-for-granted basic assumptions held by the members of the group or organization" (Schein, 1992, p. 15), which are similar to Argyris and Schön's (1996) concept of theories-in-use. The latter are those unspoken and unacknowledged understandings that guide people's behaviors and actions in contrast to the verbal explanations they give of their actions. The former are extremely difficult to get at, because we are not conscious of them. It

is however imperative that they be changed by means of Argyris and Schön's double-loop learning. Such a process is understandably disturbing and unsettling and will lead to the production of defense mechanisms (Argyris, 1990). Leaders need to know this, for it is through these mechanisms that groups defend their old culture. The relation between culture and leadership in Schein's conception is that they are in fact two sides of the one coin. Leaders first create culture, and then determine the conditions under which leadership is or is not allowed to be executed. Schein develops a conception of a self-correcting, learning culture, steered by a learning leader, which is capable of diagnosing and responding appropriately to changes in its environment on an ongoing basis. A fuller critical treatment of Schein's conception of organizational culture and its connection with leadership is given later in Chapter 3.

There is, however, another qualification in the organizational culture and leadership debate worth noting. Organization theorists who argue for the importance of shared meanings and agreed understandings as the core of culture tend to assume that there is one dominant and cohesive culture that gives rise to those shared understandings. Martin (1992) calls this the "integration" perspective (a view often criticized for its simplistic conception of the social fabric and its inherent political conservatism). It is also present in Schein's work, for example. This view is challenged by the "differentiation notion of culture" in which it is not assumed that there is basic consensus or one culture. Rather, leadership is considered as happening in sub-groups or counter-cultural groups. Added to this is the third "fragmentation" perspective in which organizational cultures are seen as fragmented and ambiguous, a state of affairs attributed to the complexity and size of modern organizations. In this view leadership is by necessity de-centered, and what has traditionally been described as the organizational leader's task of sense-making and creating has practically become impossible. Attempting to change the culture in order to create a coherent new culture appears futile because of modern organizational diversity, complexity and fluidity. The role of leadership becomes quite ambiguous, and rather than engaging in the management of meaning, leadership is likely to issue in "the transmission of equivocality" (Bryman, 1997, p. 286). The upshot of this latter view is that leaders and their visions and actions appear less important and less effective than in the other frameworks. It is arguments such as these that support the idea of leadership as being dispersed.

Because the application of the conception of culture to leadership studies, as presented, is touted as a qualitatively superior way of accounting for the "situational factor" that affects or substantively determines leadership depending on one's point of view, it is imperative to examine what is actually meant by "culture", and what constitutes the "changing of culture". This is also another way of asking whether the leader is the causal change agent as assumed in all models, how we might think of leadership, and whether we should think of it at all.

1.5. Reconsidering culture as cognitive process

The paradox encountered in the present discussion regarding leaders as cultural change agents lies squarely in two fundamental tendencies that inhere "culture" and subse-

quently all organizations as well. What Ouchi and Wilkins (1988) describe in terms of the tension between organizational order and rationality on the one hand, and its non-rational implicit features on the other, Hosking (1988, p. 148) considers as the problem of describing "organization as a noun, as a state, entity or 'condition' " rather than "as a verb, as activity and process"; both directly conflict with each other. Not surprisingly, this is an example of the "paradox of culture" referred to earlier.

The paradox can generally be described in terms of the duration and stability over time of shared powerful meanings – culture as a bounded and timeless system of public meanings on the one hand, and the very existence of cultural diversity and change on the other. So on the one hand, there is cultural reproduction which attests to stable structures over time, no matter what social-political perspective one adopts in appraising it (e.g., "The University of Melbourne"), while at the same time there is also contestation over meanings, cultural variation and radical change. In cultural theory, both positions, that is, the focus on the external public forms of culture and the interpretations and understandings of these public forms, have been considered in "either–or" terms, because it has not been believed possible to explain how cultural theory could explain the durability of cultural forms and expressions as well as their obvious change over time (Strauss and Quinn, 1997).

Both the durability of cultural practices and the fact of their variation, dissolution or change can be explained by the way in which humans acquire, process and represent information as the result of the specificities of the neural architecture of the human brain: they manifest two potentialities of human knowledge representation. As a result, and for reasons to be explained later, both sides of the (organizational) cultural dispute are valid, and on this account "organization" can be both object and process, Hosking's concerns notwithstanding. They are simply different aspects of the ways in which humans represent what they have learnt.

A first step in unraveling the supposed mystery is to consider that culture is not a thing, an entity that exists over and above human production and history, but happens as the result of human interactions and shared experiences over time. Speaking from their discipline of cultural anthropology, a fundamental category in Strauss and Quinn's (1997) conception of culture is that of cultural meanings, which for present purposes play the part of "taken for granted basic assumptions" (Schein) or Argyris and Schön's theories-in-use, in that they denote the causal realm in which sense-making is said to take place. The central question to ask is how did we acquire cultural meanings? The important fact to recognize for the purposes of this discussion is that human cognition's inner non-symbolic dimension (such as meanings, understandings, beliefs, reasons), while different, is not radically separated from cognition's external, symbolic representation (Evers, 2000).

The long-held assumption that human cognition is limited to what we can express in language or other symbol systems has considerably narrowed our understanding of the scope of cognition. In excluding knowledge of our inner world of values, feelings, and those things we know how to do but cannot express in symbolic form, our practice (Hutchins, 1991, 1996), we have for a long time worked with an *additive* view of cognition and culture: culture as something added to the workings of the mind while

remaining substantively separate from it. However, we now know better. Contrary to the assumption of the additive view, our brains are not primarily symbol processors (like linear computers) but are a vast confederation of interconnected neural nets whose *modus operandi* is to work in parallel rather than linear fashion (for a brief discussion of how brains learn see Churchland, 1993, pp. 159–171; Sejnowski, Koch and Churchland, 1988). The cultural anthropologists Strauss and Quinn (1997; see also Holland and Quinn, 1993) have begun to draw out the implications of a connectionist account for cultural theory. This account applies equally well to organizational culture, and cultural change and leadership, as we will see later.

1.6. Distributed leadership

If, as argued in the previous section, the explanation of organizational change equates with the explanation of the durability of cultural meanings, practices and so on, then at the very least it should have become obvious that there is no direct causal link between the leader and organizational change. The early attempt to redescribe organizational culture in neuroscientific terms, while merely at the beginnings, points to some very important insights. For one, what has been termed the *embodied and embedded brain* by writers such as Clark (1997) and Hutchins (1996) allows us to recognize for the first time just how human cognition works in its external symbolic as well as its internal neural net representations, and that it does so seamlessly. Cultural external manifestations can be explained as externalizations as well as extensions of the human mind that is limited in its computational capacities (for detailed discussion of this complex issue see Clark, 1997; Norman, 1993). The forming of organizations, or more generically, organization, is the telling example of the results of the out-sourcing of complex task solutions throughout human evolutionary history.

The other conclusion has already been alluded to earlier: leaders are embedded in the cultural–organizational context as is everyone else; their formal position at the top of the hierarchy does not bestow cognitive privilege, because the patterns of cultural meanings do not acknowledge structural positioning. However, in so far as people tend to know what they learn from their more immediate environments, shaped by the specificities and nature of the work tasks and tools, there exists an organizational differentiation created by differential inputs, for example, created by differential access to information. This is the kind of cognitive differentiation that matters in an organization.

The idea of dispersed or distributed leadership, as currently gaining ground in organization theory, goes a long way towards debunking the leader myth of traditional leadership theories in attempting to account for situational and contextual factors. Robinson's discussion (2001) of *distributed leadership*, leadership as a process, coheres well with the argument presented here. Taking her departure from the observation that traditional leadership studies treat leaders and the tasks they are entrusted to accomplish as completely disconnected, Robinson puts forward a view of leadership as embeddedness in task performance. Her conception of leadership, as both distributed across work groups and as inherent in the very tasks to be solved through organizational action, is the most

radically de-centered view offered. Her observation that "Leadership disappears when tasks are well-structured, because the knowledge that progresses the task has been structured into the technologies and routines that are involved in its completion", Robinson (2001, p. 101), comes close to abolishing the concept completely. However, she believes that leadership is still required in the conversion of ill-structured to well-structured problems.

While for Robinson leadership is distributed in terms of its embeddedness in task performance, for Hosking leadership is thought of in terms of a "bottom-up" approach that focuses on "leadership acts and processes as special kinds of organizing ... This makes leadership intrinsic to organization, rather than a mere epiphenomenon as in a top–down perspective" (Hosking, 1988, p. 150; see also Knights and Willmott, 1992). The skill of "networking" is identified as a core leadership skill. Gronn (1999) recently suggested a model of *distributed leadership systems* "... as the demonstrated or presumed structuring influence attributable to plural-member organisational units". We shall revisit this idea again later.

Other writers such as Manz and Sims (1991) and Sims and Lorenzi (1992) have coined the term "SuperLeadership", which emphasizes leading others so that they may become leaders themselves. For Kouzes and Posner (1993) leadership means emancipation from formal leaders and taking on leadership through groups and teams, as is the case in Katzenbach and Smith's (1993) proposal for the development of leadership through "real teams".

These various positions cannot all be discussed now, but they are important to note in terms of the greater awareness that leads away from studying designated formal leaders to studying the complexities of contextual and situation-specific organizational functioning and practice, mostly conducted in groups or sub-units. The meaning of dispersed or distributed leadership is generally indicative of such emphases. Chapter 4 takes a more detailed look at some prominent perspectives of dispersed leadership. Attention to teams, groups and specific organizational processes and practices is a very important development, because it is through such fine-grained empirical work that more insights can be gathered of organizational functioning. However, what is absent in those perspectives is an account of how organization members acquire cultural–organizational knowledge; that is, the very machinery that makes their practices possible.

Given the preceding comments, at the very least, we should no longer be able to use the concept of leadership with the innocence of old – notwithstanding current popular writings that appear to perpetuate the myth with scant regard to, or knowledge of, its many difficulties. While Robinson makes an interesting point in terms of leadership being required in converting ill-defined into well-defined problems, it is the ensemble of organizational/group cognitions that is responsible for the change.

The distributed nature of human cognition in its internal and external facets, coupled with the strong determining inputs of specific contexts and situations, is where causal explanations of how things happen in organizations are to be found. They are to be found in the contextual specifics of organizational procedures and processes, and they will differ from situation to situation, and between organizations. There can no longer be any pretense of developing *a* theory of leadership, just as it is no longer possible to

speak of *the* culture of the organization. We can of course continue to speak of formal leaders as "tenants of time and context", that wonderful phrase coined by Leavy and Wilson (1994, p. 186). And, to be sure, it will be difficult to override our old neuronal patterns of leaders and leadership, because they are constantly activated and re-activated in our culture. But as the previous brief overview indicated, while change may be slow, it does happen. We might just begin by training ourselves in talking about effective organizational practice and how to bring it about, and drop talk of leadership and leaders from our vocabulary as no longer useful in helping us create better practice in any of our organizational endeavors. However, before we get there, we need more help in rethinking leadership.

1.7. Conclusion

Leadership can be considered as an attempt to find some order or pattern in organizational functioning (see Evers and Lakomski, 2000). Traditionally, as we saw in the preceding discussion, it is conceived of as a pivotal node that exerts control, and thereby facilitates and dominates organizational functioning and performance. Equally, however, there was always doubt that such a pattern, characterized as a central source of control, actually exists. As Pfeffer (1977) has described previously, we appear to be programmed towards seeking out single causes or sources to order complexity, by what Resnick (2000) calls a *centralized mindset*. Observing a flock of birds in flight makes us assume straight away that the bird out front is the leader who sets the flight path. The same mindset is at work in our folkloristic description of the harvester ant queen who is said to rule over her colonies. Yet no such thing happens (Johnson, 2002). Ant queens oversee nothing and lead no one. They exist at a far remove from the throng of worker ants whose division of labor constitutes and re-constitutes the actual survival of the colonies "from the bottom up", while the queen's job is limited to that of reproduction. The *modus operandi* of ant colonies, as distinct from individual ants, is the intricate interplay of thousands of locally produced behaviors, insignificant on their own, but powerful at the macro scale because the ensemble of local action has the individually unanticipated consequence of the survival of colonies over time. What characterizes this behavior is that it is *distributed*; more precisely, it is a matter of *cognitive distribution*, built from local elements that through collective action manage to produce global behavior (Johnson, 2002, p. 74).

There is no simple implication here that humans are or act like ants. The suggestion is nevertheless that we might learn something from the emergent nature of complex systems that learn from the ground up when studying the leadership phenomenon as akin the flocking behavior of birds, or indeed the work of ants, that is, as the *self organizing property of complex systems*. Observing such patterns in organizations might be explained by positing leadership as the explanation; however, we might also conclude that such is not necessary because organizations are merely behaving *as if* they are guided by a leader while none is necessary. The point to be made here is that a conclusion can only be reached *after* examination, and that the assumption of the centralized mindset

must not be accepted as privileged. While considering leadership as an emergent property of a complex dynamic system is rather a provocative thesis, this book presents some fascinating results in the study of self-organization that support such a thesis.

In the next chapter I consider leadership viewed from the perspective of postmodernist theory. In a way, the postmodernist perspective can be called a "stand-alone" view because it is the most explicit *anti-science* position in administration and organization studies alike. It has been quite influential in the social sciences, and it is therefore important to see whether its claims are well founded. We also need to see what consequences the anti-science stance has for the theory in regard to claims of leadership, the "discursively constructed self", and "the death of the subject".

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CHAPTER 2

Postmodernist Leadership

2.1. Introduction

In the introduction to his *Postmodern School Leadership* (1994), subtitled *Meeting the Crisis in Educational Administration*, Maxcy sums up the postmodernist agenda: "Educational administration research and publication has been traditional, conservative, and naïve: Postmodernist critique reveals this fact while pointing to normative moves that may correct and improve administrative theory and practice" (Maxcy, 1994, p. 10). The aspirations expressed here (see also, Maxcy, 1991; English, 1994, 1997, 1998, 2003) are nothing short of an alternative way of understanding the social and cultural crises experienced in Western society, as well as sorting out the turmoil in contemporary educational administration.

The postmodernist perspective's most important feature, for present purposes, is its insistence on the irrelevance, even danger, of a scientific approach to educational administration, where science is identified with positivism which, it is said, has proved to be a destructive myth. Anglo-American postmodernist writers opt instead for the playfulness, indeterminacy, and open-ended nature of literary approaches to the understanding of social phenomena, as presented by theorists of the French tradition such as Foucault (1972, 1980) and Derrida (1976).

As postmodernism is the most outspoken anti-science movement in current social (cultural) theory as well as educational administration, it is important to understand the theoretical assumptions and frameworks of postmodernist writers to evaluate their usefulness for educational and organizational theory and practice. This position shifts with the emphases of its advocates, but it is the rejection of science that is at issue in this chapter. While the mis-identification of science with positivism can be quickly disposed of, there remain more interesting postmodernist claims regarding the primacy of discourse and the so-called "death of the individual", with an abandonment of that inner human dimension of emotion, reason and feeling traditionally taken to be indicative of a self.

The idea of the de-centered, positional and contingent individual, constructed in and through discourse, is a valuable insight, albeit not for the reasons advanced by postmodernists. Language does play an important part in what it is to be human, but it does not "construct" a human being. What is described as the subject's *de-centered* and *fragmented* state indicates no more than the manner in which human beings acquire and process information in their various environments, both social and natural, because of

the special features of their evolved brains. Being "positioned" is our natural state of being. Where exactly the boundaries of self are drawn in this discussion is a question in search of an answer.

Although the Cartesian ego is indeed a misrepresentation of self, we would never know this on the theoretical resources of postmodernism. Left to its own devices, the postmodernist rejection of Descartes' cogito remains a narrative amongst others, robbing the critique of its point. More importantly, the postmodernist rejection of science results in a spectacular loss of knowledge – at a time where knowledge from the sciences and philosophy provides initial answers to many of the problems that postmodernists rightly pose. In particular, developments in neuroscience are beginning to present explanations for the "neural self", and this chapter concludes with what such an account might look like.

Why a postmodernist stance should be taken seriously as an alternative to a scientific approach in educational administration is indeed a puzzle. The case made in this chapter is that postmodernism, although it makes a number of fruitful observations, falls short of substantiating its own claims. Ironically, its critique relies in part on the version of science it rejects; that is, on empiricism with its implied restrictive theory of mind. Where the insights of postmodernism are useful, they derive their value precisely from the view of human learning and knowledge processing developed by recent connectionist cognitive science.

2.2. Postmodernism in organization theory and educational administration

Critical discussion of the postmodernist movement in educational administration is not yet well advanced (Barlosky, 1996; Constas, 1998; Evers and Lakomski, 1996b, Part IV; Willower, 1998). In his discussions of the nature and (lack of) progress of the field, Willower (especially in his 1998) comments on the shortcomings of this new perspective. It is not surprising that he singles out postmodernism and poststructuralism for special attention, because both run counter to what Willower believes advances the theory and practice of educational administration. For present purposes, we can take four doctrines as central to a postmodern position:

(1) the metaphysics or philosophy of presence and representation,
(2) metanarratives and the rejection of "essentialism" or "foundationalism",
(3) textualism and the primacy of discourse,
(4) deconstruction and the "death of the individual".

There are other doctrines implied in the four mentioned that deserve to be singled out, such as the power/knowledge nexus and the belief that research should be "aimed at resistance and indeterminacy where irony and play are preferred to rationality, predictability and order" (Alvesson and Deetz, 1997, p. 205). All these will be taken up later.

Despite the many different uses of the term, it is fair to say that the postmodernist movement arose in opposition to the "modernist project" characterized by its Kantian Enlightenment emphasis on rationality and autonomy; by the overcoming of enslavement, both material and intellectual; the progressive victory of reason over prejudice,

and the growth and beneficence of science in understanding and controlling the natural and social world. When applied to the organizational context, the term "modernist", following Alvesson and Deetz (1997, p. 194) is used to

> . . . draw attention to the instrumentation of people and nature through the use of scientific-technical knowledge (modelled after positivism and other 'rational' ways of developing safe, robust knowledge) to accomplish predictable results measured by productivity and technical problem-solving leading to the "good" economic and social life, primarily defined by accumulation of wealth by production investors and consumption by consumers.

Much of the flavour of postmodernism in educational administration is caught in the work of English, for whom theories in educational administration are simply stories or narratives that can exert power over us (1994), especially when they remain hidden from our perceptions due to culturalization patterns. English is motivated to fulfil the political ideals of democracy, which in his view are not pursued by present theories in educational administration subject to infection with management ideologies centered on prediction and control. Such distortion leads to power games and purposes, and perpetuates "systems of schooling that are clearly deficient, dysfunctional, and counterproductive to the political ideals of a democracy" (English, 1994, ix). Knowledge and truth are intimately woven into and created by discourse and are never neutral.

The role of knowledge, as discussed in detail by Scheurich (1994), is *not* to explain the workings of the social and natural world. This aim is considered to be the prerogative of positivism, which is believed to be false. Thus the aim itself is judged futile. Rather, knowledge is dependent on its varying historical contexts and social conditions. This is an attack on views of knowledge labelled "essentialism" or "foundationalism". Epistemology in this perspective is no more than a "truth game". As a result, science joins the ranks of other metanarratives including realism, critical theory, feminism and constructivism. Scheurich argues that epistemological judgments on the nature of reality are too problematic even for scientific realism (the standpoint defended by Evers and Lakomski (1991, 1996a, 2000), and strangely one cautiously applauded by Scheurich; also see Barlosky (2001) for a critique of Evers and Lakomski). In his view, it is not possible to have any kind of realist conception of the social sciences because its categories, like all categories, are socially constructed within shifting and different contexts. However, it is claimed that such a condition does not lead to a vicious relativism, because the social character of our knowing sets limits on how we think and what we do. Knowing and acting are thus properly relative to the constraints of context and history. Because of these features, his "social relativism" is offered as the alternative to "any positivist or realist efforts to develop foundational or ahistorical truths or truth claims" (Scheurich, 1994, p. 22). Scheurich believes that it makes little sense to propose "postfoundational" criteria, standards, procedures, decision rules or rationality, because nothing can rise above historical relativity, as described.

The view of educational administrators as serving the interests of power and repression pervades postmodernist writing. Prominent intellectual origins are found in Foucault's conception of power, discourse and method (Foucault, 1977, 1980; see Anderson and Grinberg, 1998, for an explicit discussion; English, 1997, 1998; McKinney and Garrison, 1994). Broadly in agreement with this perspective, Maxcy (1991) discusses the

preparation of principals, and broadens the discussion to school leadership in his 1994 text. He claims that what sets this approach apart from earlier efforts, which accepted the definition of educational administration derived from positivist social science, is "that postmodern administration theorists draw on new philosophy, literary theory, qualitative research methods, and other nontraditional intellectual backings" (Maxcy, 1994, p. 10).

Postmodernism's reliance on language allows the displacement of the structure of the (Cartesian) unconscious in its emphasis on textual and discursive fields. Human actors are always part and parcel of ongoing discourses into which they are born and which shape them. Discourse determines what an individual is able to express as relevant and worthy of attention in the world. It positions the agent in the world, and provides the structures of being in it. Human subjectivity and identity are therefore determined by the discourses in which the individual is located. In opposition to humanism, the origin of experience is not the autonomous self as declared by Descartes, but a self that is social first.

Following Foucault (1977, 1980), discourses as systems of thought not only depend on material practices but in turn shape them linguistically as well as practically by means of power techniques. Power is an integral part of discourse. In this way particular subjectivities are produced. The view of the person, given the primacy of discourse in meaning creation, is subsequently a de-centered and fragmented one; there is no autonomous, rational, self-determining individual with a unitary identity. Subsequently, the so-called "death of the subject" is possibly the "clearest common thread of theoretical writings ranging from Foucault, Barthes, Derrida, and Lacan in France to the cultural studies movement in England and America" (Baack and Prasch, 1997, p. 131). Baack and Prasch present an excellent overview of the history of the death of the subject. It is not that the subject has disappeared completely, but that its grounding has been shifted to give expression to the construction of identity. Baack and Prasch (1997, p. 135) emphasize that while the subject is de-centered, the *experience* of subjectivity is not: "... if subjectivity is conceived as positional and contingent, then the subject cannot be taken as unified over time; the experience of subjectivity, however, never takes place over time at any rate, but only in immediate relations". They sum up, "What has changed fundamentally is the notion that the subject exists in any sense autonomously, outside the net of relations. What has become impossible is Descartes' a priori assumption of the thinking ego isolated from all existence" (Baack and Prasch, 1997, p. 135).

This new theory of subjectivity, in Baack and Prasch's view, has far-reaching implications for organization theory and behavior. First and foremost, the employee can no longer be considered as a stable and fixed subject. Traditional understandings of motives, decision-making processes and values must be questioned in light of the de-centered nature of the subject. They should be seen as "positional, relational, subjective, and temporary...". The main idea is to be alert to the constant environmentally determined refiguring that subjects undergo. For example, an employee's values and goals may be refigured when the organizational contingency of "downsizing" comes into play. Organizational change thus implies a new definition of terms previously considered as fixed and stable. Consider an analysis of decision-making processes:

> In the Carnegie model of decision making . . . coalitions form to influence managerial decisions, grounded in agreement among members on organizational goals and priorities (Cyert and March, 1963). Adding new subjectivity to the analysis provides a ground for new understanding of how such coalitions develop, in terms of the positional identities of the individuals involved. (Baack and Prasch, 1997, p. 137.)

The concepts of hegemony and counter-hegemony offer explanations of how such coalitions come about. Discourse analysis could demonstrate how particular goals and priorities are deployed in the creation of organizational entities such as stakeholders or union groups. By applying the theory of the new subjectivity in this manner, traditional concepts could be redescribed, including that of "organization" itself. An organization's identity could then be seen as embodying the "identifications based on the range of positions held by individuals and their groups from within and outside the organization" (Baack and Prasch, 1997, pp. 138–139). The authors conclude that "The 'atom' of the human subject, like the atom of physics, has been found not to have a hard shell at all" (Baack and Prasch, 1997, p. 139).

What has been termed "The metaphysics or philosophy of presence and representation" refers to the commonsense assumption that the objects of our experience are unproblematically represented by our language, and that it is the major function of language to represent them. Science (here identified with positivism) is the starkest expression of this assumption, believed to be false. Postmodernists deny representation for "The *stuff* of the world only becomes an *object* in a specific relation to a being for whom it can be such an object. Linguistic and nonlinguistic practices thus are central to object production" (Alvesson and Deetz, 1997, p. 207). The attendant relativism, as explained above in Scheurich's conception, is not considered problematic (see Rorty's influential defense of antirepresentationalism in his 1992 article). What needs to be explained is the apparent stability of objects over time, and the difficulty of working out what activities and practices produce and sustain certain objects (see the example "worker", as described by Alvesson and Deetz, 1997, pp. 207–208). Overgeneralizing some complex matters, an object only exists for us in so far as we have a word for it and a set of constitutive practices and social relations. Hence, the relational nature of object construction, rather than the object itself and its properties, is what counts according to postmodernists. Given that anything can be constructed as many different objects, meaning is never fixed. It changes with the constructing, and thus remains indeterminate and fluid. It follows that language, borrowing from Rorty (1979), is not "the mirror of nature"; rather it remains metaphorical and playful, and full of contradictions.

The idea of "master-" or "meta-narrative" is closely twinned with the idea that knowledge has no foundations, an idea with which we are now familiar through the work of theoreticians such as Kuhn (1962), Rorty (1979), Dilthey (1976) and Gadamer (1976, 1979) and especially through modern epistemology and philosophy of science (e.g., BonJour, 1985; Quine, 1969; Williams, 1977). According to the metanarrative view, grand theories, including theories of knowledge and science, are totalizing and universalizing because they deny difference and otherness, thereby presenting a false view of reality. It follows that the appropriate way to conduct postmodern research is the opposite of that advocated in the social sciences. Rather than seeking valid knowledge and

certainty, postmodern research is designed to open up indeterminacy instead of closing it off, creating "a kind of anti-positive knowledge (Knights, 1992)" (Alvesson and Deetz, 1997, p. 210). This happens primarily via deconstruction and the discovery of resistances.

Deconstruction, following Derrida (1976), means generally the critique of the "metaphysics or philosophy of presence" by unearthing the suppressed terms that make up the system. Interrogating any text in this manner is expected to bring forth the suppressed or marginalized other voice. Applying this procedure to leadership, English (1994, pp. 125–126) notes,

> ... is to recast and re-center leadership. The re-centering moves from a single person acting independently and conclusively (heroically) to multiple interactions between people ... Deconstructed leadership is counterhegemonic. It is neither behavioral nor structural, exclusively one or the other, or dualistically interwoven as a single unified text ... The study of leadership must be recontextualized ... as a kind of intertextual theatre.

This brief presentation of the recent postmodern contribution provides sufficient detail to begin examination of its claims and to determine their veracity and usefulness for organization theory and educational administration alike.

2.3. Problems of postmodernist theory and practice

Given the postmodernist tendency for opacity, which is not considered a problem by its advocates but is deployed as a deliberate strategy, assessing the perspective's veracity is not an easy task. Meanings shift and key concepts and assumptions are left vague. Nevertheless, bearing in mind the focus on common themes, and detecting some old philosophical arguments and problems, sufficient difficulties emerge to cast serious doubts on the value of the postmodernist agenda for educational administration.

A modest yet powerful starting point in this examination is the requirement that claims made about any aspect of our environment, and about ourselves as agents thoroughly enmeshed in it, have to be compatible with our ability to learn. We cannot get to know what we do not have the capacity to know. This sounds harmless enough, but further reflection demonstrates that such a requirement severely modifies claims made, or even rules them out as unknowable. This turns out to be the case with the postmodernist claim for the primacy of discourse and the construction of the subject.

Several points need to be made at the outset. Recall that discourse was considered to displace the unconscious in its emphasis on textual and discursive fields. The postmodernist target is the Cartesian ego, possessed of autonomous and disembodied reason. Related to this is the rejection of internalization; that is, the notion of a being with internal states and processes (Foucault, 1977). Identity is constructed through discourse, because discourses provide the categories by which the subject is positioned in the world. This is Foucault's conception that is generally adopted by postmodern writers. We may call the claim that the subject is entirely constructed by discourse the *strong thesis of discursive construction*. To pre-empt the results of the discussion to come, and not to put too fine a point on it, the strong version of the thesis is false.

A weaker version, however, can be accepted as uncontroversial. This would argue that language *shapes* a person's view of the world and provides the categories in which to apprehend that world. There is no difficulty in accepting that language, learnt in particular contexts and at particular times, also sets limits of understanding and shapes human identity. These insights have been standard fare in hermeneutics and interpretive social science as well as modern cultural anthropology (see Evers and Lakomski, 1991, Chapter 6). The thesis of the theory-dependence of observation, a central pillar of contemporary philosophy of science, acknowledges this basic human feature in theory construction, and thus for the whole business of science and its claims.

It is, however, quite something else to claim that the ability to manipulate symbols and be manipulated by them accounts for what it means to be human, leaving out both the person's body and the inner dimension commonly described as motives, beliefs and emotions. In this conception any distinction between inner and outer realms of existence, as well as between self and other, is disallowed *a priori*, reducing a human being to "a creation, construct, or 'effect' of social discourses" (Strauss and Quinn, 1997, p. 28).

There are several issues of note here. The first is that the thesis is a *claim* about human capability, which like any claim needs to be substantiated by evidence. The second concern is that according to postmodernist doctrine, *representation*, that is, the idea that our theories represent or mirror the way the world is, is disallowed because it is part and parcel of a rejected positivism; that is, of science as they describe it. Because discourse or narrative, being self-referential, lays no claim to be representing anything other than itself, the very idea of representation would be irrelevant and futile. But the foundationalist form of representation, which is a hallmark of positivism, is not the same thing as a non-foundational post-positivist form of representation, and rejecting the former does not imply rejecting the latter. These two positions are run together in postmodernism (see Evers and Lakomski, 1996b, pp. 267–268). Privileged representations have been widely rejected in modern philosophy, but there are good reasons why a modest representationalism is necessary, as will be seen shortly. Ironically, the claim that narratives *are* self-referential seems to imply the very representationalism rejected as positivist, for how else would postmodernists know that narratives refer to nothing but themselves in the absence of any supporting evidence?

The important question of how subjects acquire words and meanings is not considered in this postmodernist approach. Yet it is implicitly conceded that subjects somehow acquire words, and as a result become formed by the discursive formations they encounter, and that there is something external to discourse. This externality, however, is merely considered as something "other" (Alvesson and Deetz, 1997, p. 209), which has no purchase on discourse itself. The question now is how subjects *get to know* the discourses or discursive formations they end up possessing or inhabiting. This is an epistemological issue of some consequence, so let us consider it first before we turn to "the death of the subject".

Consider an everyday example, that of "traffic lights", which in poststructuralist/postmodernist fashion can be seen as a system of signs characterized by the binary opposition of "red" and "green". Although the example comes from the structuralist

anthropologist Lévi-Strauss, it serves our present purpose equally well because binary oppositions are central to the notion of discourse. It is not the case that one acquires knowledge of a set of signs as the result of identifying the significance of each. Rather, "red" means stop just because "green" means go; it is the system itself that constitutes its meaning. What is presumed here is that we already know the structure of traffic signs, for without that the meaning of its parts could not be known in the way we do.

It is all very well to counter that we know a traffic light when we see one, but how do we know that a certain set of signs arranged in a particular manner and in specific locations *is* a traffic light, rather than, say, a piece of modern art, or a radar device, or something else again? This poses an epistemological problem that Lévi-Strauss and other advocates of the primacy of discourse do not consider because the respective claims they are advancing are presumed to be obviously true. But "obvious" is an epistemic notion whose applicability is constrained by a whole network of conceptions, including theories about what kind of creatures we are, what our cognitive capacities consist of, how we learn language and, in general, what kinds of things we can know.

However, these background theories are neither self-evident nor simply given (e.g., Churchland, 1989, Chapter 6, pp. 239–276; Sellars, 1963). For example, we have to learn about our own sensory experience, usually on the basis of an already acquired language of ordinary objects. Being able to identify traffic lights, or anything else, presumes us having learnt to name certain objects by certain names and not others. If this is so then our court of appeal for knowledge claims; that is, for seeing traffic lights rather than radar devices, is itself composed of a set of knowledge claims. The next step for justification would consist of comparing and evaluating the principles of assessment of knowledge claims with the claims themselves (Evers and Lakomski, 1991, Chapter 2). But this step is prohibited by postmodernists because deconstruction, the method used, rules out *a priori* anything that could possibly count as evidence for or against the claim advanced. We are thus left with mere assertion. What becomes clear in this assessment is that the postmodernist postulate of the primacy of language/discourse implicitly relies on a theory of knowledge that is traditional empiricism. So, while rightly objecting to the totalizing influence of "positivism" and its overdrawn strong view of representation (as in the correspondence theory), it seems that postmodernists nevertheless tacitly assume that which they publicly eschew (see also Willower (1998) for critical comment).

Consequently, the argument against the "metaphysics or philosophy of presence" also loses its point, because what is criticized is an outmoded and rejected conception of science and its form of representation. Modern, post-positivist conceptions of science (Churchland, 1989), such as *naturalistic coherentism*, have no problem in accepting that observation is theory-laden and that our knowledge is fallible *without having to forfeit knowledge.* Accepting coherence criteria as the least controversial (since standard in scientific theoretical arbitration) but nevertheless the most stringent arbiters of demarcating good from bad theory, as measured by degree of coherence, provides the most defensible justification for claims to knowledge (Evers and Lakomski, 1991, Chapter 2).

In light of these considerations, it emerges that deconstruction hardly reveals the marginalized and suppressed voice of the oppressed. Deconstruction deconstructed reveals reliance on a whole integrated network of previously *learnt* theories; that is linguistic

constructions of some kind that had to be learnt from infancy onwards, because words are not "given". This reflection leads to further problems with the idea of the primacy of discourse, and with the conception of the subject as created in and by discourse.

2.4. The alleged primacy of discourse and the construction of self

If my argument that the presumed self-referential nature of discourse hides the old-fashioned problem of empiricism is correct, then the claim of the primacy of discourse is doubly suspect. First, it is foundationalist, but second, as is the case in traditional empiricism, its implicit *theory of mind* is also false. The "linguistic turn" in postmodernism, although it rightly disavows foundations, essentialism and the Cartesian autonomous ego, finds itself continuing the rationalist tradition it set out to defeat. The reason for this is the assumption that what characterizes human subjectivity is not merely its embeddedness in discourse but its very creation by it.

The shift from Descartes' conception of the rational, self-determining autonomous being to the de-centered and fragmented subject constructed through discourse leaves untouched the primacy of language so central for human cognition in the rationalist tradition. The postmodern insight that humans are shaped by the language in which they grow up and which gives them parameters of thinking and acting is correct, but does not originate with postmodernism. However, it is not just the ability to represent knowledge in external symbolic form that constitutes what it is to be human, but also the whole gamut of human tacit, sub-symbolic practice – our inner domain (Churchland, 1995; Clark, 1997; Damasio, 1996).

The view that humans are created in the strong sense by language can be traced back to the Cartesian idea of what it is to be a thinking thing (Dennett, 1996; Dreyfus, 1987, 1994; Dreyfus and Dreyfus, 1986; Fetzer, 1996, Chapter 4). It is this idea that has determined how human cognition, intelligence and reason have been viewed in the Western philosophical tradition up to the present day. A brief sketch is useful to understand why this idea became so dominant, and why the postmodernist externalization of the Cartesian ego gives up more than it gains.

Descartes was concerned to find out how to acquire true empirical knowledge of the world and how that might be distinguished from apparent knowledge (Churchland, 1989, pp. 243–245). He set out to identify a method by which this aim could be accomplished. The immediate task for him was to establish what could be taken for certain, and he thought that his own thoughts, feelings and doubts would qualify as such. Whether these thoughts matched up with an external reality was not his concern. This inner reality, or the soul and its contents, was believed to be self-evident, and could be reached through introspection. Descartes believed that the distinction between reality and appearance had no purchase on the soul's self-knowledge. Thus his famous statement *cogito ergo sum*, "I think, therefore I am" (in the fourth section of the *Discours de la méthode*, 1637), was claimed as the firm foundation upon which the edifice of knowledge could be erected (see the extensive discussion of foundations in Evers and Lakomski, 1991, Chapter 2). The means for building were already present in the rational soul, which came equipped with the ideas and principles of logic that would enable it to differentiate between the self-evident and the non-self-evident.

Descartes' idea implies, as Fetzer (1996, p. 53) put it, "that what it is to be a human – the nature of human nature – is to be an instance of the kind which thinks". And it does so by means of logic; that is, a special kind of symbol system. This view of human cognition has been dominant until recently and underlies the traditional artificial intelligence research agenda conducted by such prominent researchers as Newell and Simon (1976), whose conception of the *Physical Symbol System Hypothesis* assumes that humans are mainly symbol processors. There is one further detail to note. Descartes was a *substance dualist* (for critical discussion see Churchland, 1988, p. 7 onwards; Dennett, 1996). He believed in both "mental" and "physical" stuff and thought the former to be quite independent of any physical body to which it might find itself attached. The difficulty of accounting for how a non-material mind so conceived could have any causal influence over the material body he resolved by postulating "animal spirits", a rather convenient material substance that was alleged to pass the mind's commands on to the body. Suffice it to note that the problem was not solved, either by him or other kinds of dualists (see Churchland (1988) for further discussion).

In their desire to replace the autonomous, self-directed ego proposed by Descartes, postmodernist writers such as Foucault have not so much replaced a faulty notion of the subject with a superior one as eliminated the conception of the material human being completely. The shift away from Cartesian dualism, which postulated a self as radically other and separate from both body and world, has resulted in the obliteration of any distinction between a self and the world it inhabits. While in the former conception there was only the inner "thinking thing", in the latter the externalization of self has eliminated both the self's differentiation from the world, and any conception of an inner realm. Ironically, the move from radical internalization (Descartes) to radical externalization (Foucault and others) has amounted to the same thing: a conception of a disembodied being whose cognition (in so far as it has cognition) is identical with the ability to process symbols; that is, with the ability to reason. In externalizing and de-centering the subject, this thesis has merely turned the Cartesian subject "inside out"; the common denominator remains the manipulation of symbols, whether described as the primacy of discourse or as the contents of consciousness, central to Descartes. Exclusive inner representation has been replaced with exclusive outer representation. Neither account does justice to real human capacity.

The postmodernist conception of discourse is an interaction of abstract symbol systems; that is, a socio-cultural system which, however, is singularly devoid of human actors. The living human beings who created the socio-cultural system in the first instance are no longer part of the equation (Clark, 1997; Hutchins, 1996). How this creation was possible is not a concern to postmodernists. They may concede an "other", as noted earlier, but that is rather unsatisfactory because it is the undertheorized "other" that does the required causal work; that is, material human beings who are capable of learning but whose capabilities are not deemed causally important by postmodernists. If it were not that humans have evolved an enormously complex brain that enables them to learn as they do, there would not be a "de-centered" subject for postmodernists to talk about.

In their haste to get away from Descartes' cogito, postmodernists went too far in sacrificing an inner human realm that need not owe anything to an immaterial sub-

stance, but can suitably be redescribed by the thoroughgoing materialism of the neurosciences. The reason that postmodernists did throw the baby out with the bath water is their implicit acceptance of the Cartesian ideal of the human being as a "thinking thing". For a number of reasons this conception is far too narrow. To suppose that the human ability to represent objects symbolically is the only way in which humans process experience is to misunderstand both representation and human capacity. As highly competent pattern recognizers, humans "read" mathematical and linguistic symbols as well as situations, practices and behaviors. This is so because our brains are not primarily symbol processors but a vast confederation of interconnected neural nets whose *modus operandi* is to work in parallel rather than linear fashion. The base units are neurons that assemble into patterns when they are suitably activated, and disassemble when they are not. The human brain is a wonderfully efficient pattern processor and recognizer because of this parallel processing ability, and symbols such as words are just such patterns. (For an introductory discussion of how brains learn see Churchland, 1993, pp. 159–171; Evers and Lakomski, 1996b, Chapters 8 and 9; for more technical literature see Bechtel and Abrahamsen, 1991; LeDoux, 2002.) Neural nets can vary in the weights of their connections, and it is this variation that explains human diversity (Churchland, 1993, p. 131).

In light of the neural explanation, it is possible to redescribe the productive insight of the de-centered subject without either giving up on a demarcation between self and environment or eliminating an inner dimension altogether. We are able to develop an understanding of what our neural, embedded and embodied selves might comprise. Given the information processing capabilities of real brains (although modelled by artificial neural nets), the self is always determined by the interactions of its symbolic and subsymbolic environments, the dynamic interplay of its internal and external dimensions including what are commonly referred to as cultural artifacts. This means quite literally that what we describe as our self is constantly being constructed and re-constructed, is characterized by a high amount of fluidity, and is indeed not "internally fixed" as the Cartesian ideal critiqued by postmodernist writers suggested. The question of how to explain the considerable plasticity of self on the one hand and its durability over time on the other thus turns into the question of the specific properties of brain functioning. What needs much further exploration is the neural basis that constructs the self, as we will see in the concluding part of this chapter. But before that, there is yet another way of approaching the strange idea that there is no inner dimension, no coherent subject, in Foucault's terminology, and this is by way of cultural anthropological work.

If identity is nothing but performance, as maintained by postmodernists, and if the idea of a subject with inner states and processes is indeed a Western invention, as argued by Foucault (1978), especially in the *History of Sexuality*, volume 1, then the empirical anthropological record would bear this out. In their assessment of postmodern cultural theory, the cognitive anthropologists Strauss and Quinn (1997, p. 29), while supporting the postmodern emphasis on de-essentializing culture and the political context of, in their terminology, psyche formation, draw the line at the "death of the subject". Their rejection of this doctrine is uncompromising:

> . . . the anthropological record does not support the idea that most people in the world see no difference between persons (and their inner thoughts, feelings, and motives) and the world outside them. In fact, denial of this difference is the more "strange and contingent" philosophy. (Strauss and Quinn, 1997, pp. 28–29.)

A review of cross-linguistic and cross-cultural data conducted by Wierzbicka (1993), reported by Strauss and Quinn, indicates that while the concept of the autonomous stable self seems to be culturally specific, "every language has a way of referring to the 'person' or 'individual'. Similarly, while the English word 'mind' does not have close semantic equivalents in other languages, there are words for the concepts covered by the English terms 'thinking', 'knowing', 'feeling', and 'wanting' in every language she [Wierzbicka] knows of" (Strauss and Quinn, 1997, p. 31).

Furthermore, the work of anthropologists has largely concentrated on the formation of socially learnt identities which, while cross-culturally variable, nevertheless involve building up psychological structures that create "powerful internal thoughts, feelings, and tendencies to act a certain way", or cognitive schemas, in Strauss and Quinn's (1997, p. 33) terminology. The idea that these schemas can be ignored in the analysis of dominant discourses without considering what people think and feel about them, Strauss and Quinn note, is a neat way to avoid empirical data that might refute postmodernist claims and "can give a spurious plausibility to theories positing the demise of the meaning-seeking subject" (Strauss and Quinn, 1997, p. 33). The postmodernist assertion that the subject is directly constructed by discursive formations is viewed equally dimly, and described as the "fax" theory of culture acquisition (Strauss and Quinn, 1997, p. 33). From the cultural anthropological evidence there is no support for the postmodernist contention of an absence of a self.

2.5. The neural self

Let us now return to the question about the plasticity of self and its durability over time. Or, using postmodernist terminology, let us consider the de-centered, fluid, positional, contingent subject – from a neuroscientific point of view. Contrary to postmodern assertion, the subject is indeed "unified" over time, but that admission owes nothing to Cartesian dualism or mind stuff. Part of the answer has been hinted at earlier in terms of the weight configurations of a particular brain. What needs explaining is the relative stability of those brain weights that make up one's self.

The general answer to why we continue to be our "selves", barring major neurological collapse, has to do with established neural nets (old learning) and with the natural tendency of neuronal connections to become re-activated through repeated encounters with the kind of environment that activated them in the first place. A further reason is that cultural understandings, as neuronal patterns of activation, become self-reinforcing, and thus strengthened. Connection weights of such a pattern have the tendency to complete themselves even when only a few of their nodes are active. (Glimpse of a nose already contains enough neural "clues" to recognize "mother".) This makes shifting an old pattern rather difficult, because conflicting evidence tends to be overridden by

the previously set activation pattern. Stereotypes, that is, negative schemas, also keep people from situations where these schemas might be threatened or overturned. Lastly, strong emotions of any kind also contribute to the durability of neuronal patterns of activations. If we consider the impact of all these neuronal tendencies, it becomes much clearer why we do not "lose our minds" more often. The neural construction of self, it seems, is just as much a matter of learning as are all the other objects we learn about in interaction with our environments (LeDoux, 2002).

The following comments are based on the pioneering work of Damasio (1996) on the neural basis of the self, which throws light on human subjectivity. As a practising neurologist, Damasio has observed that patients with severe neurological disorders are still able to refer to their selves. Even when something unusual or bizarre is happening in their cognitive functioning, like partial loss of speech, they talk about this from the vantage-point of a self. Patients still ask: "What is happening to me?". As Damasio (1996, p. 236) says, "The frame of reference [for assessing their cognitive impairment] is not different from the one they would use were they referring to a problem with their knees or elbows." His suggestion does not presume that the contents of our minds can be introspected (as assumed by Descartes) by a privileged central source/owner, or that subjectivity is the same as (self-)consciousness, or that the self has a specific location in the brain. Summarizing his discussion, he notes

> . . . our experiences tend to have a consistent perspective, as if there were indeed an owner and knower for most, though not all, contents. I imagine this perspective to be rooted in a relatively stable, endlessly repeated biological state. The source of the stability is the predominantly invariant structure and operation of the organism, and the slowly evolving elements of autobiographical data. (Damasio, 1996, p. 238.)

To account for the notion of a self, he suggests the continuous reactivation of two sets of representations. One set concerns the key autobiographical events in a person's life, which through repeated reconstruction establish a person's identity. This set of representations is held in the association cortices of many brain sites and must not be thought of as contained in a single filing cabinet. In his view, it is the constant and endless reactivation of our identity, updated by biographical data, that makes up a large part of self. The second set of representations that determine the neural self "consists of the primordial representations of an individual's body . . ." (Damasio, 1996, p. 239). This means more than what the body has been like in general; it refers to the most recent state of the body just before the process that led to the perception of an object. Damasio argues that subjectivity depends on this immediacy, the immediate "before" the processing took place, and thus includes background body states as well as emotional states. "The collective representation of the body constitutes the basis for a 'concept' of self, much as a collection of representations of shape, size, color, texture, and taste can constitute the basis for the concept of orange" (Damasio, 1996, pp. 239–240).

> What is happening to us *now* is, in fact, happening to a concept of self based on the past, including the past that was current only a moment ago. At each moment the state of self is constructed, from the ground up. It is an evanescent reference state, so continuously and consistently reconstructed that the owner never knows it is being *re*made unless something goes wrong in the remaking . . . The present is never here. We are hopelessly late for consciousness (Damasio, 1996, p. 240).

Damasio did not write to explain the postmodernist account of the fragmented subject, but the above passage expresses beautifully just how much more radical the conception of the neural self is, a conception supported by the best evidence modern science can offer.

However, this raises a very important question: "By which legerdemain do an image to object X and a state of self, both of which exist as momentary activations of topographically organized representations, generate the subjectivity which characterizes our experiences?" (Damasio, 1996, p. 240). While the organism is generating a set of responses to an object, "the existence of a representation of self does not make that self *know* that its corresponding organism is responding. The self . . . cannot *know* . . . However, a process we could call 'metaself' might . . ." (Damasio, 1996, p. 241). That meta-self does not use language, although the above described perturbations could be translated into language.

Damasio suggests that, in addition to the neural structures that support the image of an object and those neural structures that support the image of a self, there is a third set of neural structures that is reciprocally interconnected with both. He describes these as a kind of "third-party neuron ensemble . . . a convergence zone . . . which we have invoked as the neural substrate for building dispositional representations all over the brain, in cortical regions as well as subcortical nuclei" (Damasio, 1996, p. 242). In receiving signals from either kinds of neural structures as described, the third-party ensemble is "building a *dispositional representation of the self in the process of changing as the organism responds to an object*" (Damasio, 1996, p. 242). Damasio proposes that the subjective perspective arises out of this latter event "when the brain is producing not just images of organism responses to the object, but a third kind of image, that of an organism in the act of perceiving and responding to an object" (Damasio, 1996, p. 243).

Particularly important for the present discussion is the fact that this fairly minimal neural device does not require language. The meta-self is purely nonverbal. "In effect, the third-party view constitutes, moment-by-moment, a nonverbal narrative document of what is happening to those protagonists [the different neural structures]. The narrative can be accomplished without language, using the elementary representational tools of the sensory and motor systems in space and time" (Damasio, 1996, p. 243). As human beings, we possess second-order narrative capacities provided by language and we can turn non-verbal narratives into verbal ones. What Damasio describes as our "refined form of subjectivity" derives from this ability. While language may not be the source of the self, it certainly is the source of the "I" (Damasio, 1996, p. 243).

Damasio gave his book the title *Descartes' Error*, and it is now easy to see why. Descartes has the relation between mind and body the wrong way round: first we are, then we think.

> This is Descartes' error: the abyssal separation between body and mind, between the sizable, dimensional, mechanically operated, infinitely divisible body stuff, on the one hand, and the unsizable, undimensional, un-pushpullable, nondivisible mind stuff; the suggestion that reasoning, and moral judgment, and the suffering that comes from physical pain or emotional upheaval might exist separately from the body. Specifically, the separation of the most refined operations of mind from the structure and operation of a biological organism. (Damasio, 1996, pp. 249–250.)

Let us now draw together the various discussions of postmodernist claims for the business of educational administration as well as organizational studies.

2.6. Conclusion

The aim of this chapter was to examine the major assumptions shared by postmodernist writers in social–cultural, as in administration and organization theory. Many criticisms of postmodernism that are routinely raised have not been considered in this context. These include its inbuilt political conservatism; the relativism which tells against its own claims to be taken as a serious contender for social theory and practice; its conflation of knowledge and power; and its deliberate strategy of remaining vague when presenting its own assumptions and claims. In contrast, my approach began modestly on the principle that any claim had to be defended on the assumption that humans are finite learners, endowed with specific means of acquiring and representing knowledge of their environments, both external and internal. Rather than proceeding from *a priori* assumptions, whether expressed in rationalist or postmodern terms, the tools of cognitive science reveal the fine-grained, complex and truly astounding neurophysiological mechanisms that make us human. Hence discourse, or the ability to represent knowledge in symbolic form, is one very important human capacity that remains tied to the way we are able to represent anything. The spectrum of knowledge representation is broad, and for biological beings it should hardly surprise that the "self" is constructed in the same way and by roughly the same neurophysiological mechanisms as all our knowledge of objects around us. The fact that we can talk about the "I" does not mean that we are free-floating non-material entities, constructed in discourse in the postmodernist sense. The "I", as it were, became the icing on the cake in that the development of language allowed us to represent our selves to our selves. But we had "to be" first before we could think.

In order to have developed the way we have, a modest representationalism is necessary. We grow into the distinctive kinds of people we become because of the infinite range of feedback from our external or internal environments that we receive from the first moments of biological life, with language gaining in importance with the growth of our vocabularies. While the fine details are not yet known, at least we know that this is the result of evolved natural capacities developed in our natural and social–cultural environments which, in turn, have shaped further internal and external factors. Interestingly enough, the very fact that we manage not to "lose our minds", apart from outright mental breakdowns, and manage to refer to our selves correctly throughout our history is ample evidence that there are sufficiently regular features in our environments to reinforce our notion of who we are.

Considering both the alleged primacy of discourse and the death of the subject, we might conclude that postmodernists run headlong in the wrong direction. Rather than countering the Western prejudice of the human being as rational in the symbol manipulation sense; that is, rather than attacking the mainstream symbol-centric view of human nature, postmodernists shore it up even further. In reifying discourse and disallowing an

inner human nature, they have nothing interesting to contribute to how real human beings, including administrators, managers, and educators, might explain and solve the many problems they encounter in their various organizational contexts. As we saw, the proposal for a naturalistic explanation of self, other and culture not only explains the observations that postmodernists contribute, but more importantly suggests productive and exciting strategies for further exploration, and thus better understanding of our practices. In light of such promising developments, why would postmodernists want to give up on knowledge, especially in view of the fact that they rely on such a lot to make their case?

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CHAPTER 3

Leadership, Organizational Culture and Change

3.1. Introduction

An organization's resistance to change in the face of environmental pressures and uncertainty is a phenomenon for which many interpretations are offered. One popular and widely discussed approach is the suggestion by Schein (1992) that, at root, it is the organization's *culture* that causes resistance, and that needs changing. An organizational learning process needs to push the organization beyond its currently held understandings of itself and its ways of dealing with its internal and external reality. The prime mover of change is the leader, who transforms the current stagnating culture into a productive one. Furthermore, because accelerating change is the *sine qua non* of contemporary life, organizations ought to transform themselves into *learning organizations* so that they might meet all unexpected challenges successfully. Ongoing learning is believed to be the best preparation for the future, and it is the leader's responsibility to see that it happens.

Although organizational learning (and the learning organization) continues to have wide exposure in organizational theory, having spawned a large literature of its own (for comprehensive discussions see March and Olsen, 1976; Dodgson, 1993; Fiol and Lyles, 1985; Huber, 1996; Robinson, 2001a), an emphasis on the role of culture is still relatively rare in the field (for examples see Cook and Yanow, 1996; Alvesson, 1993; for education contexts see Hallinger and Leithwood, 1996; Heck, 1996). Instead, theory continues to be dominated by the cognitive perspective of the behavioral science tradition. Although diverse in its emphases (e.g., Argyris and Schön, 1996; Hedberg, 1981; Levitt and March, 1988; Simon, 1991), this perspective maintains that the analytical base unit is the learning of the *individual* within an organizational context. The question of what exactly constitutes *organizational* learning, and whether there is such a thing anyway, continues to tax the minds of theorists.

In this chapter I want to examine the claim that we need to change the organization's *culture* if we want to bring about organizational change. This conception of culture relates to "organizational culture" and *cross*-cultural management as a special case. Of particular interest is what is called "the paradox of culture" (Strauss and Quinn, 1997), a term that indicates culture's twin tendencies towards stability *and* variability. In the process, the role of the leader and organizational learning are

reassessed in their purported causal interrelation. I want to offer some suggestions on how to approach this task by way of a revised notion of culture that includes the most recent account of human cognition, developed in cognitive neuroscience. In particular, the notion of *embedded* and *embodied cognition* (Churchland, 1993; Clark, 1997; Hutchins, 1991, 1996a, 1996b; Lakomski, 1999) has been taken up within cultural theory by cognitive anthropologists Strauss and Quinn (1997) under the heading of *culture as cognitive process*. The research undertaken in both fields converges in a new unified conception of cultural cognition or cognitive culture, a development of vital importance for the study of organizational culture and change.

This account of human knowing no longer draws the boundary between private knowledge (what is in the mind) and public culture (what is outside of it) in the sharp manner of older theories of human cognition *as symbol processing* and of culture *as an object*. External, symbolic features, traditionally believed to represent culture, and internal non-symbolic ones such as beliefs, values and meanings, usually taken to be the property of the individual mind, are no longer seen to represent separate worlds but one world. The relevant issue is how *all* our knowledge is represented, an account not available until recent work in connectionism. (Classic texts are Rumelhart and McClelland, 1986a, 1986b.)

Given such interdisciplinary developments, it becomes possible to shed new light on the old conundrum of individual and collective cognition and learning in context, as well as leadership. The neural net account provides an initial answer to the problem of why it is so difficult for humans – individually and collectively – to "change their minds"; that is, to embrace change, the major concern both in Schein's proposal and in cultural theory's desire to explain culture as stable *and* variable.

I begin this foray into largely unexplored terrain with some notes on the conception of *culture* as used in organization theory and in *cross*-cultural management studies. While the latter denotes a separate and as yet diffuse field within management (a useful overview is provided by Holden, 2002), the idea of "culture" is also central to it, especially in terms of managing cultural *differences*, as emphasized in the work of Hofstede (1984, 1991, 2001). In so far as modern conditions of work and business are characterized by international networking requiring managers to move and work increasingly in world-wide contexts, there is some urgency to understand what "culture" might mean in the global context, if it means anything at all.

3.2. Organization and culture

The late 1970s and early 1980s were an important phase in the history of organization theory because they signaled the arrival of the role of culture in organizational research and practice (e.g., Pettigrew, 1979; Pondy and Mitroff, 1979). This new interest can be gauged by three influential publications: the *Administrative Science Quarterly* special issue (28[3]); a special issue of *Organizational Dynamics* (12[2]), and the collection of essays in Sergiovanni and Corbally (1984) that contributed to raising the significance of organizational culture in education contexts.

The idea that the anthropological concept of culture, conceptualized in diverse ways, could be of benefit to the understanding of organizations is easy to grasp once it is realized that in anthropology "culture" is a core concept that seeks to explain the orderliness and patternings of social life, while "organization" can be seen as a response to the problem of social order, as implied in much sociological and organization theory (Smircich, 1983; Ouchi and Wilkins, 1988). It is thus not surprising that the concept of culture has "proved a useful device for differing orientations towards organizational activity" (Linstead and Grafton-Small, 1992). Managers have appropriated it to help explain and predict organizational effectiveness, as is evident in popular writings by Deal and Kennedy (1982) and Peters and Waterman (1982), and also in the work of Schein (1992). Here, culture is generally understood as an instrument for management to shape and control the beliefs, understandings and behaviors of individuals, and thus of the organization, to reach specified goals. (For a critique of culture-as-control see Angus, 1995; Meek, 1988.) This use of the concept of culture is also evident in discussions of schools as organizations, in what Evers and Lakomski (1991, especially pp. 114–117 and 123–127) describe as "the cultural perspective in educational administration".

Academics, however, have worried over whether "culture" should be considered a dependent or independent, external or internal *variable* in the study of organizational functioning, or whether it is more appropriately understood as a *root metaphor* that emphasizes organization as process (see Smircich, 1983). These two interpretations have different theoretical commitments and yield different consequences for the questions that can be asked and answered by research.

Following Smircich's (1983) discussion, *culture-as-independent-variable* is a feature characteristic of comparative (cross-cultural) management studies, where it is considered as a background factor that helps determine variation in managerial and employee practices and attitudes across countries. "Culture" in this management perspective is imported into the organization by the members and subsequently "shows" itself in the ways they act and the attitudes they display. The research agenda is to "chart differences among cultures, locate clusters of similarities, and draw implications for organizational effectiveness. . . .The practical utility of such research would be seen most immediately for multinational organizations, and yet, because of the recognition of global interdependence, this research can be of widespread interest" (Smircich, 1983, pp. 343–344). This characterization still appears to apply to current cross-cultural writing, especially the work of Hofstede, which has acquired paradigm status in this branch of management research. The concept of culture itself however remains under-discussed, as noted by Holden (2002).

A variant of the *culture-as-independent-variable* concept is the belief that organizations themselves create cultural phenomena in form of organizational rituals, stories, ceremonies, legends and myths, often to do with the remarkable features and feats of the organization's founding father/leader. Steeped in the systems theory perspective, research in this mode focuses on the contingent relationships between variables that seem to account for organizational survival. Culture is the "social glue" that holds the organization together through members' *shared* beliefs and ideals. Despite their different emphases, these two perspectives overlap because of their view of culture as shared

values and beliefs. "Corporate culture" is perhaps the most overt expression of this commonality, emphasizing the potential control function of "culture". Knowledge of shared beliefs and meaning provides managers with a lever to influence change. In this more restricted sense, Linstead and Grafton-Small (1992, p. 332) argue that corporate culture is "…devised by management and transmitted, marketed, sold or imposed on the rest of the organization; [and] …is less easily viewed as a subcultural aggregate than is organizational culture", which has a more organic flavor. Both versions of the *culture-as-independent-variable* concept – external and internal – are embedded in the functionalist view of organizations as organisms that are knowable by dint of the general and contingent relationships stipulated (as variables) to hold between their stable and lasting elements. Here, as Smircich (1983, p. 347) observes, "the issue of causality is of critical importance". This point will be revisited later.

Finally, the idea of *culture-as-root-metaphor* (also Jelinek, Smircich and Hirsch, 1983) is fundamentally different in that organizations are conceived of *as cultures*. Culture is no longer an add-on, something an organization possesses, but is considered as something an organization *is*. The inference is that organizations can be studied in terms of their expressive forms, paying attention to the symbolic aspects of their life and the meaning-making activities of their members. Organization conceived of as subjective experience allowed for the study of the patterns of organized action. Which aspects of subjective experience become the focal point of analysis depends on which aspects of culture are chosen. We will later consider what is described by cognitive anthropology as a system of shared knowledge or cognitions; in other words, the view that cultures are created by the human mind. It is important to note here that this understanding of culture is explicitly epistemological, in that *organization* is understood *as the product of human cognition*. Whether organizations as patterned meanings and symbolic relationships have a less objective status than organizations conceived of as organisms or machines, the prevalent metaphors of functionalism, is a question to be addressed in the context of Strauss and Quinn's recasting of cultural meaning as cognitive process. While the root metaphor perspective opens up new avenues for research by asking how organization is possible in the first place, the issue of "the meaning of meaning" needs further examination.

3.3. The special case of culture in cross-cultural management

Echoes of the *culture-as-independent-variable* concept can be detected in comparative management. As Holden (2002) notes, "culture" is generally seen as a problem when emphasis is placed on cross-cultural *differences*, and what to do about them, while acknowledging that "culture" can bestow competitive advantage. In either case, the managing of culture is acknowledged as a difficult task requiring quite different means depending on which aspect is stressed. While there is no consensus on the meaning of culture itself, Kroeber and Kluckhohn's (1952) traditional anthropological definition is widely accepted in management literature:

> Culture consists of patterns, explicit and implicit of and for behavior acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts: the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action; on the other, as conditioning elements of future action (as cited in Holden, 2002, p. 27).

The above fits the *culture-as-essence* conceptualization (Holden, 2002, p. 28) that places great emphasis on language as "the mediator of social intercourse …" an idea that "created and perpetuated the tricky trinity of language, culture and *nation*". As a result, cross-cultural management studies operate with a rather "exclusive view of culture, which proves convenient for making comparisons of managers' educational background, decision-making style or modes of communication". Such knowledge is useful to have, but Holden goes on to comment that "this is a view of culture which does not lend itself readily to the description and analysis of cross-cultural behavior in today's business world" (Holden, 2002, p. 28). Furthermore, transferring the culture as essence concept to that of the nation-state, as in Hofstede's work (1984, 1991, 2001), is rather problematical, as we will see. However, Hofstede's framing of basic concepts, principles and methodology in cross-cultural management studies remains prominent to this day.

Focusing explicitly on cultural *differences* amongst IBM subsidiaries across 40 nations in his early surveys, Hofstede argues that the mental programs we carry in our heads; that is, the "patterns of thinking, feeling and acting" developed in interaction with our environments, determine our views of the world and make us different from one another. His well-known phrase, the "software of the mind" redescribes the earlier insight in his later work. The sources of our mental programs lie in the environments in which we grow up and our collected life experience. The customary way of describing what goes under "software of the mind" is, he says, *culture*, or in slightly different terms, culture is defined as "*the collective programming of the mind which distinguishes the members of one group or category of people from another*" (Hofstede, 1991, p. 5; emphases in original). The computer analogy notwithstanding, it is clear that Hofstede's definition of culture places him in the *culture-as-independent-variable* perspective. By operationalizing shared values (dominant value systems) and administering questionnaires across cultures, Hofstede claims to have identified the four main dimensions on which all the countries researched differed: *power distance*, *uncertainty avoidance*, *individualism* and *femininity/masculinity*. These dimensions of culture, "revealed by theoretical reasoning and statistical analysis" (Hofstede, 1984, p. 11), represent what he considers the implicit structure that can be found in the variety in people's minds, one "which can serve as a basis for mutual understanding" (Hofstede, 1991, p. 4).

For policy makers in national and, more importantly, multinational corporations, knowing the sources and kinds of cultural differences is of the utmost importance "for the validity of the transfer of theories and working methods from one country to another" (Hofstede, 1984, p. 12). Therefore, it can be argued that such knowledge is useful in "ironing out" cross-cultural differences, and helps to control them. By doing so, competitive advantage is enhanced on part of those managers who use it. It is clear that

"culture", here exemplified in work-related values and operationalized in terms of observable behaviors, is used in the service of management. More will be said later about Hofstede's identification of culture with the nation-state, exemplified by "the passport one holds" (Hofstede, 1991, p. 12), and the empirical methodology employed (for critical comment see Degabriele, 2000).

In this and the preceding account of culture with reference to organizations, the implicit assumption seems to be that culture is more or less static and cohesive, an object that can be manipulated and controlled. In the approach that is discussed next, the conception of culture serves a slightly different purpose.

3.4. Schein's conception of organizational culture and leadership

Like many of his management colleagues, Schein takes his departure from the anthropological tradition. However, he considers organizational culture, directly linked with leadership, as an important component in bringing about change. The concept of culture (for an overview see Schein, 1992, pp. 8–9) helps us understand why organization members do the things they do, or do not wish to do, and provides the manager with a tool to bring about changed behaviors in subordinates. When faced with apparently non-rational resistance by employees in the face of necessary change, it is to the "dynamics of culture" that we must turn to explain this phenomenon. (See Wilkins and Ouchi (1983) for critical discussion of organizational change.) Not only does this help us understand the differences between groups in organizations, it also makes possible a deeper understanding of why they are so hard to change (Schein, 1992, p. 5). Culture is viewed as

> ... the accumulated shared learning of a given group, covering behavioral, emotional, and cognitive elements of the group members' total psychological functioning. For shared learning to occur, there must be a history of shared experience, which in turn implies some stability of membership in the group. Given such stability and a shared history, the human need for parsimony, consistency, and meaning will cause the various shared elements to form into patterns that eventually can be called a culture. (Schein, 1992, p. 10.)

Culture formation, in Schein's view, is always a matter *of striving toward patterning and integration* and group learning happens at the behavioral as well as at the conceptual internal level, "... the deeper levels of learning that get us to the essence of culture must be thought of as concepts or ... shared basic assumptions" (Schein, 1992, p. 11). The *culture* of a group can then be defined as:

> A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. (Schein, 1992, p. 12, emphasis in original.)

The usefulness of the concept of culture then consists in its assumed ability to help leaders understand "seemingly incomprehensible and irrational aspects of groups and organizations" by getting at the "taken-for-granted basic assumptions held by the

members of the group or organization" (Schein, 1992, p. 15; see also Argyris, 1990). Schein considers these assumptions as similar to Argyris and Schön's (1996) concept of theories-in-use, those unspoken and unacknowledged understandings that guide people's actions in contrast to their stated explanations of their conduct. Because we neither confront nor debate these, he notes, it is exceedingly difficult to change them. But we need to change them, and some of "the more stable portions of our cognitive structure", by means of Argyris and Schön's double-loop learning. Such a learning process is deeply unsettling, anxiety creating and prone to eliciting defense mechanisms. Leaders must become conscious of these mechanisms because it is through them that the existing culture of the group is defended. If they do not, culture will manage them instead of being managed by them. Schein is clear on the relationship between culture and leadership. They are

> two sides of the same coin in that leaders first create cultures when they create groups and organizations. Once culture exists, they determine the criteria for leadership and thus determine who will or will not be leader. But if cultures become dysfunctional, it is the unique function of leadership to perceive the functional and dysfunctional elements of the existing culture and to manage cultural evolution and change in such a way that the group can survive in a changing environment. (Schein, 1992, p. 15.)

The role of the leader as change agent needs to be understood on the basis of the processes of organizational change. The organization must first experience *unfreezing* of old assumptions. This phase is followed by a second development characterized by a process of cognitive restructuring. It is in part defined by new trial and error learning or by imitating a role model with which members identify. The result of this process is some *cognitive redefinition* of a core part of the organization's basic assumptions. Finally, once cognitive restructuring has taken place, a process of *refreezing* ends this episode of change. This means that the changed behaviors and new assumptions become entrenched and reinforced as the new culture that enables the organization to solve its problems.

According to Schein, this change model applies equally to individual, group or organization. In light of these characterizations of culture, Schein defines further the role of the leader in managing culture which is more or less interventionist depending on the maturity of the organization in question, and the description of the change processes that a dysfunctional organization undergoes in order to acquire a new culture. He maps out a conception of a self-correcting, or learning, culture, steered by a learning leader, which is capable of diagnosing and responding appropriately to changes in its environment on an ongoing basis. Given his definition of culture as constituting a stable core of shared beliefs and assumptions, how can culture so defined also become the grounds for continuing change?

The character of a learning culture, the organization of the future, shares some of the features identified by Senge (1992). A number of key assumptions constitute its core. A learning culture has to suppose that its environmental context is "to some degree manageable", specifically, "… the more turbulent the environment, the more important it will be for leaders to argue for and show that some level of control over the environment is desirable and possible" (Schein, 1992, p. 364). Humans are active

problem-solvers and learners, and solutions to problems can be found anywhere in the organization, depending on the nature of the problem. To believe that there is only one source or method of truth is against the spirit of a learning organization; the implication for leaders is that they too have to own up to "their own lack of expertise and wisdom". Acknowledging this is not easy, because people in leadership positions are expected to "have the answer" and are pushed to provide one whether it solves the problem or not. The learning task should be seen as a shared one on the assumption that human nature is basically good and humans mutable (Schein, 1992, p. 367).

When it comes to the most appropriate structure for the learning organization, the answer is not straightforward. A participative organization is able to generate more creative solutions because it has access to a wider range of resources. Whether or not such a democratic structure is the best arrangement when it comes to implementing the solution remains tied to the nature of the solution (Schein, 1992, p. 369).

3.5. Some inconsistencies

Some inconsistencies in Schein's account need to be considered briefly before proceeding to the substantive issues of re-conceptualizing organizational culture.

Like the older school of anthropology, Schein understands culture as the human response to evolutionary pressures *and* as an object that can be controlled by a leader. Attempting to avoid this inconsistency by appealing to different phases in the life cycle of an organization that require more or less leader intervention does not eliminate the problem. Culture cannot be a dependent and an independent variable at the same time. Closely related to this problem is the leader's purported ability (the "unique function of leadership") to "get at" the basic, taken-for-granted assumptions, the *theories-in-use*, by means of the leader's self-insight (Schein, 1992, p. 392), possibly aided by the services of a consultant. The issue of (self-)insight is a well-known and problematic concept, discussed both in philosophical terms ("the problem of introspection"; see Lakomski, 1997) and in social psychology (Nisbett and Wilson, 1977). From both perspectives, insight is not a reliable source of knowledge about oneself or an other because it makes assumptions about the human mind/brain's general functioning that cannot be supported, such as that human agents have direct access to the contents of their own minds (Churchland, 1983). More will be said about this point later.

Furthermore, the leader appears to be part of the culture of the organization *and* to step out of it when required by circumstance; that is, when he or she discovers that cultural assumptions have become dysfunctional. The cognitive capacities of the leader are thus deemed superior to those of other organization members. It is the leader's interpretation of dysfunctionality that is considered correct. But leaders, as we know, are neither omniscient nor infallible: their interpretations of the situation may be wrong, a possibility freely admitted when we come to the learning leader.

Much of what Schein states about the purposes, goals and structures of the learning organization is sensible and in line with the prescriptions of other theorists, such as Senge (1992). However, given that the leader's basic role is to interpret the culture and

its dysfunctional properties correctly, and assuming, on Schein's account at least, that a new, more productive culture is formed and "refrozen" as a consequence of that leader's judgment, how is this conception to be reconciled with the proposal that the *learning* leader should admit to uncertainty and lack of wisdom? The conception of the *learning* leader undermines the conception of the *leader-as-culture-creator* whose judgment is believed to be beyond doubt.

A final concern is the role that environmental or situational factors play in this conception of organizational culture. Although Schein acknowledges that situational factors have a bearing on members' behaviors, the relationship between organization, organization members and the leader and external factors is not explained. It is noted that the leader "must be somewhat embedded in the organization's external environment ... and must be well connected to those parts of the organization that are themselves well connected to the environment – sales, purchasing, marketing ..." (Schein, 1992, p. 383), but there is no further discussion on the nature or influence of factors external to the organization which, in turn, have an impact on it.

Many of the difficulties encountered in Schein's model derive from (1) his assumption of what culture is; (2) the nature of cognition and learning; and the interrelationship of these two points. An answer to these issues is attempted in what follows.

3.6. Cultural cognition or cognitive culture: two sides of one coin

The difficulties that invest Schein's proposal for organizational culture are in part the difficulties encountered by all cultural theorists. As pointed out earlier, there has been a tension between culture as a stable core of shared beliefs and assumptions, and culture as the grounds for continuing change. Part of Schein's solution to this paradox, as we saw, is his conception of leadership as the creation of culture, a model reminiscent of the classical view of change (see Chandler, 1966) as well as the learning leader. If Schein's solution is less than coherent, how else can the paradox be resolved?

The problem that Schein, Argyris and Schön, Senge and many other writers on organizational learning address is anything but trivial, and its solution hinges on explaining the nature and origins of *theories-in-use*, or the "pattern of shared basic assumptions" which are at the root of culture in need of change. The critical issue is how group members come by these assumptions; that is, how were they *learnt*? This question remains unanswered by Schein and colleagues, because forming beliefs, values and meaning is something humans just do. This also holds for Hofstede's view that humans somehow acquire mental programs in interaction with their environments; culture is learnt, not inherited. The mechanisms by which this happens are not explained, although it is evident that Hofstede assumes the traditional symbol processing view in his reliance on survey and questionnaire data. The question of learning can be answered, though, once it is recognized that human cognition has an *inner, non-symbolic* dimension that, while different, is not radically separated from its *external, symbolic* representation.

The traditional identification of human cognition with its public expressions, such as language or other symbol systems, has misled us into a narrow conception of human cognition and intelligence that excludes knowledge of our inner world of values,

feelings and things we know how to do but cannot express in symbolic form (Hutchins, 1996b). Our brains, however, as was noted in Chapter 2, are wonderfully efficient pattern processors and recognizers because of their parallel processing ability. Symbols such as words are just such patterns. (For an introductory discussion see Sylwester, 1995; also LeDoux, 2002.) As Churchland (1993, p. 131) expresses it, "The character of one's perception, one's cognition, and one's behavior is determined by the particular configuration of weights within that network. It is the many weights that determine what features in the world one responds to, which concepts one uses to process them, which values one embraces, and which range of behaviors one commands".

It is this feature of our brain that accounts for the extraordinary plasticity of human nature, and it is this plasticity that made culture possible in the first place, a recognition shared by Strauss and Quinn (1997), Holland and Quinn (1993). Sperber and Hirschfeld (1999) provide a good overview of the culture/cognition debate. Yet, and this is the "paradox of culture", such plasticity also raises a problem fundamental to cultural theory which is the following:

> How can we explain both cultural reproduction, thematicity, and force . . . [centripetal forces] at work in social life – and cultural variation, inconsistency, and change . . . [centrifugal forces]? More plainly, how do we handle the fact this is not a homogenous world without creating separate entities . . . to explain the differences? (Strauss and Quinn, 1997, p. 4.)

Since it is the human mind that constructs the meaning of whatever is encountered in the outer/"public" or inner/"private" world, the analysis of *cultural meanings*, created by both intrapersonal mental structures (schemas, assumptions, understandings) and extrapersonal, world structures, is the base unit of analysis. Both forces are representative of culture, and the problem is to supply a coherent account why *both* are correct. In other words, how do we explain the enormous plasticity of human nature in light of the fact that humans also create relatively stable structures that last over considerable periods of time? Strauss and Quinn (1997, p. 8) outline the assumptions guiding their analysis in four points that are worth spelling out here:

1. We cannot explain cultural meanings unless we see them as created and maintained in the interaction between the extrapersonal and intrapersonal realms. The force and stability of cultural meanings, as well as their possibilities for variation and change, are the outcome of this complex interaction.
2. Intrapersonal thoughts, feelings, and motives, on one side of this interaction, are not simply copies of extrapersonal messages and practices, on the other side, and the dynamics of these realms are different.
3. Therefore, we need to know how the mind works in order to understand how people appropriate their experience and act on it, sometimes to recreate and other times to change the public social world.
4. We need to examine socialization in greater detail to learn the concrete forms of extrapersonal culture in learners' worlds and to examine what learners internalize at different points in their lives from experiencing these things.

The critical task for cultural theory is to explain the *durability of cultural centripetal tendencies* that, in organizational theory, is reflected in the problem of how to change dysfunctional behavior and routines. Because centripetal tendencies causally depend on how humans create, store or change their schemas, Strauss and Quinn turn to the connectionist model as it offers the most useful explanation of how this happens (see Strauss and Quinn, 1997, Chapter 3). Culture, in Strauss and Quinn's "pared down" new definition, "consists of regular occurrences in the humanly created world, in the schemas people share as a result of these, and in the interactions between these schemas and this world. When we speak of culture, then, we do so only to summarize such regularities" (Strauss and Quinn, 1997, p. 7). Culture is not a separate realm above everyday routines, understandings and interactions with others, with materials or with artifacts; it is a *cognitive process*.

Cultural theory is thus fruitfully expanded in the neural net account's more productive way of considering *cultural meaning*. The " 'cultural meaning' of an object or event is the typical output of the networks of people who have similar histories" (Strauss and Quinn, 1997, p. 82). What is gained for understanding (organizational) culture is an understanding of how meanings are formed, and why meanings are as contextually variable and changeable as they are. Social variations in meaning, within groups and between groups, can also be explained now as differences in cognitive networks; that is, differences in their respective connection weights resulting from their different experiences. Working in the service department of a car dealership, for example, would strengthen certain shared understandings and ways of doing things because of consistently recurring stimuli to do with all aspects of car repair and maintenance. The inputs received by organization members in sales or accounting would differ considerably, resulting in different connection weights, and hence different shared understandings, because of different task requirements and other contextual features. Nevertheless, there would also be a considerable overlap of network connections, given the functional interrelationships between these departments. For example, there would be a shared understanding of "invoice", because invoices are experienced by all members in those departments. In addition, where there are intra-cultural variations, these may be due to the combinations of inputs that are activated most typically, rather than being a matter of difference in schemas (Strauss and Quinn, 1997, pp. 83–84).

Let me now turn to the factors that contribute to the durability of shared cultural understandings, as re-described in terms of net architecture and properties (Strauss and Quinn, 1997, pp. 90–93). These are highly relevant for Schein and other organizational learning theorists' conception of organizational change *as* cultural change. First, neuronal connections that are repeatedly activated by the environment are strengthened, and are thus not easily undone. Second, cultural understandings, or patterns of activation, are self-reinforcing. This is because the connection strengths or weights of a pattern of activation are set so that they can complete themselves when only a few of their nodes are active (Tienson, 1990). For this reason it is difficult to "dislodge" a pattern, given that disconfirming evidence is overridden by the older self-completing pattern. Here we have one reason why organization members appear irrational in light of apparently good reasons and evidence for change. Third, negative schemas, such as stereotypes,

may cause people to avoid situations that might make them change their minds; that is, their schemas, because such situations could contain evidence that contradicts the stereotype. Fourth, a final reason for the durability of cultural schemas is that strong positive or negative emotions may be associated with an experience, and thus strengthen the neural connections that result. Considering these features together, it is not difficult to see that such neuronal tendencies favor the durability of schemas. It should also become evident that these durable entities might represent themselves in (organizational) behavior.

We can conclude that wishing to maintain our schemas – resisting change, in other words – is not simply caused by the properties of one's individual schemas, but is equally determined by those with whom one constantly interacts in the workplace or elsewhere, as well as by organizational policies, practices and routines.

3.7. Organizing in context

Some rather big questions were raised in the preceding sections: What is (organizational) culture? What is the leader's relationship to culture? What is (organizational) learning? (Evers and Lakomski, 2000, Ch. 5). How can (organizational) culture change? The answer to all these questions lies in the capacities of the *embodied and embedded human brain*. The difficult part is to spell out the fine-grained neuroscientific detail on both the individual and the collective social-cultural levels.

The redescription of (organizational) culture in neuroscientific terms yields results in two directions. The insight that the human brain is a very powerful neuronal pattern recognition engine allows us to recognize *all* aspects of human cognition, the inner, non-symbolic as well as the outer, symbolic manifestations, as continuous. In fact, the outer, "cultural" manifestations, such as structures, artefacts, and symbols, are quite literally externalizations and extensions of our minds (Norman, 1993). Because human brains are limited in their computational capacities, we "out-source" many tasks too complex to be carried out by one brain alone. "Organization" (of whatever form or type) is the human solution to cognitive limitations and, in turn, has vastly expanded the scope of human capacity. For example, while we believe in everyday life that the successful completion of a flight is due to the skill and knowledge of the individual pilots, such an assumption, while in part correct, is also quite misleading (this is Hutchins's (1995) example, much simplified here). It is more appropriate to speak of the whole cognitive system that makes modern flight possible. Human agents such as captain and co-pilot and their knowledge are part of the system, as is the complex array of technological devices, computerized systems of operation and communication, the spatial configuration of the cockpit, cockpit protocols of interacting, procedures, manuals, and the many relationships and interactions with various ground and control tower personnel that make up what is meant by the cognitive system we call "modern flight".

One thing emerges clearly from the discussion so far: culture is not an entity assessable independently of humans and the systems that they have created and that in turn shape their acting in organizational or other contexts. This insight has already been

noted in the *root metaphor of culture*, although in the present context the manner in which organization *is* culture is no longer understood merely metaphorically but is explained by the natural learning capacities of human beings. While the social–cultural world is created by us and represented in both symbolic and non-symbolic ways, it does not follow that it has merely subjective status. Culture-as-cognitive-process rather than culture-as-a-thing explains the cognitive organization of ideational complexes and links with reference to how humans think. In other words, we draw on the best of current science to explain ourselves to ourselves, and while this is a self-referential procedure it is not therefore subjective. As has been argued before, our knowledge of the world and ourselves is never theory-free, because it always depends on some prior knowledge, learning or theories where coherence criteria do the work of arbitrating between different accounts. While conceptions of objectivity and truth are complex matters that cannot be discussed here (BonJour (1985) provides a good discussion on these issues), the theory that displays most virtues of system, and is most coherent, is true in the sense of providing the best evidence on its own account.

The most important conclusion of this discussion for our purposes is that leaders are just as embedded in the culture of their organization as other employees, and in turn embody the regularities and patternings that make up the organization. Although their explanation would differ from the naturalistic one above, Meek (1988, p. 459) nevertheless stresses that "Most anthropologists would find the idea that leaders create culture preposterous … It is unlikely that social anthropologists would postulate that tribal leaders create culture; the chief is as much part of a local culture as are his tribal or clan compatriots." This anthropologically odd idea, according to Meek, merely indicates Schein's selective reading of the literature.

Furthermore, it is important to recognize that organizational hierarchy or structure cannot be mapped on to one specific set of regularities or patterns. Hierarchy is not a feature of neuronal patterns of activation. The kind of organizational differentiation that matters is created by different inputs (such as differential access to information); by the specific natures of the organizational tasks and the socio-technical means available to carry them out, as well as by members' prior experiences, which formed the specific weights in their individual neural nets. Leaders may well know more than or know different things from the rest of the organization. But the notion that they know best on the basis of their formal leadership position cannot be supported. Paradoxically, given Schein's two conceptions of leadership, this is also acknowledged by him. To assume, as we are wont to do in everyday life, that it is entirely the pilot who controls the aircraft in getting us safely to our destination is to ignore her embeddedness in the highly complex social and technical domain that characterizes, or simply *is*, modern flying. She still has an active role to play, of course, but it is a role constantly mediated by a highly structured field of operations. Schein's leader is no different. This argument will also play an important part in the discussion of the following chapter on efforts to distribute or disperse leadership.

If we push this analysis further to consider how the leader's cognitive or cultural embeddedness relates to organizational change, it becomes obvious that the relationship between leader and change is not causal in the way Schein supposes. The classical idea

of change as brought about by an internal or external *designer* who is both omniscient and rational, who explicitly represents the desired change and implements it, is in large part erroneous and based on an attribution error. The leader's interpretation of members' apparent resistance to change, a phenomenon known in social psychology as "belief perseverance" (for example, Nisbett and Ross, 1980, Chapter 8), possibly indicates only that basic schemas are in conflict, or are too far apart to connect. Because organizations consist of many interlocking and interdependent parts, their members need to integrate the change imperative into schemas that are subject to local constraints; thus, there is a fair amount of variability in cognitive integration between the various parts. In other words, members in different organizational positions know different things, and interpret them differently. None knows all there is to know about the organization, the leader included. The leader's contextual knowledge of the organization differs from the contextual knowledge of the car mechanic or the sales representative. The "big picture" perspective or vision may not make any sense to other organization members because their networks are not tuned in the same way. The important thing to remember is that such resistance is not a conscious, deliberate act, although it may of course also be the case that members consciously oppose or torpedo a suggested change. Hence, established networks, when fed new information, follow their tendencies to complete the pattern, override it or, as the case may be, shift their connection weights. Change, as a result, is slow and piecemeal because it is so context-sensitive. When change, as described, happens, and when it has become enshrined in new routines; that is, members' theories-in-use, then the organization can be said to have truly learnt (Argyris and Schön's double-loop learning), at least in respect of the new routines. We can now also say that in this instance, at least *part* of the organization has changed, bearing in mind the new definition of culture that disallows describing an organization as having *one* culture, or talking about *the* culture of an organization.

On the basis of this new understanding, Hofstede's account appears less than plausible. To begin with, there is no justification for limiting culture to the borders of the nation-state. Indeed, Hofstede acknowledges that such a move is to a large extent expedient, because enormous amounts of data and statistics are collected at the level of the state and are thus readily available to researchers. However, relying on data of this kind means relying on patterns of abstraction from people's individual perceptions of what they were asked. The methodological procedure Hofstede employs is what we encountered in empiricist leadership studies (see Chapter 1, pp. 9–10). As Hofstede notes, while our mental programs may well be determined by the states of our brain cells, it is not these that we are able to observe but only behavior, words or actions. In turn, our observations lead us to infer the presence of stable mental programs. As a consequence of their intangible character, mental programs need to be *operationalized* in order to become useful for empirical research. This way of arguing is characteristic of empiricist science, which requires a theoretical tool as a means to allow intangible and non-observable objects to become part of scientific investigation, the operational definitions we have encountered before.

3.8. Organizations and change

Are solutions to organizational problems imposed from the top down? Do leaders change culture? Do organizations change by design? Or do solutions "grow" from the bottom up so that the end result, a new solution to a problem, looks exactly as if it had come about *by design*? The least we can say at present is that the issues are much more complex than traditionally described, largely due to our greater knowledge of human computational abilities as well as limitations. Given better understanding of what theories-in-use are, why they are not representable in symbolic form, and how we form and modify them, the *a priori* assumption of a central designer/leader seems highly problematic.

In much leadership theorizing, and Schein's work is one example, the general idea of change is that of an omniscient rational designer who plans the organizational cultural change, and then executes it according to plan. The causal arrow goes in only one direction – from leader to organization – and members are assumed to be passive recipients or opponents, as the case may be, of the planned change. Even if there is no hostility to a proposed change, given that the specificity of members' local organizational knowledge may differ significantly, in and between groups, the efforts to absorb or integrate the requested change into their existing mental maps may be very difficult indeed (Argote and McGrath, 1993). What might appear as resistance to well-intentioned change may be no more than an inability to override the activation patterns members have because their connection weights are too strong. Their networks may just not be tuned in the same way, or not tuned sufficiently closely to enact a shift in patterns. (This does not deny that there may be overt and deliberate opposition, but that is another matter.) Add to this the existence of many organizational layers and functional subdivisions, and it becomes ever clearer why organizational change is such a slow and piecemeal process. Context, as it has been explained in this discussion, is centrally important, in "making sense" of the change, and may end in results that were unforeseen. Where there is evidence of organizational change in terms of the existence of new procedures, as exemplified in members' theories-in-use, it can be said that the organization has learnt with regard to the specific routines and procedures in question.

The process of (cultural) change is more akin to adaptation or evolution. (See Hutchins' (1996a) fascinating account of how a navigation team discovered the solution to a mechanical breakdown, which turned out to be just the sort of solution one would expect from a designer.) But adaptation does not necessarily rule out change by design. As Hutchins (1996a, p. 400) notes, a whole system can change in three modes:

1. Without any design activity at all, through the adaptive interactions among the subsystems.
2. Through local design activities in which manipulations are performed on representations of local subsystems in order to discover more adaptive relationships with the subsystem's environment. These changes, in turn, lead to adaptive changes, either designed or not, by other subsystems.
3. Through classical global activities in which the representation is of the entire system of interest.

The fundamental distinction that determines how to classify change is that of the scope of awareness of the subsystems; that is, its ability to represent the solution. For our purposes, the most important result is that whether or not an organization changes as the result of a leader's/designer's directives or by any of the above possibilities is a matter of detailed empirical investigation. Such a determination is thus to be made *after* the event rather than by *a priori* stipulation, as was the case in Schein's conception of the leader. A more detailed discussion of the evolution/design issue will be presented in Chapter 7.

3.9. Conclusion

Given the preceding discussion, the concepts of "culture" and cultural change have been stretched in a direction that converges with causal explanations by connectionism. Whether "culture" has become a redundant category is an important question, but not one to be pursued in the present discussion. Quinn and Strauss want to maintain the concept because it highlights human experience of the external world not yet sufficiently understood by the artificial neural net account. While they acknowledge their debt to the connectionist model, they also believe that it falls short in terms of explaining "how cultural meanings become motivating (or not), persistent in people and communities (or not), spread thematically (or not), and widely shared (or not)" (Strauss and Quinn, 1997, p. 84).

In addition, the effects of motivation and emotion also need to be investigated further in their view. Again, these are of enormous importance to organizational theorists, and there is no reason to doubt, on the evidence so far, that connectionism will have interesting things to say about them. What is remarkable to note is the degree of coherence between two different disciplines on the nature of human cognition that leads to the beginnings of a unified account of culture and cognition. Such an account, unlike traditional cultural theories including Hofstede's cross-cultural account, does not follow the hypothetico-deductive model of empiricism with its associated methodology, but rather begins from the "bottom up" with an explanation of what people *say* they do and what they *actually* do. Linguistic behavior, while playing an important part in culture production, is not all that people do. Culture is indeed shared knowledge, and cultural models, either the taken-for-granted models of the world, or prototypes as described by connectionism, serve many cognitive functions. Many of these are not consciously available in verbal accounts. Given these complexities it would seem that the construction of cultural accounts becomes very much a local affair, because it is the embeddedness of our cognition, and subsequent prototypes formed, that makes us what we are. How we get from here to claiming knowledge of *cross*-cultural differences, let alone similarities, is another story entirely, because our current knowledge is barely up to the job of explaining the specifics of our own situations.

In the next chapter, some proposals for substituting or distributing leadership in some form are considered. Again, the approach adopted examines what claims are made on behalf of leadership, what is understood by "distributed" leadership, and whether the

theoretical–epistemological resources available are sufficient to make a coherent case. As in earlier discussions, the basic stipulation of learnability again exerts its pull.

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CHAPTER 4

Substituted or Distributed: The End of Leadership as We Know It?

4.1. Introduction

The emphasis on the context-specific features of organizational functioning and the complexities of organizational practice is a welcome shift away from the traditional focus on designated positional leaders, a preoccupation that still dominates the field of leadership studies. Such emphasis has taken many different forms, and this chapter will discuss some of the major models in the field that indicate just how far the belief in leader influence has changed. The weight of the leadership argument has been relocated – fanning out, as it were, from an over-reliance on the leader's influence to determining relevant variants of leader influence, to finding substitutes for it, and lastly, to arguing for *distributed leadership practice* as the most radical perspective to date. The meaning of distribution in this context is of particular importance. It is true to say, though, that such broadening of perspective is not entirely new. The contingency approaches of the 1970s, broadly defined (e.g., Fiedler, 1967; House, 1971; Yukl, 1971), can be taken to be important forerunners, as was Hersey and Blanchard's *Situation Leadership Theory* (1977). Although the idea of hierarchical leadership was maintained, more attention was paid to "the boundary conditions within which a particular style, orientation, or behavior would lead to effectiveness" (Tosi, 1997, p. 109). To that extent external variables came into focus as having a strong influence.

A more radical approach, labeled *Antileadership* (Gronn, 2002), has also been part of discussion in the field. In a major early review of leadership studies Miner (1975) noted disappointment with ambiguities and the absence of coherent empirical results and drew the radical conclusion that the concept had outlived its usefulness. Interestingly, he thought that "a more fruitful way of cutting up the theoretical pie" (Miner, 1975, p. 204; also Calder, 1977) would be to replace the concept of leadership with that of control. His reasons are instructive:

> The concept of leadership has its roots in small-group theory and the group dynamics emphasis within social psychology. It does not appear to be adequate for the tasks currently faced by management theory and organization theory, since the leadership concept is both over and under inclusive. The control concept, in contrast appears to carve out a more

> meaningful theoretical domain. It offers more powerful analytic tools to those who are primarily concerned with the organizational, as opposed to the small-group, level of analysis. (Miner, 1975, p. 208.)

It is in part because of such critiques that Kerr and Jermier (1978); also Jermier and Berkes (1979); Kerr (1977) launched their *Substitutes for Leadership* perspective. What was needed in their view was a "conceptualization adequate to explain both the occasional successes and frequent failures of the various theories and models of leadership" (Kerr and Jermier, 1978, p. 377).

The significance of their work lies in its departure from the axiom that certain leader behaviors elicit certain subordinate responses. They propose instead that factors such as organizational context, subordinate characteristics or group processes might act as leadership substitutes, or might even neutralize leadership effects. Their view can thus be described as at least de-centered, if not distributed. While this model accepts the older two-factor conception of leadership styles where leaders are either relationship-oriented or task-oriented, *Substitutes for Leadership* is not interested in which properties of leadership may be distributed, what they consist of, or under what conditions substitution might happen. Rather, the model is concerned with explaining the observation that sometimes individual, task or organizational variables rule out either positive or negative leadership influence. Given certain combinations of situational–organizational factors, leadership just does not figure. *Substitutes for Leadership* is thus rather different from the other approaches to *distributed* leadership in that it attempts to demonstrate when leadership is unnecessary or when it is simply impossible. Such an approach departs significantly from one based on the belief that leadership is always exerted, is not necessarily combined in one person, and is "spread" or "stretched" across groups or organizations.

Substitutes for Leadership has admittedly done some damage to conventional leadership wisdom (Meindl, 1993, p. 92), but the challenge has not amounted to a serious blow, as I will argue. Remaining wedded to the empiricist tradition, its theoretical and methodological commitments are shaped by it. Specifically, its quantitative-methodological approach does not allow for the relevant identification to be made between the various substitute variables. That is, it cannot determine when effects were due to leader influence or to other factors. Without such identification, the whole edifice collapses for want of support.

The most recent proposals for expressly *distributed* leadership display much greater theoretical and methodological sophistication, especially in the work of Spillane, Halverson and Diamond (2004, 2001) and Gronn (1999, 2000, 2002). These writers attempt to capture the routine ways of organizational functioning by exploring the social and spatial distribution of leadership practices and processes, emphases that are also present in the studies of Hosking (1988), Knights and Willmott (1992) and Ogawa and Bossert (1995). This is a productive as well as promising development that substantially broadens the field of leadership studies.

The focus of my discussion here is to ask what is meant by the term "distributed" in these approaches, and to examine whatever are taken to be the relevant distributed

properties. Of particular interest is Spillane et al.'s a conception of distributed leadership, derived from the field of education, which employs the concept of *distributed cognition.* This is an important contribution because it acknowledges the central role of human cognition in leadership (and other) social practices, a role not usually addressed in theories of leadership.

The interesting question is whether advocates of distributed leadership, on their own accounts, have succeeded unintentionally in rendering the very idea obsolete. The tension between acknowledging leadership as (distributed) task performance, and wanting to maintain leadership as a causal explanatory concept, ultimately cannot be sustained. This problem hinges in large part on the difficulty of demarcating leadership from non-leadership practices and on a narrow conception of "distribution" that remains indebted to the classical conception of cognition.

Although these perspectives differ in theoretical orientation and emphases, both have difficulties in substantiating the claims made on behalf of their theories. Both are based in the final analysis on an unacknowledged commitment to the empiricist principle of empirical adequacy, as will be seen. If it turns out that a more parsimonious explanation exists that can "stand in" for what are claimed as leadership substitutes or leadership practices, we should accept it, a request anticipated by Pfeffer (1977).

4.2. The substitutes for leadership view

The *Substitutes for Leadership* model has been described as a "Leadership Classic" because it qualifies in terms of both prominence in the *Social Sciences Citation Index* and its contribution to leadership research (Hunt, 1997, p. 93). Considered as "a logical consequence of a decade of leadership theory building and research" (Howell, 1997, p. 113), it was overshadowed by the publication of McGregor Burns' text *Leadership* in 1978, the year in which Kerr and Jermier's classic "Substitutes" article was published. Whereas Burns celebrated the charismatic leader, Jermier and Kerr (1997, p. 98) later wrote of their model, "In figure-ground imagery it elevates the usual background to the center of attention and challenges the view that interpersonal leadership should be seen as the primary theoretical category."

Reflecting on why hierarchical leadership apparently did not make the difference as expected, their central idea was convincing: "if we really want to know more about the sources and consequences of guidance and good feelings in organizations, we should be prepared to study these things *whether or not* they happen to be provided through hierarchical leadership" (Kerr and Jermier, 1978, p. 401; emphasis in original). It is this reflection that led to the term "substitutes for leadership", where "substitute" is defined as "a person or thing acting or used in place of another". In context, this term may be used to describe characteristics which render relationship and/or task-oriented leadership not only impossible but also *unnecessary*" (Kerr and Jermier, 1978, p. 395). More specifically, the conceptual domain of substitutes for leadership comprises personal *characteristics of the subordinate* (e.g., professional orientation that might make organization members relate better to peer reviews than to formal leader evaluations);

features of the task (such as machine-paced operations or highly standardized work methods where leader influence would be neutralized), *and of the organization* generally, e.g., degree of formalization in terms of explicit plans and goals, closely-knit work groups, spatial distance between leader and subordinates). In this manner Jermier and Kerr (1997, p. 97) presented a counterweight to the "overly psychologised, methodologically-driven approaches that dominated" and of which many scholars had grown tired. Looking back over the history of their model's applications, the authors note a number of issues that serve well as points of departure for the present analysis.

The first issue is that there has been very little work on refining and elaborating the model conceptually and theoretically although it has given rise to interesting applications in turn (for example, Manz and Sims (1980) idea of self-management); no new suggestions for leadership substitutes have emerged. What should be investigated, for example, is how substitutes interact with one another to produce effects, and "why the effects of substitutes in certain combinations are different from their effects when considered individually". This question is to be answered by using different quantitative methods such as nonlinear analysis or clustering algorithms (Jermier and Kerr, 1997, pp. 97–98).

Second, the subsequent work carried out on substitutes *as moderator variables*, while interesting, did little to advance the core of the original research agenda; that is, the examination of the main effects: organizational processes, individual, group or task features that lie "outside the reach of formal, hierarchical leadership understood as "superior-subordinate interactions" (Jermier and Kerr, 1997, p. 98). This sociological orientation, in the authors' view, is the overriding difference between their and other models of leadership and is considered to lead to better insights on organizational behavior. Focusing on moderator variables, as did Howell and Dorfman (1981), is somewhat beside the point because "at the heart of the matter of leader substitutes is the typical situation where leader behavior and outcome variables are weakly related or unrelated" (Jermier and Kerr, 1997, p. 98). The explanation given is important for present purposes. Jermier and Kerr argue that this result is an indication that "leadership has already had its effects through the substitutes such that formal, face-to-face interactions would be superfluous" (Jermier and Kerr, 1997, p. 98). Much of the background theoretical framework is derived from classic group dynamics theory that itself contextualized the formal roles of leaders. What is required in their view is more research on the processes by which the substitutes exert their effect.

Third, there need to be more context-sensitive methodological approaches as counterweights to the preponderance of cross-sectional designs and questionnaire surveys; contemporary research does not delve into the subjective meanings actors attribute to substitutes, "[w]e need to understand how substitutes get created and how leadership interactions change as a result of the introduction of the substitutes" (Jermier and Kerr, 1997, p. 99). However, more experimental or quasi-experimental research is also required because it allows for causal inferences to be drawn. Above all, the writers assert, their model should not be considered as a kind of contingency model but rather as "a screen to be used by researchers to determine whether interpersonal leadership should even be part of a particular study…" (Jermier and Kerr, 1997, p. 100).

Kerr and Jermier's attention to the various factors that contribute to organizational performance, sociological, psychological, or generally organizational, went in the right direction. For an elaboration of their model, where would we begin? Major revisions would be needed to make the relevant identifications between substitutes, between substitutes and leader behaviors, and for the causal conclusions claimed by the model to be drawn. Such an attempt would be faced with considerable difficulties.

Critiques directed against the theory's poor empirical support are abundant. Podsakoff and MacKenzie (1994, 1997) provide a comprehensive overview, and refer to a host of earlier studies of quantitative issues. The end result always seems to come out the same way: "...regardless of whether a narrow or broad interpretation of the theory is adopted, the conclusion is the same – there is little empirical support for the hypothesized moderating effects of the substitutes variables" (Podsakoff and MacKenzie, 1997, p. 121). Issues relating to statistical validity or regression analyses are not of concern here, although they have their own technical complexities and are no doubt responsible for some of the problems of empirical analysis. More central is the theoretical framework upon which the *Substitutes* model is constructed, and whether, to use Miner's colorful phrase, the way "the theoretical pie" is cut up is helpful. It seems that it is not.

We have already encountered the basic two-factor framework in the *Generic Leadership Model* (Chapter 1; Evers and Lakomski, 2000, p. 66, Figure 4.1), which begins with the stipulation of the leadership construct at the top. In Kerr and Jermier's case this is the familiar *Consideration/Initiating* version; that is, a form of hierarchical leadership is accepted *a priori*. Structurally identical, the *Substitutes for Leadership* and the generic model differ in that the first replaces leader behaviors, duly operationalized, with the substitutes (non-leader factors). This assessment is tricky, as Kerr and Jermier admit. Existing scales were reworked because of an endemic uncertainty regarding what was actually measured: the substitutes themselves or the prescribed leadership. The problem of interpretation was corrected in new scales that, so the authors claim, "permit the distinction between effects which are the result of leadership and those which stem from substitutes for leadership" (Kerr and Jermier, 1978, p. 381). But do they? How did the authors know that the revised set was any less ambiguous than the first? Several points can be made here.

As we know, there is no theory-free way to describe the world, and our observation statements always contain some theoretical vocabulary. This is true for the construction of measurement scales as for writing operational definitions of both leadership behaviors and their substitutes. Scales of any kind, no matter how carefully reworded, as well as operational definitions, are always compromised in this way. A second point is that a finite set of observations, as exemplified in a substitute questionnaire, can confirm a number of theories because theories are always underdetermined by evidence. Furthermore, organization members interpret scales in terms of their implicitly held leadership views, as well as their own organizational experience that determines how substitute questions are understood. But importantly, these interpretations are not static. Over time we change our minds, have new experiences, and see ourselves and our capacities differently. The same set of scales administered at a different time to the same group, for example, might well have different outcomes. Scales purporting to represent

substitutes are not context-invariant, and thus do not hold universally. Because organization members' perceptions of what is being asked in a questionnaire are determined by their understandings of leadership, organizational functioning and their own roles, substitute categories fragment at the local level. The answers provided are not evidence for the relevant substitute categories. Rather, they reflect individual perceptions of the above concepts. As I commented earlier, that is to be expected given theory-ladenness, and what is at issue is how to differentiate between these perceptions in order to identify which substitute is or is not at work in the situation under investigation. However, because empirical adequacy is the principle that determines empirical results in this model, further questioning or surveys, or more observations, would not be of help as the issue of demarcation can be raised with each new questionnaire. The end result is that no demarcation can be arrived at with any assurance as to its validity, leaving empirical results ambiguous.

These examples are all indications of the limits of *empirical adequacy*, the conception of evidence held by empiricist science. The same point can also be made in relation to the construction of substitutes in the first place, and to the unargued-for assumption that there *is* a valid relationship between substitutes and leadership behaviors. Researchers with different theoretical predilections, or practical ones for that matter, might well come up with a different set. The fact that no one appears to have done so, as duly noted by Kerr and Jermier, cannot be taken as confirmation that their findings are either valid, or the only possible ones. It might just be the case that research training in leadership studies, as well as prevailing theories in organization science, have socialized researchers in accepting certain theories, at least for the time being, as plausible explanations for organizational behavior. Another explanation might just be poverty of imagination. None of these points should be construed as supporting a tacit belief in the existence of substitutes, or as casting aspersions on leadership researchers' theoretical horizons. It is just that there are as many possible theories to account for the observation as we have the wit or training to conceive.

In view of our discussion, the discovery that leader behavior and outcome variables are weakly related or unrelated in typical leader substitute situations is what one would expect. But to claim that such an ambiguous state of empirical affairs is evidence that leadership has already happened by way of its substitutes is hardly defensible, and amounts to a theoretical sleight of hand. Such a retrospective assessment implicitly relies on what has been shown to be impossible to achieve by the model's own resources: the demarcation of substitute variables from one another. This difficulty cuts two ways, because not only did the authors wish to demarcate substitute from leader behaviors, and demonstrate the influence of the substitutes as "stand-ins", but they also wanted to separate out where leader influence can be detected. The argument presented above can be applied to this side of their model as well, with the same outcome. When it comes to causal relations, the authors conclude, quite sensibly, that causal arrows can go both ways because influence can be exerted either by the subordinates or by the leader under given conditions. But then, what have we learnt? What has this particular conception contributed to the leadership field?

The idea that factors other than, or in addition to, the formal leader influence organization members and their performance in some way is of course quite plausible. But

this leads to the conclusion that we have learnt what we already know from a commonsense understanding of organizational functioning and performance. We still do not know what these substitute factors are, and why they do what they are alleged to do. It appears that there is little advance in our knowledge on the leadership phenomenon, and how to account for it.

Although the route taken here is different, we end up with the assessment of Sheridan, Vredenburgh and Abelson (1984, p. 57) that it is difficult to distinguish leadership effects from other behavioral influences occurring at the same time in the organization. They conclude, unsurprisingly, that "...relationships between the leader's and subordinate's behavior may be largely spurious because of their shared covariance with contextual variables". The critical issue in this model is its adherence to empiricist principles, as evident particularly in the methodological framework adopted, with its implicit reliance on a view of learning as symbol processing.

In the next section a more holistic perspective on leadership will be discussed that recognizes and develops further the understanding of the distributed nature of organizational work.

4.3. Distributed leadership: an idea whose time has come?

The idea that leadership is something many people may be able to exercise has been expressed in various ways by critics of conventional leadership approaches. This view reflects what people experience in their workplaces where leaders seem to emerge from time to time, and from task to task. The reality of organizational functioning, and the recognition by agents that leadership can be, and frequently is, distributed in practice, is out of step with traditional leadership theory.

Such a view has been strongly argued by Ogawa and Bossert (1995, p. 225) who maintain that "leadership is not the realm of a few people in certain parts of organizations". They draw attention to research on leadership as an *organizational* quality that seems never to have entered the mainstream debate. Ogawa and Bossert (1995) propose to conceptualize leadership as a *quality of organization* by means of institutional theory. This theoretical framework has the advantage of allowing a view of the function of leadership as social legitimacy and organizational survival. It thus extends beyond leadership as the possession of individuals apart from social context, what the authors call "the technical-rational" dominant view, which sees organizations as technically rational systems that are goal-oriented and display formal structure. Despite significant differences in emphases, their perspective is reminiscent of Jermier and Kerr's earlier approach.

As Ogawa and Bossert (1995) note, because the framework of institutional theory allows leadership to be seen at the organizational level, leadership in this sense is also causal, "a form of social influence. By combining the organizational and causal parameters, we learn that leadership goes beyond influencing individuals; it affects organizations' structures. In a word, leadership is organizing" (Ogawa and Bossert, 1995,

p. 238). Refocusing the mainstream research community to consider their conceptualization, they believe, will meet with resistance. Nevertheless, "Perhaps a different conception of leadership is emerging, one that sees it everywhere" (Ogawa and Bossert, 1995, p. 241). The sense in which leadership is distributed here is different from that of writers such as Gronn, although the sociological emphases are also present, as we will see in the following.

Canvassing various possibilities of what to do with leadership, Gronn (2000) opts for salvaging some notion of leadership as an explanatory concept, provided we concentrate on rethinking organizational practices and how they are constituted through what he terms *conjoint agency*. While there is no argument for why (a conception of) leadership should be maintained, the assumption is that it continues to be a useful explanatory concept if fruitfully reconceptualized. Such reconceptualizing should be grounded in a theory of action that, Gronn argues, is at the core of the agency-structure interplay (Gronn, 2000, p. 318). Leadership (and influence) is to be found distributed across structured organizational relationships and can emerge as the result of various forms of conjoint agency. This conception is introduced to foreshadow a "new division of labour in which the authorship and the scope of the activities to be performed have to be redefined to encompass pluralities of agents whose actions dovetail or mesh to express new patterns of interdependent relations" (Gronn, 2000, p. 325).

Although some versions of distributed leadership have always existed, Bass's transformational leadership model, described as "representing a kind of apogee of individualism" (Gronn, 2000 p. 317), overshadowed these perspectives. Discontent with the former, coupled with growing interest in organizational learning and the learning organization (for detailed discussions see Evers and Lakomski, 1996, 2000), has led to an expansion of work in the second, distributed leadership branch. For Gronn (2000, p. 334),

> Distribution entails maximizing sources of information, data and judgment, and spreading the detrimental impact of the consequences of miscalculations and risk. Because of the pooling of expertise and sources of advice, it also affords an increased likelihood of detecting errors in judgement and more attention being accorded feedback. These things amount, in short, to an overall widening of the net of intelligence and resourcefulness.

Add to the above the enormous potential and power of electronic means of communication and networked offices, he observes, and the meaning of distribution expands in ways never before encountered. Gronn has recently developed these ideas further and suggests that we consider *distributed leadership as the new unit for analysis* (Gronn, 2002). The reality of the modern division of labor, which is more differentiated, segmented and increasingly technologized, presents a more appropriate focal point for studying leadership practice that is thus similarly distributed practice. In the final analysis, organizational performance is determined by embedded organizational practices and it is these that are of concern. How people perform their tasks is captured in the concept of *conjoint agency*, specifically concertive action, which is said to be characterized by three main patterns: spontaneous collaboration, intuitive working relations, and institutionalized practices. In the process, it is no longer productive to maintain the leader-follower distinction of old, and leadership is better seen as an attribution. Specifically, leadership is described

> as a status ascribed to one individual, an aggregate of separate individuals acting in concert or larger plural-member organizational units. The basis of this ascription is the influence attributed voluntarily by organization members to one or the other of these focal units. The basis of attribution of legitimate influence by the attributing agents may be either direct experience, through first-hand engagement with the particular focal unit, or vicarious experience, and thus reputed, presumed or imagined. The scope of attributed influence encompasses the workplace-related activities defined by the employment contracts which operate in particular contexts. (Gronn, 2002, pp. 428–429.)

Influence can be attributed potentially to all organization members. In other words, every organization member can be a leader in certain circumstances.

In his earlier work, Gronn (2000, p. 323) makes reference to socially distributed cognition as an explanation of distribution in the study of organization. In fact, he notes that the idea of cognition has been the "most popular" and "most advanced area of understanding distributed systems". While distributed cognition is evident in task performance and in modern networked working environments, cognition seems to drop out of the sense of distribution when it comes to discussing distributed leadership. Here, Gronn, following Gibb (1954), reverts to *conjoint agency*, and to the implicit "analytical duality of agency and structure" knitted together by conjoint agency. This is a somewhat puzzling move, because there appears to be a disjuncture in acknowledging that socially distributed cognition is operative in organizational task performance, but plays no role in leadership *practices* within these same organizational contexts. Why should it be presumed that socially distributed cognition does not apply to leadership, particularly since Gronn emphasizes the conjoint action of agents in the execution of their tasks or practices? If distributed cognition is causal in the first case, why is it not causal in the second, leadership case as well? This is an interesting twist in Gronn's argument that will be taken up at the end of the chapter.

While Gronn's approach is developed from within the broader domains of organization theory and leadership studies, the perspective on distributed leadership in the following discussion derives from the field of education. It is unique in that it does acknowledge the importance of understanding how we acquire our knowledge, and how we learn, in leadership contexts as in other areas of social activity.

4.4. Distributed leadership and distributed cognition

The most comprehensive recent approach to distributed leadership is presented in the work of Spillane, Halverson and Diamond (2004, 2001). Not unlike Gronn, the authors consider distributed leadership as exemplified in "distributed leadership practice". The concept of *leadership practice* or *activity* provides a conceptual framework that goes beyond the individual agency of positional leaders and defines a more appropriate context for observation:

> A conceptual framework for leadership practice is likely to yield more insight into the relations between leadership and innovation in schools than theories that focus exclusively on organizational structures and leadership roles because leadership practice is a more proximate cause of that innovation. (Spillane, Halverson and Diamond, 2004, p. 5.)

Leadership *practice* that is "stretched over" the social and situational contexts of the school is the relevant unit of analysis. Leadership in this framework involves "the identification, acquisition, allocation, coordination, and use of the social, material, and cultural resources necessary to establish the conditions for the possibility of teaching and learning" (Spillane, Halverson and Diamond, 2004, p. 11). Indeed, the appropriate unit of analysis is "leadership activity at the level of the school", because "focusing either exclusively on one or more formal leaders or on teacher leaders is unlikely to generate robust insights into school-level leadership practice" (Spillane, Halverson and Diamond, 2004, p. 28). The focal point on leadership practice, the authors believe, allows them to include positional leaders and informal leaders, as well as followers. This is one sense in which leadership is considered as *distributed*, and it is in keeping with what Gronn has argued previously. We might call it the non-positional model of leadership.

Developing their framework on the twin pillars of distributed cognition and activity theory, the authors accept that the study of thinking and cognition needs to encapsulate the contexts in which it occurs. They thus align themselves with the perspective of situated cognition or action (for discussion of these perspectives see Clancey, 1993; Evers and Lakomski, 2000, Chapter 3; Greeno, 1997; Greeno and Moore, 1993; Lave, 1988). It is important here to be clear on what the authors understand by "distributed" in "distributed cognition". Pea (1997), whose views are a theoretical source, notes (while using the term distributed *intelligence* rather than cognition):

> When I say that intelligence is distributed, I mean that the resources that shape and enable activity are distributed in configuration across people, environments, and situations.... While it is people who are in activity, artifacts commonly provide resources for its guidance and augmentation. The design of artifacts, both historically by others and opportunistically in the midst of one's activity, can advance that activity by shaping what are possible and what are necessary elements of that activity. (Pea, 1997, p. 50.)

Spillane, Halverson and Diamond (2004, 2001) follow the *person-plus* view of both Pea (1997) and Perkins (1997), which denotes "the person plus surround" where surround means "...the immediate physical and social resources outside the person – [that] participates in cognition, not just as a source of input and a receiver of output, but as a vehicle of thought" (Perkins, 1997, p. 89). Added to this is a second qualification, "The residue left by thinking – what is learned – lingers not just in the mind of the learner, but in the arrangement of the surround as well, and it is just as genuinely learning for all that" (Perkins, 1997, p. 90). The location of knowledge and learning on this view – inside or outside the skull – is no longer a matter of importance.

In describing leadership practice, Spillane, Halverson and Diamond (2001) begin by identifying the tasks that are at the heart of leadership practice and that comprise both macro and micro functions, where the latter offer the more productive units of study because of attention to leaders' more fine-grained daily activities. Of importance to them are four central ideas: "*leadership tasks and functions, task-enactment, social distribution of task enactment, and situational distribution of task-enactment*" (Spillane, Halverson and Diamond, 2004, p. 5; emphasis in text). In recognizing the problems of

attending to espoused practices only, the authors draw on Argyris and Schön's distinction between espoused theory and theory in use, because the latter enables an understanding of a task "*as it unfolds*" (Spillane, Halverson and Diamond, 2001, p. 25).

While leadership tasks and functions and task enactment are centrally important, the third concept, the *social distribution* of task enactment is more problematic. Here, the authors acknowledge the complexity of their framework in so far as enacting leadership tasks is distributed across multiple leaders in a school. In addition, the collective cognitive properties of the group, while enacting a leadership task, may lead to the evolution of a leadership practice "that is potentially more than the sum of each individual's practice" (Spillane, Halverson and Diamond, 2001, p. 25). As a consequence, it may be more appropriate to study leaders' knowledge and expertise at the group or collective level.

The fourth central idea is the *situational* distribution of task enactment. In keeping with the basic tenets of situation action the authors consider leadership practice as being situated "... in an environment saturated with artifacts that represent in reified forms the problem-solving initiatives of previous human action. ... The material situation does not simply 'affect' what school leaders do, it is *constitutive of their practice*" (Spillane, Halverson and Diamond, 2001, p. 26). Finally, of most importance is that the exploration of distributed leadership is advanced for the purpose of illuminating leadership for instruction, where the latter itself is a vast and complex set or practices. Several issues emerge here which are worth examining briefly.

In the work of Spillane et al., the understanding of leadership fluctuates between formal position holders, other individuals, who might be followers, and groups. All can be leaders at different points in time, and this means that leadership practice is in principle everyone's practice. Given that Gronn maintains an equally dispersed view of who can be a leader, this observation applies to his conception as well. Furthermore, because organizational structure, symbols, language and so on are constitutive of leadership practice, and because leadership practice is to be located at the school level, these practices are constitutive of school practice. And so they might well be. But if so, how can we tell practices apart? Has anything distinctive been left over that demarcates *leadership* practice from any other practice teachers and principals engage in? How is such identification possible empirically?

The authors stress that "an investigation ... must involve both observing practice as it unfolds and asking practitioners about the observed practice" (Spillane, Halverson and Diamond, 2001, p. 24). However, as we know, observation always depends on the conceptual lenses through which we see. Different conceptual lenses will give us different answers to what an observed practice is believed to be an example of. So how do the authors know when they observe leadership rather than any other practice? The categories that help them "cue" their observations are the categories derived from a blend of transactional as well as transformational leadership perspectives, which, amongst others, define practices such as vision building, establishing norms of trust, and collaboration, but also routine task execution as leadership practices.

The same theoretical point applies to understanding how a task unfolds from the perspective of practitioners and their theories-in-use. The accounts practitioners are able

to give on their understanding of their leadership practices are also cued by what they understand leadership to be. What they might observe as their own emerging task enactment is their *a posteriori* account of what they think it is. And what they think it is depends on what kind of leadership framework they assume. Recall that this point also applied in Kerr and Jermier's framework, in that what counts as a leadership substitute was similarly in the eye of the beholder. In addition, when researchers observe unfolding task enactment, it is *their* interpretations that give meaning to the actions observed. They find what they were looking for, in so far as their conceptual lenses are colored by the categories of transformational or indeed any other conception of leadership.

The methodological point made here is that different observers may come to different conclusions, because all that is offered methodologically is *empirical adequacy*. This means that observations are not supported by additional, extra empirical criteria that might allow for demarcating practices. As a consequence, in regard to what might be called the narrower goal of identifying leadership practices, the methodological framework offered is of little help. Regarding the much more ambitious goal to study leadership practice in *context* as well as at the school level, empirical adequacy is too narrow a tool for the task. The conceptual framework of distributed cognition, as Spillane et al. understand it, and the empirical methodological approach used, do not cohere. The latter remains rooted in an empiricist understanding of observational evidence, *empirical adequacy*, and despite the discussion of distributed cognition, the analytical work done in distributed leadership is framed by assumptions of transformational/transactional leadership that have little to say about context, and the other important aspects of distributed cognition, as categories in their own right.

Although expressions such as "stretched over" and *person-plus* do capture some of the meaning of "distributed" in *distributed cognition* in terms of the "outward" reach of cognition, there is no explanation of the agent's "inner" cognition; nor is there discussion of the nature of the cognitive machinery that explains situational and social distribution of cognition. It seems as if all the cognitive action happens "out there" with no loop back to the cognitive action inside the agent. As we saw, for Gronn, the cognitive machinery that does the work of executing leadership practices as he defines them is located in conjoint activity, which in turn is reliant on the analytical categories of agency and structure. While he does offer an account of a cognitive, internal mechanism it is one unrelated to distributed cognition.

The rich descriptions of context as enabling human action are valuable contributions to our study of how humans do what they do, but such portrayals depict the results rather than the causes of human interactive engagements with, and transformations of, their physical and social environments. While much is made of context, artefacts and networked working environments in distributed leadership, there is little on the cognitive capacities of humans who do the interacting with and changing of their environments. It might be said that distributed leadership is not distributed enough in the relevant sense. While the writers discussed earlier stress the importance of *cognitive systems*, there is no account of the architecture and processing capacity of the human brain that is causally their point of origin. It is here that the theory of cognition offers a more comprehensive account and methodology.

4.5. The theory of cognition

As outlined by Hollan, Hutchins and Kirsh (2000, p. 175), the theory of cognition studies the organization of cognitive systems where what is considered cognitive "encompass [es] interactions between people and with resources and materials in the environment". (For a cultural–historical overview of distributed cognition see Cole and Engeström, 1997.) The theory is committed to two important theoretical principles, the first concerning the boundaries of the unit of analysis for cognition, and the second concerning "the range of mechanisms that may be assumed to participate in cognitive processes" (Hollan, Hutchins and Kirsh, 2000, p. 175). Adherence to both principles demarcates this theory of cognition from other traditional accounts. While not completely rejecting the view that the individual may, under certain conditions, be the relevant boundary, the theory of cognition

> looks for cognitive processes, wherever they may occur, on the basis of the functional relationships of elements that participate together in the process. A process is not cognitive simply because it happens in a brain, nor is a process noncognitive simply because it happens in the interactions among many brains ... In distributed cognition, one expects to find a system that can dynamically configure itself to bring subsystems into coordination to accomplish various functions. A cognitive process is delimited by the functional relationships among the elements that participate in it, rather than the spatial collocation of the elements. (Hollan, Hutchins and Kirsh, 2000, p. 175.)

Unlike traditional approaches of cognition that look for cognitive events inside the agent's skull where s/he is assumed to manipulate the relevant symbols, the theory of distributed cognition is concerned with "a broader class of cognitive events and does not expect all such events to be encompassed by the skin or skull of the individual" (Hollan, Hutchins and Kirsh, 2000, p. 176). Although the material world does provide additional memory for thinking in order to alleviate agents' cognitive overload (see Kirsh, 2000), it also does more and offers opportunities for reorganizing the distributed cognitive system "to make use of a different set of internal and external processes". This is an important point not yet sufficiently appreciated, let alone understood.

Two further features, familiar from the earlier discussion of work by Spillane et al., are that distributed cognition is *socially distributed* as well as *embodied*. *Social* distribution here entails more than that different people in different positions can be leaders at different times and for different purposes, as advocates of distributed leadership assert. Indeed, in the present view social organization, including organizations and culture, is itself a form of cognitive architecture (Clark, 1997; Hutchins, 1995, 1996a, 1996b; Strauss and Quinn, 1997). This is a richer concept than distribution across the members of a group. A causal account of how such phenomena might emerge is not part of the framework of numerical distribution. As for the *embodied* nature of cognition (e.g., Clark, 1997; Clark and Chalmers, 1998; Damasio, 1996; Lakoff and Johnson, 1999, Chapter 12), suffice to note here that "It is not an incidental matter that we have bodies locking us causally into relations with our immediate environments. Causal coupling is an essential fact of cognition that evolution has designed us to exploit" (Hollan, Hutchins and Kirsh, 2000, p. 177; also Kirsh, 1995, 1996). More pointedly:

> From the perspective of distributed cognition, the organization of mind – both in development and in operation – is an emergent property of interactions among internal and external resources. In this view, the human body and the material world take on central rather than peripheral roles. (Hollan, Hutchins and Kirsh, 2000, p. 177.)

Despite broad agreement, how exactly to understand the nature of this interaction, the meaning and scope of *embodied*, and the subsequent claims for the nature of human cognition are issues whose details are far from settled. Wilson (2002) has argued that the idea of embodied cognition was originally presented as a single point of view signaling a novel and controversial view of the mind and its relation to the world. However, in her view, this perspective contains at least six related claims that deserve attention in order for the term *embodied cognition* to remain meaningful: (1) cognition is situated; (2) cognition is time-pressured; (3) we off-load cognitive work on to the environment; (4) the environment is part of the cognitive system; (5) cognition is for action; and (6) off-line cognition is body-based.

Wilson (2002) singles out claim 4 as highly problematic, while agreeing that claims 1 to 3 are likely to be true. The sixth claim has received little attention in the literature but in her view is actually the best documented. It is instructive to consider the difficulties Wilson identifies. Her argument for claim 4 is that because there is such a dense and continuous information flow between mind and world, it is not useful to study the mind alone in understanding the nature of cognitive activity; instead, we have to include the environment as playing a role in that explanation. This she considers to be the strong, and controversial, version, held, *inter alia*, by Clark (1997). More specifically, the first part of the argument, which claims that body and environment are in interaction in assisting cognitive activity is the accepted and weaker part. The extension that includes the definition of distributed cognition across the interacting situation, including mind, body *and environment*, is the stronger and problematical one. Her concern centers on the incorporation of the environment into what is considered to be the human cognitive system.

These reflections show that what exactly these roles are, and how to determine the relationship of mind and world, are issues of immense complexity, as yet largely unexplored. Nevertheless, some indication of the complexities of context and environment as activity space, and how to determine what is the relevant task environment for the problem solution, is provided in the discussion on the so-called problem of transfer in Chapter 6.

4.6. Naturalism and leadership

What lessons are to be learnt for substituted or distributed leadership from this excursion on to the terra nova of the theory of cognition's expansion into the brain's external environment? Is it necessary for us to know how the brain does what it does? There are several points to be made.

To begin with, it is clear that distributed cognition, as discussed here, demonstrates how much more complex our embeddedness in and interrelationship with the world is.

To continue to assert that human agents are autonomous and independent creatures, who operate apart from their environments, other humans and their creations, is no longer credible. It is for this reason above all that the Kerr and Jermier substitution model had to come to grief. Given the complexities of our integration into a cognitive force field that includes not just other humans but also objects, artefacts and their interrelations, and given the narrow methodological approach of empiricist science applied to separate out these factors, determining cause-effect relationships between any of them is not possible. While it is true, as might be objected, that we have to start with some assumptions and employ empirical methodologies to investigate phenomena, some are more finely honed than others in that they include a defensible naturalistic account of human learning and knowledge acquisition. In other words, they do not exceed their own theoretical resources and investigate knowing by the means of modern empirical science. The theoretical–epistemological tools offered by empiricist science, especially its principle of empirical adequacy, are too blunt to do the job. It is for this reason that leadership as discussed here has been described as "massively disconnected from causation" (Evers and Lakomski, 2000, p. 58).

Second, the presumed dialectical mechanism between agency and structure, as Gronn sees it in his conception of conjoint agency, following Giddens, can be re-described as the interplay between the results of the outsourcing of our minds, our culture, structures, artefacts, organization and our minds in action. Structure can be understood as some sediment of thought. It is not necessary, in other words, to stipulate additional analytical categories that purportedly explain our acting while engaging with the objects of our own creations in the face of a better, naturalistic account that is able to explain both coherently with the resources of its own theory.

The belief that everyone can be a leader at some time is happily accommodated by a naturalistic conception of agency. Because hierarchical position is irrelevant to cognition, what matters is where agents are located, and the nature of their interrelationships, physical, material, and computational. The sticking point for those who continue to believe in the existence of leaders as entities existing in nature, to be uncovered given the right methodology, is that as long as they persist in using empiricist tools, the task is impossible, as argued earlier. However, if empiricist methodology is abandoned, together with its narrow account of mind and learning, the symbol manipulation view, then the leadership enterprise loses its point because minds/brains are not as assumed. The essentialist concept of leadership that is still implicit in distributed leadership loses its status together with its imputed causal power.

If naturalism is a more defensible causal account of how humans act, interact and solve problems, then the continued use of the term "leader" no longer carries its previously attributed properties, because causal relations are literally everywhere and include the "leader". To the extent that distributed leadership is not underpinned by naturalism, at least not in its full-blown externalist dimension, the meaning of distribution remains one-sided and limited, as in "the modern distribution of labor". While this is helpful descriptively, it is not the sense of distribution relevant to task accomplishment for which leaders and leadership practices were postulated in the first place. It is *distribution as a property of cognition* that accounts for the modern distribution of labor, a consequence

of the human necessity of outsourcing cognitive load. One might ask in consequence why we should persist with studying leaders and leadership, while also believing, as Gronn and others in the distributed leadership perspective do, that leadership is an attribution, which makes its determination subject to the whim of individual and subjective assessment. Leadership thus remains in the eye of the beholder, and this does not cohere with efforts to account for it in a world of distributed labor. It is tempting to return to Pfeffer's (1977) comment that there seems to be a deeply held need for leadership to exist, contrary evidence notwithstanding.

One further point might be raised against the argument outlined above. Among the many problem-solving activities in which human agents engage, it may well be the case that some just seem to require the kind of performance that we ordinarily describe as "leadership". Can this observation be accommodated from the naturalistic perspective developed here?

Leadership, as commented earlier, can be understood as an attempt to find some order or pattern in organizational functioning, as a way to coordinate activity. Coordination here is not simply the arranging of physical or temporal contingencies for the purposes of solving problems, with us being in control of and separate from the various arrangements we make. Distributed cognition maintains that there is a partnership between the human actor and the artefacts, structures and objects in their environment. Following Kirsh (1999), coordinating mechanisms and processes occur at many different levels characterized by longer or shorter time spans. These may range from enduring organizational-institutional structures and communication patterns that help us achieve our goals by making coordination more effective, to short-term temporary partnerships as, for example, in project teams or task forces, called together for a limited period of time, to momentary arrangements and modifications to our environments that help us interpret or make sense of an event, situation or moment. In addition to these features, coordinating mechanisms or activities can either be symbolic and explicit or sub-symbolic and tacit. Usually we experience coordination through symbolic representations, as in memoranda, or attending a meeting where we might discuss and write up marketing plans for new higher degree courses. This is an explicitly symbolic activity where proposed action is encoded in a marketing plan. Consider as a further example of explicit symbolic coordination the case of orchestras (Kirsh, 1999, Fig. 2).

Orchestral activity is simultaneous rather than sequential; members' roles vary with the pieces they are playing; the performance of all members matters, not just that of the individual; individual variation is possible because players need to interpret the score; and finally orchestras have a "leader", a conductor whose job it is to coordinate the overall performance of the orchestra to the standards of his or her professional judgment. Kirsh (1999, p. 7) argues that a central conductor–coordinator (leader) is necessary because "orchestral scores underconstrain performance". In order for the orchestra to play a particular piece in a manner deemed appropriate, it is the conductor's role to determine what the authoritative reading of the score is to be. So here we have a system of "decentralized but rule-governed players", where coordination emerges as the result of a central figure, the conductor, imposing global constraint on how the performance is to be. Nevertheless, the success of the performance lies in the players' roles. In what sense is the conductor a leader?

Here we might return to Robinson's point (2001; see also Chapter 1) that leadership (in her terminology) is required in cases where problems are ill-structured; whereas if problems are better defined and understood, leadership shades over or dissolves into the very practices adopted to solve them. Given that there is a degree of under-determination of task performance here, specifically how to interpret or represent a particular piece of music, the score, the conductor or central source serves "the purpose of communicating global constraint to all locally constrained participants" (Kirsh, 1999, p. 8). However, this kind of coordinating function only works when (1) the "leader" can represent overall group behavior "and classify it meaningfully into better or worse states"; and (2) when he or she can "communicate with all participants as needed without creating a bottleneck. That is, it is possible to easily broadcast group wide advice or possible to target specific advice in time to be useful" (Kirsh, 1999, p. 8). When these conditions cannot be met, a flatter, less hierarchical organization is required to achieve coordination. It would seem then that where the leader is not able to represent group behavior meaningfully or communicate advice in timely fashion to relevant stakeholders, as in large and dispersed organizations, "leadership" as a coordinating mechanism is not effective. Where leadership is the most effective means of organizing activity, it is as a mechanism of coordination, as described previously. This conception has nothing in common with leadership as essence. While coordination emerges as the result of a central figure who adds global perspective, the relevant *causal* category is coordination for task accomplishment in the naturalistic sense, not leadership. In this sense Pfeffer (1977) was right in suggesting that, depending on the researcher's interests, leadership may be the wrong thing to start with. According to the argument advanced here, when faced with the need to coordinate our activities, as we are in our organizational reality, several solutions may be appropriate, including having a leader or coordinator when the purposes and conditions make this the most efficient solution.

4.7. Conclusion

As a category of folk psychology, leadership (including its distributed versions) is open to empirical scrutiny because the folk psychology that embeds it is a theoretical framework whose theoretical–empirical adequacy is open to question (Churchland, 1993, Chapter 6; Evers and Lakomski, 1996, Chapter 6; Stich, 1983, 1993). Regardless of how obvious, commonsense, or observationally applied the concept seems to us, and however fondly we wish to hang on to it, its embedding theory does not enjoy epistemological privilege but must defend itself, as any theory must that raises claims regarding true states in the world. Once this is recognized, we can happily draw on the best results of science to understand how we do what we do, and this is precisely what the theory of cognition has embarked on. The argument presented here does not amount to a refutation of leadership, or a full-blown *reduction* of folk leadership to neuroscience, although this is implied. Such an ambitious enterprise would require a more expanded treatment. It is not necessary to contemplate such a radical move here (on intertheoretic reduction see Churchland, 1989, Chapter 7). We can be content to provide more

fine-grained neuroscientific detail about how agents interact and act on their world, and compare these results with what advocates of leadership approaches have to offer. In this way, coherentist justification does its work by requiring of theories that they defend their claims.

On the distributed cognition view presented here, leadership is one possible mechanism by means of which human agents coordinate activity. Leaders are not omnipotent thinkers but are agents embedded in and constrained by a complex cognitive force field made up of many object–human relations. This means, cognitively speaking, that something like equal rights is attained between the various partners of cognition, with humans continuing to have a large part in the running of their world, but not the only and, possibly at times, not even the most important part. If distributed cognition works in the causal way discussed, then it does provide new and interesting insights into other organizational issues that have concerned researchers, such as the nature of organizational knowledge and its management, the manner in which knowledge transfers or fails to transfer, and how we should think about organizing, organizations and their design as frameworks for human problem solving. It is these issues that will be discussed in the second part of the book.

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Part 2: Explaining Organizational Functioning: Moving beyond Leadership

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CHAPTER 5

Managing Organizational Knowledge

5.1. Introduction

The idea of organizational learning and its attendant proposal for the learning organization has been hailed as an important conceptual and practical advance in organizational studies, especially since 1970s (e.g., Argyris and Schön, 1996; Senge, 1992). About twenty years later it was joined by the concept of *Knowledge Management*. (Comprehensive overviews are provided by Wiig (1993, 2000); Cortada and Woods (1999, 2000); Prusak (1997).) Most recently, connections have been made between organizational learning and Knowledge Management in an important *Handbook* that carries both terms in its title (Easterby-Smith and Lyles, 2003).

The belief that organizational learning and knowledge provide competitive weapons to generate productivity and secure organizational survival was reinforced by Nonaka and Takeuchi's influential 1995 book *The Knowledge-Creating Company* (for an early statement that recognizes the importance of knowledge see Hayek, 1999). Knowledge management was considered to offer

> . . . a compelling promise. As strategists agree that knowledge is increasingly the source of companies' competitive advantage, it is logical to expect that more effective management of the creation and use of knowledge would accelerate a company's natural rate of learning, allow it to outpace competitors and create value for both customers and shareholders. . . . It could be the dawn of a new management paradigm. (Lucier and Torsilieri, 2001, p. 232.)

This perception of Knowledge Management potential is evident in the volume of literature that has appeared in a relatively short time span, accompanied by a number of new periodicals. Furthermore, since 1990, many of the world's leading companies have established learning and knowledge initiatives (for detail see Lucier and Torsilieri, 2001). And yet, while the promise seemed compelling, a consensus is emerging that Knowledge Management has fallen short of expectation (e.g., McDermott, 1999).

The purpose of this chapter is to examine the current debate regarding Knowledge Management and its success or failure. Of central importance is the conception of knowledge evident in the criticisms, as well as the conception adopted by advocates of a new proposal, Nonaka and Takeuchi's *dynamic theory of organizational knowledge creation*. I argue that writers have underestimated the success of Knowledge Management as well as overestimated its scope. The explanation for this seeming paradox is

found in the epistemological assumptions that show up in the acceptance of *explicit* and *tacit* knowledge as two discrete but complementary forms of knowledge, evident in Nonaka and Takeuchi's (1995) work.

This theory of knowledge creation, proposed to overcome Cartesian dualism, is explicitly based on the *Justified True Belief* account which, however, is none other than the empiricist, and discredited, theory of knowledge that gave rise to the dualism in the first place. Just as this theory of knowledge has been discredited, so has its implicit *sentential* theory of the mind (see especially Churchland, 1986, 1989, pp. 386–399; Churchland, 1988), of how human beings *come to know*. A theory of mind is an implicit component of any theory of knowledge, because for humans to know anything they must first have been able to learn it, a point I have had occasion to make repeatedly because this modest requirement is rarely explicitly recognized (Churchland (1989, Chapter 6) provides an excellent historical overview of the development of epistemology and theory of mind). As has been argued in preceding chapters, connectionist cognitive science offers such an account of mind, and its initial explorations into the social and contextual features of cognition as distributed (e.g., Chapter 4) provide fresh insights into how to think of organizational knowledge and knowing, and how organizational practice (tacit knowledge) can be represented. The present chapter explores the implications of these developments for organizational knowledge and its management.

5.2. The promise of Knowledge Management

The emerging consensus regarding the perceived poor results of Knowledge Management initiatives converges on a number of themes. In their study of 108 companies, Lucier and Torsilieri (2001, p. 233) found "no correlation between systematic management of knowledge and improved bottom-line performance". Initially surprised by their negative results, the researchers double-checked and concluded that their results were accurate. Indeed, they put their conclusion in even stronger terms: "... we now wonder how we ever could have expected anything else. We were persuaded less by the statistical evidence than by an understanding of the experiences of individual companies" (Lucier and Torsilieri, 2001, p. 233). A heavy investment in information technology seems to have done little to improve the efficiency or effectiveness of the American knowledge worker who was expected to benefit from this new perspective of management (e.g., Strassman, 1997). It has become apparent that more attention needs to be paid to the ways in which knowledge workers actually communicate and collaborate in their work contexts, and how they share knowledge and learn from each other (Drucker, 2000).

In a similar vein, KPMG's *Knowledge Management Report* 2000 notes that although 81% of the 423 multinational organizations surveyed reported either having or considering implementing a Knowledge Management program, Knowledge Management still tended to be considered a purely technological solution. What is missing is an understanding of its cultural implications that need to be integrated with its technological aspects. As a consequence, the report notes, companies suffer in three areas: (1) the

lack of time to share knowledge; (2) failure to use knowledge effectively; and (3) the difficulty of capturing tacit knowledge (KPMG, 2000, p. 2). The report concludes that "it is not the technology that is holding organizations back but a lack of strategy and a failure to build Knowledge Management into the organization's day-to-day operations and its culture in order to encourage end-user buy-in" (KPMG, 2000, section 6.3).

According to Prusak (1999, p. 4) current Knowledge Management approaches tend to leave "knowledge" undefined and concern themselves mainly with understanding "explicit, articulated knowledge (or data), which is really another way to say information". His comments are in keeping with the view earlier expressed by Churchman (1971) in his classic text *The Design of Inquiring Systems*, that "to conceive of knowledge as a collection of information seems to rob the concept of all its life . . . Knowledge resides in the user . . . It is how the user reacts to a collection of information that matters" (Churchman, 1971, p. 10). If, as Prusak (1999, p. 4) notes, only a small amount of an individual's knowledge can ever be codified, that is, turned into information, then "This fact presents organizations with a huge opportunity to somehow 'manage' the knowledge they have that is more tacit, more embedded in practice, and therefore less explicit". He detected three strategies that organizations apply to come to grips with this problem. They attempt (1) to make the existing knowledge visible; (2) to create knowledge infrastructure in form of intranets, web access and applications, groupware, and various repository-based intellectual capital systems; and (3) to create a knowledge culture. Prusak (1999, p. 6) notes that while these technological strategies are quite important, as well as largely successful, they do not provide the means for collaborative work; that is, "the social norms or incentives that have such a strong impact on individual performance". The most important and commonly shared concern is "how to change behaviors and organizational culture so that they are more likely to generate, codify, transfer, share, or do some positive action vis-à-vis knowledge" (Prusak, 1999, p. 6). The central question that emerges from these observations is how organizations can learn to manage the more tacit, less explicit, embedded organizational knowledge (Sveiby, 1999; Nonaka, 1994).

There is an awareness that how this question is answered will determine whether or not Knowledge Management is just another management fad (see Takeuchi, 2001). This concern arises inevitably in the context of other recent developments such as business process reengineering and executive information systems, which have been described as no more than recycled concepts of quality systems analysis and decision software for executives, respectively (Spiegler, 2000). As for Knowledge Management, Spiegler nevertheless thinks that it is a new concept in so far as it goes beyond the current processing of various company databases for decision making (Kanter as quoted in Spiegler, 2000, p. 4), because it includes the tacit and implicit knowledge that humans carry in their heads. This knowledge is not represented in a company's databases (Alavi and Leidner, 1999; Davenport and Prusak, 1998; Kanter, 1999; Nonaka, Umemoto and Senoo, 1996). For Spiegler, it is imperative to clarify the notion of knowledge in Knowledge Management, an area not usually explored in management studies. No matter how unusual such an investigation might be, "if such explication leads us to philosophy and epistemology, areas which have dwelt on the subject

for centuries, so be it" (Spiegler, 2000, p. 5). Spiegler's exhortation has not gone unheeded. Nonaka and Takeuchi's (1995) theory of knowledge creation is arguably the most extensive, explicitly philosophical and epistemological treatment of Knowledge Management. In the following section I discuss the key distinction made in the Knowledge Management literature between tacit and explicit knowledge, before examining the dynamic theory of knowledge creation.

5.3. The two dimensions of Knowledge Management

According to researchers such as Davenport and Prusak (1998), Nonaka and Takeuchi (1995), Sveiby (1999) and Snowden (1999), Knowledge Management is characterized by two dimensions: tacit and explicit knowledge. This distinction seems commonly accepted, and derives mainly from Polanyi (for an explication see Sveiby, 1999). Explicit knowledge is considered as that organizational asset which is capable of being shared across the organization. It is also described as an organization's "know-what" (Brown and Duguid, 2000a, p. 257). Because it is publicly accessible, explicit knowledge is difficult to protect and is easily lost to the organization. In Snowden's view, failure to protect an organization's intellectual assets is due in large measure to the "failure to account for the second, critical dimension of knowledge – the balance between tacit and explicit knowledge" (Snowden, 1999, p. 54). Generally, Snowden notes, large information technology (IT) projects introduced to protect the organization's knowledge fail because it is assumed that providing technology to share explicit knowledge also accomplishes the sharing of tacit knowledge. But there is a marked difference between these two types of knowledge in Snowden's view, a difference which can best be delineated by considering how each type of knowledge is shared and stored. Explicit knowledge is

> reusable in a consistent and repeatable manner. It may be stored as a written procedure in a manual or as a process in a computer system. The documented procedure of a lesson-learnt workshop, the written-up comments of an economist examining a set of financial data, minutes of a meeting, a chain of e-mail correspondence: all these are explicit knowledge that we use to support or to make decisions and exercise judgment... Artifacts are the storage medium of explicit knowledge. (Snowden, 1999, p. 55.)

While the character of explicit knowledge is its capacity to be distributed, measured and identified, tacit knowledge "is something that we simply know, possibly without the ability to explain ... [it] mediates our day-to-day lives" (Snowden, 1999, p. 56). Unlike explicit knowledge, tacit knowledge is stored in human beings. "When the storage medium is an individual then it [tacit knowledge] is vulnerable to loss; where it is stored in a community the vulnerability is reduced, the ability to reuse is enhanced" (Snowden, 1999, p. 56). Furthermore, while explicit knowledge can be bought, stolen or re-invented, tacit knowledge is unique in that it is the seat of "innovation and capable of real-time reactivity in decision-making". Both types of knowledge are important in decision-making and judgment, and the task is to find the right balance between the two. Snowden defines Knowledge Management as

> [T]he identification, optimization, and active management of intellectual assets, either in the form of explicit knowledge held in artifacts or as tacit knowledge possessed by individuals or communities. The optimization of explicit knowledge is achieved through the creation of communities to hold, share, and grow tacit knowledge. The active management of intellectual assets is the creation of management processes and infrastructure to bring together artifacts and communities in a common ecology that will sustain the creation, utilization, and retention of intellectual capital. (Snowden, 1999, p. 63.)

In further specifying the importance of tacit knowledge, *know-how* in their terminology, Brown and Duguid (2000a, p. 262) stress that *know-how* "embraces the ability to put know-what into practice. It is a disposition, brought out in practice", and born of experience. Brown and Duguid also emphasize that as most work is collective and cooperative in nature, dispositional tacit knowledge is thus also collective knowledge, shared by work groups. This conception of knowledge as social property, they submit, is at odds with the pervasive idea of knowledge as the property of the individual. Their conception of *communities-of-practice* (Brown and Duguid, 1999; Lave and Wenger, 1991; Wenger, McDermott and Snyder, 2002; for critical review of the concept see Lakomski, 2004) encapsulates the *know-how* and shared sensemaking of a group. This conception will be discussed more fully later.

In the meantime, the most explicitly philosophical discussion of knowledge for Knowledge Management is Nonaka and Takeuchi's dynamic theory of organizational knowledge creation (see also Nonaka, 1994; Nonaka, Toyama and Konno, 2001; Takeuchi, 2001; Cook and Brown, 1999; Nonaka and Teece, 2001 is an excellent collection of critical Knowledge Management discussions). This conception is discussed next.

5.4. The dynamic theory of organizational knowledge creation

Taking their departure from the observation that the Western management tradition remains rooted in the Cartesian dualism between subject and object, or mind and body, Nonaka and Takeuchi argue that the Japanese intellectual tradition serves as a useful counterpoint to this dualism. In a comprehensive critical review of recent management and economic writers, the authors (Nonaka and Takeuchi, 1995, p. 32) contend

> that none of the thinkers has articulated the dynamic notion that human beings can actively create knowledge to change the world, implicitly suggesting that our view of knowledge and theory of organizational knowledge creation provide a fundamentally new economic and management perspective that can overcome the limitations of existing theories bounded by the Cartesian split.

Their emphasis on knowledge *creation*, as opposed to already *existing* "frozen" knowledge, is considered an insight neglected by both Knowledge Management theorists and organization and organizational learning theorists alike. In this they consider themselves as continuing the "unfinished business that Herbert Simon has left for us" (Nonaka and Takeuchi, 1995, p. 50) in so far as Simon is said to remain concerned only with the rational processing of existing organizational knowledge.

There is much of interest in the criticisms the authors raise about the tradition of Western organization and management studies, especially in regard to organizational learning. More important for us, however, is their view of knowledge and the claim that their "theory of organizational knowledge creation provide[s] a fundamentally new economic and management perspective that can overcome the limitations of existing theories bounded by the Cartesian split". They argue that the Cartesian dualism between subject and object gives rise to a view of *organizations as information processing entities.* Such a reading, they argue, is unable to account for innovation, because more is required of the organization than the processing of (external) information in order to solve its problems and adapt to changed circumstances. The way to encapsulate the kind of human action that facilitates problem solving is to develop a new epistemology, which differs substantially from the traditional Western approach. Central to their theory of knowledge is Polanyi's (1997) distinction between tacit and explicit knowledge, where tacit knowledge is described as "personal, context-specific, and therefore hard to formulize and communicate. Explicit or 'codified' knowledge ... refers to knowledge that is transmittable in formal, systematic language" (Nonaka and Takeuchi, 1995, p. 59). Tacit knowledge is also believed to contain cognitive and technical elements, such as mental models and know-how, crafts and skills.

The key to knowledge *creation* lies in the mobilization and conversion of tacit knowledge, which always takes place in the interaction of human beings in shared contexts (Nonaka and Takeuchi, 1995, p. 57). The Japanese concept of "ba" is introduced to indicate the fluid nature of knowledge creation which, while in some sense constrained by the "here and now", also transcends it. In this sense "ba" is considered to differ from a related concept, that of community of practice, referred to earlier, in so far as the latter "is firmly set by the task, culture and history of the community" (Nonaka, Toyama and Konno, 2001, p. 24; Nonaka and Konno, 1999).

The new epistemology of knowledge creation is accompanied by its own ontology, concerned with four levels of knowledge-creating entities (individual, group, organizational, and interorganizational); it issues in a knowledge-creating spiral from the interaction between tacit and explicit knowledge which moves from lower to higher ontological levels. According to the authors, there are four modes of "knowledge conversion" that are created as a result of the interactions between tacit and explicit knowledge: socialization (from tacit to tacit), externalization (from tacit to explicit), combination (from explicit to explicit), and internalization (from explicit to tacit). These modes are the engine of the knowledge-creating process. The authors propose: "... the traditional definition of knowledge as 'justified true belief' " (Nonaka and Takeuchi, 1995, p. 58). Yet they assert that whereas the traditional Western definition "emphasizes the absolute, static, and nonhuman nature of knowledge, typically expressed in propositions and formal logic, we consider knowledge as a *dynamic human process of justifying personal belief toward the 'truth'* " (Nonaka and Takeuchi, 1995, p. 58, emphasis in original). Knowledge, unlike information which is merely the flow of messages, is active, subjective, and embodied, and is represented in concepts such as commitment and belief, which are central to individuals' value systems.

Nonaka and Takeuchi assert that unlike the Western emphasis on explicit knowledge, the Japanese tradition stresses tacit knowledge. They believe that these are complementary entities and that in the process of social interaction between explicit and tacit knowledge new human knowledge is created. It is important to stress that such knowledge creation happens between individuals, not just within one individual. While all are important in the knowledge creation process, the mode called externalization is the most important, because "it creates new, explicit concepts from tacit knowledge" (Nonaka and Takeuchi, 1995, p. 66) and this can be accomplished efficiently and effectively through the sequential use of metaphor, analogy and model.

There are various enabling conditions that make organizational knowledge creation possible, but these will not be discussed in the present context. Nonaka and Takeuchi end with a discussion of their five-phase model of the organizational knowledge creation process. While the first four have already been mentioned, the fifth is the sharing of knowledge created in one division across to other divisions.

5.5. Netting human cognition

Nonaka and his colleagues are indeed in the vanguard of management and organization studies by recognizing that to understand what it means to speak of knowledge creation it is important to know what knowledge is, and how humans come to have it. Cartesian dualism does have a lot to answer for (see Chapter 2), and Nonaka is right in singling it out as the source of the current narrow definition and limitations of Knowledge Management. Whether or not the Japanese intellectual tradition is indeed the appropriate complement to Western philosophy and epistemology is an interesting question that cannot be pursued here. One might note, however, that Dewey's pragmatist philosophy (further developed by W.V.O. Quine) is an early philosophical framework that overcomes Cartesian dualism. It argues successfully for the naturalistic origins and subsequent holistic nature of mind and body, of thinking and acting. While some writers do make reference to Dewey's work, as in Cook and Brown's (1999) extended account of an "epistemology of possession", which accommodates an "epistemology of practice", the naturalistic implications of Dewey's pragmatism seem not to have been noticed (e.g., Dewey, 1922, 1929, 1938).

What is of immediate concern here is Nonaka and Takeuchi's preferred epistemology, identified as *Justified True Belief*. There are, *inter alia*, two main reasons why the *Justified True Belief* account falls short of overcoming Cartesian dualism, as hoped for by Nonaka and colleagues.

First, the *Justified True Belief* account is the foundationalist theory of knowledge of logical empiricism/positivism, an account of science and its methods prominent in the early twentieth century. Foundationalism is no longer accepted as valid in modern epistemology and philosophy of science (Churchland, 1986, 1987; Evers and Lakomski, 1991, Chapters 1 and 2; Feyerabend, 1963, 1975; Hanson, 1958; Hooker, 1975; Quine, 1951, 1969; Sellars, 1963; for an overview of central features of empiricism and its problems see Evers and Lakomski, 2000, pp. 1–8). This also goes

for its implicit theory of mind, which is commonly overlooked. The belief that knowledge has secure foundations came to grief because of a number of powerful objections. The most telling are two widely accepted doctrines of today's philosophy of science and epistemology, already familiar from our earlier discussions: (1) observation is always theory-laden; and (2) theory is always underdetermined by evidence; no number of observation statements will ever suffice to prove a theory. The former means that there is no theory-free way of seeing the world, or in Hanson's (1958) famous statement, "there is more to seeing than meets the eye-ball". We see what we have learnt to see. The second follows logically from the first. If every observation is already imbued with theory, or made up with theoretical vocabulary, then the very empirical foundations are themselves imbued with theory. As a consequence, when two or more observation reports clash there is no theory-free foundation to call on for arbitration, regardless of how many additional observation reports may be drawn on. The number of observations may be infinite, and is only limited by our ingenuity or prior learning. (We saw the difficulties theory-ladenness poses for empirical leadership studies that employ empirical adequacy especially in Chapter 4.)

Non-foundational epistemology, of which *naturalistic coherentism* is an example, maintains that the basic building-blocks of knowledge are theories rather than observations, and that the conception of evidence includes the so-called superempirical virtues in addition to empirical adequacy (see Chapter 1). The most important of these, for present purposes, is that of coherence. Where this virtue comes to bite is in relation to claims made regarding human knowledge and its acquisition. The principle of coherence requires that such a claim cohere with what we know about human knowledge acquisition, and what we do know we learn from the discipline of cognitive science, especially that branch called connectionism. Where scientific knowledge outstrips the claims made, it is thus more prudent or coherent to accept *its* results rather than continue to accept the claims. The demands of coherence, of course, also apply to scientific claims themselves, coherence being a central and traditional scientific virtue of "goodness" of theory (BonJour, 1985). One important implication of the acceptance of theory-ladenness is that in contemporary philosophy of science and epistemology there is no longer any sharp distinction between fact and theory, or between fact and value.

Second, the dualism of explicit/propositional and tacit/non propositional knowledge is a hallmark of empiricist epistemology; *knowing that* and *knowing how* are conceptions indicating factual/scientific knowledge on the one hand and on the other the non-scientific, tacit knowledge. This denotes the realm of values and beliefs, and is not amenable to empirical/scientific evidence, as this was defined in empiricism as empirical adequacy. Its implied theory of the mind or cognition, following the Cartesian model, privileges the processing of symbols, also known as the sentential account (Churchland, 1983), over skilful, non-sentential performance (human practice), which is not expressible in symbolic form.

To describe human performance as sentential/propositional or as non-sentential/tacit or practical is to describe *discrete prototype activation patterns* (Churchland, 1993, Chapter 10), rather than discrete kinds of knowledge. The brain is a pattern processor par excellence, and it extricates patterns from the flux of experience where patterns

are to be had (Churchland, 1986; Churchland and Sejnowski, 1990, 1994; Rumelhart, 1998). Our most human feature is indeed the mind's/brain's ability to activate relevant patterns in the presence of external, environmental or internal stimuli (as when we hold internal monologues). Brains are very accomplished even at pattern completion if only partial information is available, such as the glimpse of a nose, the hunch of a pair of shoulders, an incomplete sentence. Knowledge is actively represented in the weights between the nodes that make up a pattern of activation, and learning in a connectionist system such as the brain is a matter of changing weights (Churchland, 1993, Chapter 10; also Evers and Lakomski, 1996, Chapter 9 for further explication). It is important here to note that patterns of activation are not stored in the manner of data structures. Only when the information is actually being used is there a pattern in the system. A symbol in a connectionist system *is* a pattern of activation. Contrary to the view that rule-based processing is the outstanding human cognitive feature, as forcefully argued in the older artificial intelligence tradition (see, for example, Newell and Simon, 1972, 1976; Simon, 1996), it is rather *pattern recognition* that takes pride of place as the central and more fundamental cognitive function. Remarkably, there is no central processor or teacher in artificial neural nets that manages the whole system, because connections between nodes are local. Hence, there is not one place that affords an overview of what is happening in the system; activity in one part is independent from activity in other parts. This is not to say that a net does not represent content across the system. It does so whenever it is in a particular state; then it can be said to have stored knowledge in the connection weights between its nodes. The kind of internal representation a network exhibits consists of certain patterns of activation and is thus sub-symbolic (Smolensky, 1988). However, this does not imply that symbolic representation has no role to play. Indeed, its role is vitally important, albeit not yet sufficiently understood. Because symbolic representation such as formal language is publicly available, as noted by Smolensky (1988), it is possible to check the validity or otherwise of formalized knowledge. Furthermore, its formal character, the logical rules of inference and so on make it possible for such knowledge to be applied universally. This means that humans need not have had the actual experiences themselves from which the knowledge was developed, if indeed such were possible in the first place.

The knowledge we have gained about our brains' capacity to acquire and process information, especially through the neural net account, makes it quite clear that knowledge is *not partitioned* into the propositional and non-propositional; rather it is of a seam, with neural nets being the most basic building blocks. On this causal account, then, the explicit/tacit dichotomy collapses. The real issue is rather how we understand knowledge *representation.* The above description has provided a brief account of the manner in which all human knowledge can be represented, given the architecture and processing capacities of the parallel distributed brain.

The fact that IT-enabled knowledge management systems could ever be thought of, initially, as representing *knowledge* is no accident, given that first generation cognitive scientists including Newell and Simon (1972, 1976) argued that the human mind operates like a computer with symbols being its software (see Evers and Lakomski, 2000, Chapter 3, for a discussion of the *Physical Symbol System Hypothesis*). The computer

metaphor of the mind in turn has its roots in Descartes' idea of what it means to be human (Lakoff and Johnson, 1999, pp. 391–415). To be human is to be a thinking thing, a *res cogitans*, and thinking *is* mathematical calculation, and as such can rely unproblematically on the certainty of its claims, disconnected from the physical body in which such thinking takes place. Briefly, this indicates how body and mind are split in the Cartesian theory of mind, whose influence is still highly visible in discussions of Knowledge Management, *inter alia.*

The ability to reason, described as quintessentially human, on this account, is the ability to use formal symbol systems, and this is what human cognition is said to comprise. On this assumption, it follows that tacit knowledge; that is, skilled performance, or *know-how*, falls outside the framework of symbolic representation and rational or cognitive behavior. Attempting to find out about it, use it and convert it becomes understandably important because so much of human performance just happens to be of this kind. Indeed, understanding tacit knowledge is acknowledged to be at the heart of understanding how an organization can generate new knowledge.

Philosophically, however, the conception of tacit knowledge has always been troublesome for a number of reasons, including the traditional problem of other minds (how can I know the internal mental states of other beings if I have access only to my own), and the problem of self-consciousness: how is it that we can have privileged access to our own mental states in the first place? (See Lakomski, 1997, pp. 155–169.) The most immediate question that arises is: if our tacit knowledge has the properties described, how could we possibly ever have learnt about it, given our finite biological capacities? Descartes unfortunately does not give us any methodological help here. Reason is transparent to itself by *fiat*. The presumed direct access to the contents of our own minds/brains (the doctrine of *introspection*) is unfortunately, and quite literally, a mere figment of our imagination. As argued earlier, the contents of our minds consist of neuronal firings, activations of patterns. We do not have access to them because they happen below the threshold of consciousness. The expression "having access to" is quite misleading because what we do when we report on our inner goings on, such as giving a verbal account of what we thought we were doing in some situation, is make a plausibility judgment of the appropriateness of our response after the event. We are not really engaged in externalizing our innermost thoughts; rather, we are employing publicly shared symbol systems, such as language, and read them "backwards" to explain what we might have thought. We project the external on to the internal realm, believed to consist of thought, feeling and judging. The phrase Patricia Churchland (1983) uses for this cognitive behavior is that we "confabulate"; we make up an explanation that seems to fit the way we acted or behaved. And there is no good reason to assume that these linguistic projections (or theories) are privileged in terms of their reliability just because *we* say so. Indeed, we know from research in social and cognitive psychology that people's self-reports are systematically misleading (e.g., Kahnemann, Slovic and Tversky, 1999). Humans habitually confabulate, but this does not carry any opprobrium. Rather, confabulating is our lot. To express the point differently, interpreting our actions, motives and reasons, as well as those of others, and other observers in turn interpreting us, is an unavoidable condition of our cognitive make-up.

The idea that minds have nothing to do with bodies, that thinking is disconnected from the physical machinery that makes it possible, is one of the least plausible ideas thrown up in the history of philosophy. And yet it is an idea that has shown remarkable longevity in that it continues to be part of our folk theory of mind (Stich, 1993). The reason that the disconnected mind is so implausible is that it does not cohere with what we know of human evolutionary development, especially the development of the human brain. And, as repeatedly pointed out earlier, we can really only know something if we in fact have the cognitive wherewithal *to come to know* what we claim to know.

Perhaps we might never have got into our current difficulties regarding the Cartesian mind and the subsequent interpretation of human cognition as disembodied if, as Fetzer (1996, p. 53) somewhat mischievously suggests, Descartes had written "*Sudeo, ergo sum*" (I perspire, therefore I am). He did not opt for this version of the argument, although it would have been equally valid given the suitability of the premises for "I perspire". Descartes believed that he might be deceived about this kind of thing and chose the *cogito* because there were no possible doubts for being mistaken about being a doubting and questioning thinking thing. The rest, as the saying goes, is history.

As we saw in the discussion of this section, knowledge or human cognition is well and truly embodied, and in the sections to follow the idea that cognition is also distributed; that is, is a social property as well, is discussed, initially with reference to Brown and Duguid's conception of communities-of-practice. Their perceptive treatment captures well important elements of organizational practice and the creation of knowledge.

5.6. Communities of practice and collective knowledge

Brown and Duguid (1999, 2000a, 2001) rightly subject the individual property notion of (organizational) knowledge to critical scrutiny. They argue that while the emphasis on organizational knowledge is very important, its management is highly complex, if possible at all, due to its social nature and to the fact that it is locally produced. Their conception of knowledge as social property is thus at odds with the prevailing view of knowledge as an individual's private property, a view they express in their application of Lave and Wenger's (1991) idea of communities of practice. Brown and Duguid thus join ranks with those social scientists who have advocated a perspective of knowledge production and distribution variously described as *situated cognition* or *situated action*, *learning* or *practice* (e.g., Chaiklin and Lave, 1993; Lave and Wenger, 1991; Resnick, Levine and Teasley, 1991; Rogoff and Lave, 1984. A useful summary of the main claims of *situated action* is offered by Clancey, 1993, pp. 90–93). This group of researchers, despite their different emphases and theoretical commitments, make an important contribution to our understanding of how, empirically, knowledge is produced in the context of everyday life by studying how people actually carry out tasks and solve problems, often by being peripheral participants or apprentices. The importance of this work is the documenting of learning by doing in distinction to learning in formal settings by means of direct instruction (learning by being told), away from the place of work or application.

Brown and Duguid's conception of *communities-of-practice* encapsulates the know-how and shared sense-making of a group:

> Through practice, a community of practice develops a shared understanding of what it does, of how to do it, and how it relates to other communities and their practices – in all, a "world view". This changing understanding comprises the community's collective knowledge base. The process of developing the knowledge and the community are significantly interdependent: the practice develops the understanding, which can reciprocally change the practice and extend the community. In this context, knowledge and practice are intricately involved. (Brown and Duguid, 2000a, p. 263; see also Wenger, 1998.)

The management of knowledge within organizations, in the current model, means organizing knowledge "across hybrid communities", a task whose difficulty is often underestimated because technology has been expected to streamline the information flow by means of better search and retrieval systems. But hope in technology has been misplaced, because the knowledge produced by communities of practice is highly specialized as well as produced in specific local contexts. As Brown and Duguid (2000a, p. 266) point out, "From the organizational standpoint, however, such knowledge is as divided as the labor that produced it. Moreover, what separates divided knowledge is not only its explicit content but the implicit shared practices and know-how that help produce it". It is the locally embedded nature of these practices that can make knowledge *sticky*, a term they borrow from von Hippel (1994).

It follows that retrieval of such sticky knowledge with the aim of applying it elsewhere is an extremely difficult organizational task. Brown and Duguid (2000a, p. 268) identify the problem as follows:

> Within communities, practice helps to generate knowledge and evince collective know-how. The warranting mechanisms – the standards of judgment whereby people distinguish what is worthwhile and valid from what is not – inhere in the knowledge. Consequently, trying to move the knowledge without the practices involves moving the know-what without the know-how.

While knowledge moves relatively easily within a community, it moves between communities only with difficulty. This is not surprising given that its own community provides the context of knowledge generation through its shared practices in which knowledge is embedded. The shared understanding of what knowledge means and how to evaluate it does not transfer to other communities, which have their own shared practices and embedded knowledge. As a consequence, the authors observe, "What looks like best practice in California may not turn out to be the best practice in Singapore [as Hewlett-Packard found out]" (Brown and Duguid, 2000a, p. 269). Organizations such as universities can tolerate a number of independently operating, often highly innovative and productive communities-of-practice without disaggregating because of the lack of knowledge transfer between them. That is not the case for business firms, which need to achieve "collective coherence" in achieving their goals across all their communities, or they will fail for lack of synergy. Brown and Duguid argue that "real", tacit knowledge is the knowledge produced in work groups, or communities-of-practice, and that transferring such knowledge between communities would require, *inter alia*, the ability

to abstract it from the embedded practices that first produced it. Although it is difficult, they believe such transfer can take place.

In their view, the problem of finding organizational knowledge in its respective communities, then moving it *between* communities in order to accomplish organizational goals, is crucial for management. A fundamental difficulty will remain as long as the common organizational division of labor, accompanied by its division of knowledge into thinkers and doers (mental/manual), continues to exist. In such a division, the know-how of the doers, generated through their daily practice, is invisible as knowledge and hence cannot be garnered for the organization as a whole. As Brown and Duguid (2000a, pp. 267–268) note, "Successful organizational synthesis of knowledge requires discovering knowledge as it emerges in practice. That can't be done if when and where to look are predetermined ex ante".

Interestingly enough, the internal division of labor that makes the spread of knowledge difficult has consequences of a different kind beyond the boundaries of the organization. Brown and Duguid speak of the "leakiness" of knowledge, in that knowledge leaves the organization easily enough and flows in and out of organizations through employees' membership of communities of practice, which share interests and practices with those in other organizations. Disciplinary links between similar university departments are a case in point, and members' informal contacts spread knowledge without the organization being aware of it, or able to stop it. Given its social nature, knowledge commonly "walks out the door". Attempts to curtail such knowledge spread are fraught with danger. In Brown and Duguid's view, while managers want to keep "their" intellectual property in their organization, attempting to limit its spread also means that new knowledge might no longer flow into the organization, assuming reciprocity of information sharing.

5.7. Managing more than we can tell?

In this discussion a number of themes have emerged that now need to be drawn together, with the conception of knowledge the most important. In mainstream Knowledge Management, knowledge and information are concepts used interchangeably, and knowledge management is the management of sophisticated IT-enabled data storage and retrieval systems; that is, symbol systems. The successful manipulation and management of symbol systems, however, is not the same as the successful management of (organizational) *knowledge.* While this is increasingly acknowledged by writers critical of mainstream Knowledge Management, efforts to convert tacit knowledge into explicit knowledge, on the assumption of the validity of the dichotomy, are not the way forward, as we have seen. A unified naturalistic account of knowledge that incorporates both symbol processing (outer) and sub-symbolic (inner) knowledge on the same continuum provides the most coherent explanation of knowledge creation and processing. So while the intuitions of Knowledge Management writers are correct, they do not have at their disposal the theoretical, especially epistemological, machinery to substantiate their intuitions of how to solve Knowledge Management's knowledge problems, let alone how to manage them.

Here it might be objected that the neural net account of human cognition and information processing, for all practical purposes, does not make any difference in the quest for understanding how to manage organizational knowledge better, although it may be granted that it explains its creation. But what can we do to "capture" the practical knowledge and expertise of organization members, especially since that knowledge only shows itself in the doing, disregarding the proposition that it might have its own neuronal pattern representation as outlined above? Have we come full circle without doing anything to sort the practical problems encountered by Knowledge Management? Such conclusions are not warranted, although the answers may not satisfy those who are looking for immediate marketable applications.

A first response is that a scientific-realist explanation of how humans acquire and process information strengthens the position of those who consider tacit knowledge to be the *sine qua non* of organizational progress by providing them with a causal and much broader account of cognition. At the same time, this account also makes it possible to appreciate *why* IT-enabled management systems have been so successful. The technological advances that made possible the Internet, email communication, intranets and so on are the result of the human capacity to process symbols, and do so with ever increasing sophistication, complexity, and speed. What the current problems of Knowledge Management show up are precisely the limitations of symbol-based systems, no matter how advanced they are technically. But the explanation is not that we have explicit knowledge on the one hand and tacit knowledge on the other *as distinct forms of knowledge.* Rather, the explanation is to be found in the human ability to acquire and process knowledge in the first place, with subsequent differential representation in form of symbolic, linguistic and sub-symbolic, non-linguistic "inner" representation. Hence, symbol-based systems cannot "get at" sub-symbolic knowledge, because it cannot be captured in this way. Semantic content does not map on to activation patterns; there are no symmetrical relations between words/symbols and neuronal patterns. Knowing that human cognition is evidenced *both* in symbolic form and in such practical activities as kneading dough successfully to make excellent bread (Nonaka and Takeuchi's example) theoretically widens the proper understanding of what organizational knowledge is. Such a causal account would seem to be of central importance for a conception of organizational change and learning that takes knowledge as its key feature.

Second, the naturalistic-coherentist account that did the work in the present discussion dissolves a number of dichotomies that are currently shaping the Knowledge Management field, most importantly the explicit/tacit dichotomy with its associated forms of knowledge doctrine, as already noted. As a further consequence, the organizational division of labor between thinkers and doers, manual and mental activity, rightly criticized by Brown and Duguid, loses its force as well.

To the extent that this division also serves to underscore power differentials in organizations, its abolition is particularly significant. The naturalistic account of knowledge makes it possible to recognize manual work as an aspect of human *cognitive* activity as well. Such recognition has not been possible before because our definition of cognition has been narrowly identified with the ability to process symbols, and so that sub-symbolic activity just fell out of the frame of cognition. Brown and Duguid's point

is thus well-taken, that if we want to synthesize organizational knowledge we need to discover it as it emerges in practice, and that this cannot be done if our frame is too narrow. Methodologically, this means that we need to keep studying people at work in order to compose fine-grained ethnographies of organizational practice, such as Orr's (1996) famous photocopier repair technicians, now supplemented with a causal understanding of what makes such "knowledge construction" possible, and to study the conditions that may be helpful or detrimental to this process.

The account presented here also makes it possible to see that and, more importantly, why organizational knowledge is created everywhere and why it is not bound by hierarchy, a point made repeatedly in relation to leaders' knowledge. This is not to say, of course, that the same knowledge is created everywhere, because knowledge is generated by people in specific contexts, at specific times and locations, and is shaped and constrained by specific organizational structures. Cognition is in this manner socially distributed. It is embodied in the sense that, unlike Descartes' stipulation, mind and body belong together, and the way we think, and how we (are able to) think, is causally dependent on the brain's and body's architectures. Its embeddedness means that it is part and parcel of the various structural configurations in which it is (re)produced, and which in turn react back on it. Simply put, knowledge is not confined or limited within the skull of one individual, and although information processing takes place within one person's head, knowledge is not therefore that person's private property. This is different from what we commonly understand by the sort of personal knowledge we have acquired as the result of experiences that happened to us as individuals, that no other person knows about.

The example of the cognitive system we know as "modern flight" served to make this point earlier. The very interaction of diverse and complex entities involved establishes the cognitive system, and none of its identified parts are sufficient on their own to complete the task, including the human operators. This is another way of indicating the sense in which human brains have been successful in out-sourcing intellectual tasks successfully, and having established "organization". As a matter of fact, the study of the development of modern flight indicates quite clearly the kind of intellectual bootstrapping we have been engaged in: the more sophisticated our knowledge the more sophisticated the structures and organizations we create, structures which in turn allow us to do new and more difficult things than before. The first landing on the moon can count as one example of the extraordinarily successful offloading of mental tasks and their accomplishment in the technical, mathematical, statistical and other systems we have developed, and which in turn, facilitate other solutions, as well as create problems, for our existence. Much humbler examples are my committing to paper every week what I need from the supermarket, or figuring out what conference fees payable in Euros amount to in Australian dollars by using the calculator. The list is endless.

We can now also see why it is that communities-of-practice can operate the way they do: they are cognitive systems, operating in specific contexts, space, time and organizational level. The reason practical, expert knowledge is "sticky" is that it is indeed created in a particular context and shaped by its many contingencies. It is thus no surprise that its transfer across to other divisions and levels in the organization is difficult. But here

some other considerations come into play. These have to do with the relative weighting and role of symbolic representations such as formal language (and other symbol systems) when compared with sub-symbolic activity within our overall cognitive economy. Writers such as Brown and Duguid, who emphasize organizational practice, are correct in their emphasis; but Nonaka and Takeuchi are also right in stressing formal language as the vehicle for transferring knowledge within, as well as between, levels and divisions. Language, in the unified account of cognition, serves more purposes than communication, as indicated in the previous discussion. It is a kind of compression algorithm of experience (Evers and Lakomski, 2000, pp. 18, 157). Because we are finite physical entities, located in space and history, our own immediate experience is limited. Linguistic formulations of knowledge remain long after we have ceased to exist, and it is these that allow us to create (organizational) cultures.

5.8. Conclusion

Is there anything practical to be gleaned from the previous theoretical discussion that might help the manager of knowledge? One answer that follows from the analysis is that over-reliance on IT-based expert and other systems simply will not yield the results advocates expect, for the reasons outlined that explain what our natural cognitive abilities comprise. The more difficult to implement consequence deriving from this insight is a certain amount of re-engineering in terms of the functional units that characterize organizations, and these will differ with regard to the type, nature, and size of organization or company. Restructuring might also affect what kinds of problems an organization needs to solve. In other words, different tasks might require different structures for their execution, and these will change with the tasks to be solved (Hutchins (1996, Chapter 9) provides some interesting suggestions). In practical terms, managers need to put more emphasis on developing the learning and knowledge acquisition capabilities of organization members, and also need to promote the "cross-fertilization" of ideas and knowledge from different parts of the organization that are brought to bear on the solving of one particular problem or issue at a time. None of these suggestions are new, and the recognition that we must create "knowledge-friendly" cultures (e.g., Davenport, De Long and Beers, 1998) is only the latest expression of this. What is required in such an enterprise, however we define it, is a fundamental re-assessment of how we think we think.

Because, according to the best knowledge we currently have, there is no sharp substantive divide between our tacit, practical knowledge and our explicit knowledge, organizational activity needs to take cognisance *explicitly* of the unity of cognition and the subsequent elevation to more prominence of our practical knowing. This is saying no more than that we must bring organizational work in line with natural cognition. It is also saying that doing anything less will continue to result in losing out on maximizing cognition, and its subsequent application to all the problems we face, whether they are economic or of any other kind.

The fact that we are already rather successful at running companies, conducting orchestras, managing projects, and have developed "culture" is testament to our *implicitly*

doing what our brains have programmed us to do. Indeed, it could not be otherwise. The discussion in this chapter has provided some insights into the *causal* mechanisms of why we do what we do so well. It is very early days yet regarding the practical, detailed organizational consequences that emanate from this knowledge. There are, however, some recent developments that examine further what it means to speak of the embedded brain, more specifically, the sense in which the contexts of our work are *cognitive*, and what the implications of such research are on the issue of knowledge transfer. This is a critically important issue in discussions on organizational performance, growth, and competitiveness.

In the next chapter, the "problem of transfer"; that is, how knowledge does or does not move about in and between organizations, is examined and re-described given what we know about knowledge and its acquisition. This examination, in turn, points to further avenues of research that investigate the agent-world relation; the nature of the environment in terms of cognitive outsourcing and enhancement, and the features of task environments as activity spaces.

In the meantime, Davenport and Prusak (2000) provide sensible advice when they note that "Effective knowledge management is neither panacea nor bromide; it is one of many components of good management".

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CHAPTER 6

Moving Knowledge: What is Transfer?

6.1. Introduction

It is a truism to observe that all education and training aims at *transfer*. University-trained nurses are expected to apply their knowledge successfully in the practical context of the hospital ward; trainee teachers are expected to translate their academic or theoretical knowledge of classroom discipline into the practice of their first classrooms; apprentice auto mechanics are expected to be able to apply their technical knowledge to fixing faulty break lines or engines of different cars. In general, organizational training is expected to *transfer* successfully to the work setting (e.g., Baldwin and Ford, 1988; Evers and Lakomski, 2000, Chapter 8), and knowledge is expected to transfer successfully between departments, teams and people doing different work in different parts of the organization.

It is an equally common observation that the wished-for *transfer* does not often seem to materialize, a concern already addressed in the work of Thorndike (1923). Mosel noted (1957) that there is little evidence that industrial training makes any difference to job behavior. Lave (1997) found that students are apparently unable to apply their school arithmetic to the practical situation of the supermarket. (Further examples of lack of transfer can be found in Resnick, Levine and Teasley, 1991.) Equally negative results have been reported by researchers in knowledge management and organizational learning (e.g., Szulanski and Cappetta, 2003). Practitioners have also noted that transfer, to the extent that it happens at all, is difficult to achieve in corporate practice, as for example encountered in the difficulties of replicating or implementing advanced manufacturing technology (e.g., Galbraith, 1990; Kerwin and Woodruff, 1992; Teece, 1976).

Although it has long been recognized that transfer is problematic, in part because of the reported experience of failed or costly innovations, it has become an object of explicit attention only recently in the context of a change of view regarding the diffusion of advanced technology. Traditionally conceptualized as acts of signaling that are instantaneous and costless, following Shannon and Weaver's (1949) communication model (Arrow, 1962; Attewell, 1992; Szulanski and Cappetta, 2003), the organizational and management literature has only gradually accepted that transfer is difficult because it involves many agents, and can therefore be difficult, time-consuming and costly. It also

involves resolving complex technical and political problems, usually in more than one site. This new awareness is captured in the concept of *stickiness*, coined by von Hippel (1994) and adopted by Brown and Duguid (2000) amongst others to characterize both knowledge and the situations of its transfer.

Given that *transfer* is such a widely discussed phenomenon in many fields – from psychology, education and training to technology implementation and organizational change – what exactly is it? How is it defined, and do we know it when we see it? What do researchers mean when they talk about *transfer* as either having taken place or not having taken place, and what evidence is offered in support of these claims?

In this chapter I argue that what is commonly termed the "problem of transfer" is a pseudo problem premised on the classical view of cognition and information processing. As noted in earlier discussions, this conception is too narrow and is at odds with what we know from contemporary accounts of cognition. The expanded view of cognition discussed previously (e.g., Hollan, Hutchins and Kirsh, 2000) makes it possible to redescribe the so-called "problem of transfer" as a feature characteristic of all learning, where learning is defined as an organism's/agent's "*adaptive reorganization in a complex system"* (Hutchins, 1996, p. 289; emphasis in text). Of particular interest here is what is meant by a "complex system" from the perspective of the new cognitive science.

The discussion to follow begins with an examination of recent approaches to transfer in the context of technological innovation, and then turns to a conception of transfer from the situated cognition perspective that emphasizes the centrality of the situation in knowledge creation. Although the emphasis on the situation departs significantly from the traditional view of knowing and learning and adds to our understanding of how we think and learn in everyday life, it is argued that the authors in this perspective come perilously close to making the case against transfer rather than explaining it. It is difficult to see how any knowledge could in principle transfer *between* situations if knowledge is always situation specific.

A more defensible explanation of what happens when "transfer" is said to take place is suggested when we consider new developments that begin to explore *external cognition* – the many environmental scaffolds humans devise to help their thinking and problem solving. The supposed results of transfer, such as successful "retrieval" or application of "old" knowledge, or successful task performance and problem solving, *causally* depend on the environmental resources and constraints of the situation and thus merit closer examination, in particular the conception of *task environment*. As a consequence, rather than worrying about the purported mechanisms of transfer the issue becomes one of examining the role of the environment in task performance and problem solving for biological agents operating in real time. Three fundamental issues are at the core of this development: (1) how to understand the agent's relationship with the world; (2) how to think of environment in terms of cognitive offloading and support; and (3) how to determine what are some features of task environments as activity spaces that facilitate and constrain problem solving and coordinating activity. The chapter concludes with some suggestions regarding what topics and issues organizational theorists ought to address to deal with organizational "sticky" knowledge as redescribed.

6.2. "Sticky" transfer

One way to approach the issue or problem of transfer is by way of the idea of *information stickiness* that has become an important explanation in contemporary discussions of why knowledge transfers with such difficulty, if it transfers at all. This approach was originally developed by von Hippel (1994) to highlight the difficulties of transferring information to solve technical problems. Information is described as "sticky" when it is costly to acquire, transfer and use; that is, when it has to be transferred from place to place in contrast to bringing the required problem-solving capabilities and information together in one place, the least costly option (see also von Hippel and Tyre, 1995; Tyre and von Hippel, 1997). Where the former is the case, it can have significant effects on patterns in the distribution of problem solving.

This finding differs from the economic paradigm that determined the understanding of transfer as costlessly transferable (e.g., Arrow, 1962). When the cost of transferring information is low, stickiness is low; where cost is high, so is stickiness. Von Hippel includes in this definition the attributes of the information as well as those of information seekers and providers and the choices they make in order to be able to focus on the impact of stickiness independent of its cause. There are several reasons why information might be sticky to do with the nature of the information, the amount to be transferred, as well as the attributes of seekers and providers of the information.

Increasingly accepted as a better account of why transfer does not proceed as smoothly and costlessly as theorized by traditional innovation diffusion research (for discussion see Attewell, 1992), *stickiness*, so it is argued by Szulanski and Cappetta (2003), for example, is a feature of all transfer, not just difficult transfer. Difficult transfer becomes more noticeable because of its organizationally disruptive effects and the amount of effort required to solve the problems that caused the disruption. The notion of "stickiness as eventfulness" is proposed to indicate the degree of difficulty experienced in a transfer, where *eventfulness* refers generally to the kinds of critical, identifiable incidents (observable in human activity) that accompany transfer in all its phases, from initiation to implementation, "ramp up" and integration (Szulanski and Cappetta, 2003). This typology of stickiness suggests that the degree of difficulty encountered in the implementation stage (implementation stickiness) is dependent on how well the communication gap between the source and the recipient can be filled, as well as the recipient's technical gap (Szulanski and Cappetta, 2003, p. 518). The degree of stickiness can be anticipated to some extent through prior planning or experimenting in set conditions before the new knowledge is put to use ("learning before doing"), followed by the "learning by doing" phase in which unexpected problems are solved that appear when the new knowledge has been put to use. However, the extent to which implementation activities can be planned "depends on the depth of understanding of the practice, that is, on causal ambiguity" (Szulanski and Cappetta, 2003, p. 520). This is a critically important point to which I will return later.

Just how sticky a transfer is likely to be, according to Szulanski and Cappetta (2003), can be predicted by considering two properties of transfer: the characteristics of the knowledge transferred and the characteristics of the situation in which the transfer occurs. What they describe as *causal ambiguity* means in this context that replication or

successful integration of a new technology, say, may fail because of the specific idiosyncratic features of the new transfer situation. Although sometimes it is obvious *after* transfer what information or knowledge was needed, such knowledge is not available *prior* to transfer because we cannot anticipate which piece of knowledge might be useful to aid transfer prior to the transfer having taken place. Knowledge before knowledge is not possible, and causal ambiguity is ever present. This line of argument leads Szulanski and Cappetta (2003, pp. 522–523) to the logical conclusion that

> If results cannot be precisely reproduced elsewhere because of differences in environmental conditions and if there exist[s] causal ambiguity about the inner workings of productive knowledge then problems that arise in the new environment have to be solved *in situ* through costly trial and error.

In their discussion of the characteristics of the situation, the authors list the lack of motivation or trustworthiness on part of the source on the one hand, and also possible lack of motivation by the recipient on the other. More important for the present discussion is the lack of both *absorptive* and *retentive* capacity by the recipient. Where the recipient does not have the requisite basic skills, shared language, up-to-date knowledge and complementary expertise, new knowledge is less likely to be integrated successfully, and retained. *Retentive capacity* refers to a recipient's ability to use the new knowledge over time, and to institutionalize its utilization. The upshot of these considerations is that *stickiness* should become the prime focus for further investigations into transfer. Stickiness should be considered as "a property of the transfer situation, not necessary [ily] of the knowledge transferred" (Szulanski and Cappetta, 2003, p. 528). Unlike von Hippel, they believe that to manage stickiness, the issue of causality is important and must be addressed.

Szulanski and Cappetta's conclusion that stickiness is the order of the day, in the sense that there are always more or less complicated problems arising out of the process that need to be solved, especially where complex technology is at issue (see Eveland and Tornatzky, 1990), is welcome in that it offers a more differentiated perspective on what happens in organizational contexts. Whether the process of diffusion is however correctly labeled as *transfer* is what is at issue. The argument put here is that it is not, a view also expressed by Attewell (1992), who argues that the diffusion of complex technological knowledge is a matter of individual and organizational learning, not "transfer". Carlile (2002) adds to this discussion the importance of understanding that knowledge can be both a source and a barrier in new product development; therefore it is "knowledge boundaries" that are worthy of study because it is there that problem solving becomes difficult.

These approaches indicate a recognition of what seems to have been absent from the transfer discussion so far: the role of knowledge and learning as implied in the conceptions of "learning before doing" and "learning by doing" listed earlier. As Attewell (1992) and Carlile (2002) rightly point out, the point of these activities is that agents need to appropriate and integrate a new technology *on site* and this means *learning* new skills in the context of their own work situation, far from where the innovation originated. As a result of this need, Attewell (1992, p. 6) thinks it is unwise to continue to

use the imagery of information *transfer* because it "obscures more than it enlightens". The point is well taken, and the sense in which the conceptions of transfer reported here obscure will become clearer as we proceed.

The idea that transfer, however conceived, is related to learning and cognition is central to the discussion and is addressed directly by Perkins and Salomon (1994), who argue that *transfer* cannot be neatly separated from learning in general, but that it only becomes interesting when it is more than a manifestation of ordinary learning. Where transfer between similar contexts occurs, it is described as "near transfer"; where it happens between contexts that seem unrelated and quite different from each other, it is defined as "far transfer". "Near" transfer seems to be more successful in Perkins and Salomon's view. Going further, for Gott et al. (1993, p. 260) transfer and learning are seen as "functionally equivalent" and as in fact "indistinguishable from learning in a general psychological sense" while for Sternberg and Frensch (1993, p. 35) transfer means successful retrieval of information in a new situation. *Transfer* has failed in their view if learning in one setting does not transfer to another setting. Transfer is closely connected with intelligence because it facilitates *selective comparison,* which allows for the recognition of old information as relevant for the new purposes (Sternberg and Frensch, 1993, p. 25).

Given these difficulties, researchers have naturally wanted to find out why transfer apparently happens so rarely. The central question asked is not *what* it is but what the mechanisms are by which it might be brought about. Gott et al. (1993, p. 259) ask, for example, "What are the levers that are used to access prior knowledge and utilize it productively? What is the content of the knowledge that is accessed and transferred? What features and/or conditions associated with prior knowledge/skill appear to impede the acquisition process?" Sternberg and Frensch's (1993, p. 26) name four mechanisms as responsible for transfer. The first is *encoding specificity*; that is, the successful retrieval of an item of information in a new situation depends on how it was first encoded. Second, retrieval depends on how the information from the old situation is *organized [organization]*. Third, *discrimination* is important, in that it leads to "tagging an item as relevant or nonrelevant to a new situation in which that item might be applied". Also important is the mental *set* of the agent as they approach the new situation or task; transfer is said to occur if the agent "has a mental set to achieve transfer".

Although this description provides the barest outline of the classical approach to transfer (for a fuller discussion see Detterman and Sternberg, 1993), it nevertheless displays some of its main features: knowledge is the possession of the individual; it resides in his or her skull, can be transported intact from situation A to situation B, and is independent of the specific situation in which it was acquired. Also implied is a particular view of cognition as information processing and symbol manipulation that is most evident in the laboratory experiments of recall and retrieval tasks characteristic of transfer research in the traditional mode. In the next section, I discuss the issue of transfer as presented by advocates in the situated cognition perspective, who take the role of the situation in cognition as an important ingredient in "moving" knowledge.

6.3. Situated learning and transfer

The research perspective variously described as situated cognition, learning, or situated action is currently much favored in discussions of what organizational knowledge is and how it gets created, as noted in Chapter 5 (e.g., Lave, 1988, 1991, 1997; Chaiklin and Lave, 1993; Clancey, 1993; Pea, 1997; Perkins, 1997; Salomon, 1997). Of particular significance in this perspective is the work of Greeno, Moore and Smith (1993) who, unlike the others, present an explicit model of transfer whose base assumption is that the agent has learnt to participate in a socially constructed domain of situations that includes the situation where transfer can occur. The authors stress that their conception is to be considered from within the context of a general view of cognition where

> learning is considered to be essentially situated, an adaptation of a person or group to features of the situation in which learning occurs. Knowledge – perhaps better called *knowing* – is not an invariant property of an individual ... knowing is a property that is relative to situations, an ability to interact with things and other people in various ways. (Greeno, Moore and Smith, 1993, p. 99.)

It follows that the question of transfer translates into the question of understanding "how learning to participate in an activity in one situation can influence (positively or negatively) one's ability to participate in another activity in a different situation. The answer must lie in the nature of the situation, in the way that the person learns to interact in one situation, and in the kind of interaction in the second situation that would make the activity there successful" (Greeno, Moore and Smith, 1993, p. 100).

Transfer thus depends on structure in the situation that is primarily socially defined, and that has been included in the person's previous social experience. Of particular importance for this model of transfer are the conceptions of *affordances* and *invariants.* Any activity in which a person is involved is shaped by properties of things and materials in the situation as well as by the characteristics of the person. Support for particular activities, as offered by the joint interaction of those things and materials, are what the writers call *affordances*. Transfer of learning from Situation 1 to a different Situation 2 requires a transformation of the situation (S2) and "and invariant interaction of the agent within the situation" (Greeno, Moore and Smith, 1993, p. 102). Or more formally: "Transfer can occur if the structure of the activity is invariant across the transformation from s1 to s2 with respect to important features that make it successful..." (Greeno, Moore and Smith, 1993, p. 102). In addition to invariance in regard to specific features of the situation, the agent has to be able to perceive or be attuned to the affordances in order for transfer to occur. The characteristics of agents who are able to engage in these activities are described as their *abilities*. The relationship between both is one of reciprocal interaction. In the authors' view, it is the ecological perspective that is dominant, and considerations of cognition in its cultural–social context are de-emphasized, although not considered unimportant.

This characterization of transfer goes a long way towards making transfer impossible (e.g., St. Julien, 1997) in the following way. Becoming highly attuned to the very

constraints and affordances of Situation A would seem to make it near impossible to "take out" of that situation what might be generalizable to Situation B. If the specific constraints and affordances of any situation determine what can be learnt or known, and in the absence of further clarification of the sense in which situations might be said to be invariant ("near transfer"?), transfer is not possible (also Bereiter, 1997). For our purposes, the central concern is that there does not appear to be a knowing/learning agent who does the knowing. Context-dependent cognition is a very important insight, but no context or situation has its meaning written on its sleeves; it needs to be interpreted by an agent capable of doing so. To put the matter differently, the identification of what constitutes an affordance or constraint in a situation, or what is an invariant feature between situations, depends causally on an agent's seeing it as such. Such identification in turn depends on the agent's prior learning and, most importantly, on his or her cognitive capacities to be able to make the requisite determinations in the first place. More will be said about this important point later on.

For present purposes, the most interesting point that arises from the work of situated action/learning theorists is that while they provide an excellent account of why knowledge does not transfer there is not much explanation in terms of what does make "transfer" possible, as indeed can be observed in our interactions with events, things and people, day in day out. The new emphasis on the situatedness of knowledge and its creation in communities of practice are important insights. This conception might be said to occupy a place at the other extreme of the transmission/transfer model to that occupied by Herbert Simon and colleagues, for whom cognition and knowledge is private and individual property. In contrast, for situated perspective advocates, knowledge and cognition is all out in the situation, and thus external to the agent.

The so-called question of transfer, interestingly, is phrased both in terms of agents' inability to transfer *formal* (explicit/propositional) knowledge (classical view) between situations on one hand and in terms of the specificity of the situation and its contingencies that generate *tacit* knowledge (situated action perspectives) on the other. Both sets of approaches rely implicitly on the symbolic view of information processing where human cognition consists of acts of symbol processing in the head which, in turn, are externally representable in texts, electronic messages and the like. The opposite of this symbolic view is the so-called tacit domain, which is not amenable to symbolic representation – hence the descriptor *tacit*. As noted previously, this distinction confuses what knowledge *is* with *how it can be represented*. What easily transfers between groups and communities is abstract or propositional knowledge, abstracted from the contexts in which it was created. Tacit knowledge, since it cannot be expressed in symbolic form, shows in the practices, or human action, and cannot therefore be "transferred" in the standard sense. Situated cognition writers have correctly noted this but without providing an explanation of human cognition, knowledge acquisition and processing that takes into account the agent's biological capacities, as well as the fact that we are both *embodied* and *embedded* creatures by nature. In the next section, these features are considered in more detail.

6.4. The meshing of mind and world

In the exploration of the theory of cognition in Chapter 4 the importance of cognition's external features was raised as an intricate and puzzling issue. We do not yet know what the specific nature of the relationship of mind and world is. This issue contains immense complexity that to date has barely been recognized. Specifically, the interesting question of where mind ends and the world begins is critical. Here I return to the work of Kirsh (1995, 1996, 1999), introduced earlier. Consider the interesting example of guitar players (Kirsh, 1999). Some players like to grow their nails long to help their plucking, others use a plectrum which is used only during the performance. So where do we draw the boundary between agent and world? In Kirsh's view, the boundary depends on what kind of explanation we want to provide, and its level and focus of analysis. Clark and Chalmers (1998) describe this kind of mutually interacting mind/world relationship with its shifting boundaries by means of the concept of *active externalism*. Their claim is that such linkage constitutes a *coupled system* that is to be considered as a cognitive system in itself. Active externalism is best exemplified by way of the following three cases of human problem-solving:

(1) A person sits in front of a computer screen which displays images of various two-dimensional geometric shapes and is asked to answer questions concerning the potential fit of such shapes into depicted "sockets". To assess fit, the person must mentally rotate the shapes to align them with the sockets.
(2) A person sits in front of a similar computer screen, but this time can choose either to physically rotate the image on the screen, by pressing a rotate button, or to mentally rotate the image as before. We can also suppose, not unrealistically, that some speed advantage accrues to the physical rotation operation.
(3) Sometime in the cyperpunk future, a person sits in front of a similar computer screen. This agent, however, has the benefit of a neural implant which can perform the rotation operation as fast as the computer in the previous example. The agent must still choose which internal resource to use (the implant or the good old fashioned mental rotation), as each resource makes different demands on attention and other concurrent brain activity. (Clark and Chalmers, 1998, p. 10.)

Is cognition going on in each case? It would seem so in that all three cases are similar. Case (3) is on a par with case (1); and case (2) has the same sort of computational structure of case (3). If rotation in case (3) is cognitive, we do not have any grounds for considering case (2) as fundamentally different. We cannot use the skin/skull boundary as the demarcation point because it is the very boundary that is in question.

These examples show how human agents rely heavily not simply on sophisticated computing resources but on environmental supports generally, an insight with which we have become familiar: Clark's (1997) simple example of pen and paper to make long multiplication easier; Hutchins' (1995) description of airline pilots' use of external markers on their controls, and the use of the nautical slide rule in ship navigation; the experiments of Maglio et al. (1999) with Scrabble players who physically rearrange letter tiles for better word recall; and Kirsh and Maglio's (1992) laboratory experiments

with agents playing the interactive video game Tetris all support the claim that agents modify their physical environment to make identification faster, cue recall, and generate mental images faster than would be possible without such external props. In this manner agents save themselves from potentially costly computations.

This formulation makes it clear that there is not just interdependence between internal and external structures but that the external actions agents engage in can be most significant "for simplifying the mental computation that takes place in tasks which are not clearly symbolic – particularly tasks requiring agents to react quickly" (Kirsh and Maglio, 1994, p. 513).

In so far as all components are considered to play an active *causal* role, where "the relevant parts of the world are *in the loop*, not dangling at the other end of a long causal chain" (Clark and Chalmers, 1998, p. 11), human cognition and at least that part of the environment with which it is coupled for the purposes of accomplishing a specific task can then be seen as comprising one cognitive system. It follows that this external action can be conceptualized as having an epistemic function, for which Kirsh and Maglio (1994) coin the term *epistemic action*. "*Epistemic actions* are physical actions people take more to simplify their internal problem-solving processes than to bring themselves closer to an external goal state" (Kirsh and Maglio, 1994, p. 514). The latter are called "pragmatic" (see Alterman, Zito-Wolf and Carpenter, 1998), and it is actions of this kind that have provided the main analytical frame for planning and action theory. However, as Kirsh and Maglio (1994) point out, not all actions are of this kind. Acknowledging *epistemic action* as a category of activity has the consequence that if we continue to consider planning in the traditional mode as state-space search, we must redefine the state-space in which planning occurs.

The conceptualization of the mind/world relationship, the identification of *epistemic action* as a hitherto overlooked complement to *pragmatic action*, and the complexities of determining whether or where to place the boundary between mind and world are considerations far removed from the way these relationships have been theorized to date. In order to set in relief the significance of these recent developments in the new cognitive science, it is useful to shift our attention from "figure" to the "ground" that provided the topographical contours for the present cognitive journey.

6.5. How to determine a [task] environment

Reflecting on the mind/world boundary problem and its complexities, it seems clear that our everyday understanding of (task) environment as unproblematically existing outside our bodies is open to major revision. If cognition, or perhaps cognitive systems, are as "spread" or distributed as indicated previously, and leaving aside difficulties surrounding the concept of "system", task accomplishment or enaction is a far more complex affair than previously assumed. The classical conception of task environment, due to the original and highly influential work of Newell and Simon (1972), kept the mind/world boundary analytically separate, and is thus deficient. However, by the same token, without their brilliant analytical work this relationship

would not have come into focus as sharply as it has. In discussing it, the different theoretical and philosophical commitments of the two research programs of artificial intelligence (AI) on the one hand and the new cognitive science on the other become clear. (The origins of and arguments between AI and the new cognitive science and connectionism are well described in Dreyfus, 1994; Dreyfus and Dreyfus, 1990; Kirsh, 1991; also Lakomski and Evers, 2001.) Since the perimeters of what a [task] environment is were set by Newell and Simon, a brief account of the classical conception is useful to see just how far the new cognitive science has expanded it.

To begin with, Newell and Simon locate the philosophical foundations of their approach in Meno's Paradox, which Plato solved by means of the theory of recollection. In contemporary form, they suggest, a simpler solution to the paradox can be formulated:

> To state a problem is to designate (1) a *test* for a class of symbol structures (solutions of the problem), and (2) a *generator* of symbol structures (potential solutions). To solve a problem is to generate a structure, using (2), that satisfies the test of (1). (Newell and Simon, 1990, p. 120.)

Symbols are at the core of intelligent action and physical-symbol systems consist of sets of symbols or physical patterns such as "chalk marks on a blackboard" (Simon, 1996, p. 22; Newell, Rosenbloom and Laird, 1996). "A physical symbol system is a machine that produces through time an evolving collection of symbol structures" (Newell and Simon, 1990, pp. 109–110; see also Simon, 1996, p. 21); and finally, Newell and Simon (1990, p. 111) boldly assert that "intelligence will be realized by a universal computer". In their view, the physical-symbol system is the appropriate theoretical framework for modeling intelligent action, and intelligent action in turn shows up best when humans solve problems.

A problem presents itself to an agent when "he wants something and does not know immediately what series of actions he can perform to get it" (Newell and Simon, 1972, p. 72). The sorts of things people want are manifold, but Newell and Simon (in *Human Problem Solving*) are concerned primarily with those things that are systems of symbols, such as proofs of theorems, or English sentences.

Given this kind of formalization, a problem is well defined "if a test exists, performable by the [physical-symbol] system, that will determine whether an object proposed as a solution is in fact a solution" (Newell and Simon, 1972, p. 73). Or to express the matter differently, assuming that symbol structures represent the solutions to problems, solutions are produced by heuristic search. By this means intelligence in problem-solving is exemplified in that symbol structures are generated and progressively modified until the solution is reached (Newell and Simon, 1990, p. 119). There are several important ingredients to problem solving, and the one of most concern here is the nature and role of the environment which Newell and Simon term "task environment". In their view:

> The term *task environment*, as we shall use it, refers to an environment coupled with a goal, problem, or task – the one for which the motivation of the subject is assumed. It is the task that defines a point of view about an environment, and that, in fact, allows an environment to be delimited. Also . . . we shall often distinguish the two aspects of the theory of problem

> solving as (1) demands of the task environment and (2) psychology of the subject. These shorthand expressions should never seduce the reader into thinking that as a psychologist he should be interested only in the psychology of the subject. The two are in fact like figure and ground – although which is which depends on the momentary viewpoint. (Newell and Simon, 1972, p. 55.)

This formalization of the agent's internal representation of the task environment – the problem space – represents an important abstraction because there is a need to delimit what is the relevant problem space in the face of a potentially limitless search space. Here, the interrelationship between problem space and goal, an agent's representation of the goal to the goal itself, is essential for the task environment because it allows the task relevant to be sorted from the task irrelevant. Thus Newell and Simon provide an explicit answer, and sorting mechanism, to what may arguably be the most crucial question in the so-called problem of transfer. This is the question to which Greeno et al. and other situated cognition writers provide no answer, although the problem is clearly recognized, as we saw especially in the previous discussion of technology diffusion.

Furthermore, the determination of task environment with respect to goal is crucial for the information processing system (IPS), because its available processes need to be geared in advance towards a specific problem. Newell and Simon (1972) are aware that for a fuller understanding of problem solving it is necessary to understand task environments in their particularities while admitting that they used only simple examples and metaphors so as not to "obscure the broad issues in the technical particulars of that environment" (Newell and Simon, 1972, p. 86).

In concluding this section, there are at least two basic moves in Newell and Simon's account that are of significance. Consider what it means to talk about the environment of a manager's problem-solving activities or the activities performed by a pilot. Without further specification, the term *environment* is so all encompassing as to be meaningless. It could include the manager's finger-tapping during a planning meeting, for example, or the pilot's talking to himself aloud while executing take-off procedures. Finger tapping is as much part of the manager's environment, or *activity space*, as is talking aloud part of the pilot's. But in the Newell–Simon view they are the agents' individual properties, so to speak, rather than activities that are directly relevant to the task of managerial problem solving or executing take-off procedures. The shift from *environment* to *task* environment makes it thus possible in principle to draw on only those actions that are task relevant and edit out all others, such as the color and shape of scrabble tiles (Simon's example), or the physical actions described above. In this manner, Newell and Simon are able to *operationalize* problem solving and to provide a "built-in" measure of task accomplishment, as outlined in the previous section.

Before I address the issue of real everyday environments and how humans maneuver in them and with them, Newell and Simon's summing up their theory of human problem solving is worth quoting for its sheer elegance:

> A representation of a problem space is given, comprised of a representation of the environment and one of the problem … Then the IPS is specified. It incorporates the problem space, not in the sense of spanning its whole extent, but in possessing symbol structures and programs that provide access to that space via the system's processes for generating,

> testing, and so on. In addition, the IPS incorporates the goal or task, either explicitly in a symbol structure . . . or implicitly in the behavior of some of its programs. . . The IPS, when set in the environment and given the goal, becomes a determinate system that produces a stream of behavior. This is the theoretical behavior to be compared with the human's actual behavior. (Newell and Simon, 1972, pp. 78–79.)

6.6. Environment as activity space

The move from environment to task environment and also the strong coupling of agent and environment in terms of agents creating their own problem spaces are important insights. The way Newell and Simon formalized these relationships, however, is too limiting in the face of the capacities of biological human problem solvers, and thus also constrains the nature and construction of their problem spaces. The reason Newell and Simon's examples work reasonably well – playing chess, scrabble, tic-tac-toe or solving the Tower of Hanoi problem – is that they are all characterized by restricted problem spaces. In each of them, there are only so many legitimate, task-relevant moves, and there are no degrees of freedom for improvisation. Engaging in these kinds of problem-solving activities is something humans do, and do well, but they are not representative of the everyday problems human agents face, problems whose "problem spaces" are much more diverse, as in the working out of schedules and timetables. This cognitive task is one humans perform routinely, but is one that trips up even the fastest and most sophisticated modern supercomputer.

Every time human agents are confronted with a problem, they are able to draw on vast stocks of knowledge, acquired in different contexts, for different purposes, at different times and applied to different tasks. The mind/brain sorts what knowledge was relevant *then* from the knowledge relevant *now*. This ability to sift quickly, and seemingly effortlessly, relevant bits of knowledge from irrelevant bits is an ability that cannot in principle be programmed into a linear computer. Although neurons are much slower than the components in modern computers, operating in milliseconds rather than nanoseconds, "brain-style computation" (Rumelhart, 1993, p. 134) is still vastly superior despite the time constraint because there are just so many neurons that operate cooperatively and in parallel fashion rather than in serial steps. A computer program, in contrast, would need to be able to sift a practically limitless search space and be able to make the right connections out of a potentially limitless repertoire. The computational powers of the most modern computer could not cope with this kind of complexity because it is constrained by the manner of its serial step procedures.

It is in this context important to reiterate that the biological brain, modeled as a connectionist system, does not store knowledge the way a computer does, in the state of certain units in the system from where it can be retrieved on demand. (See Bates and Elman, 1993.) Knowledge in a connectionist system is in the connections between neurons, more specifically in the strengths, or *weights*, between them. Knowledge representation is non-symbolic; knowledge is implicit in the processor itself and is created through tuning of connections while processing is going on. It is neither formulated nor

stored in the form of symbols. It also follows from the parallel distributed architecture of the brain that knowledge is not in any one location; it is everywhere, distributed in the system.

Does this connectionist account mean then that a task environment is in principle as limitless as is the search space discussed earlier? If not, what specifications could be determined that, based on what we know about human information acquisition and processing, would provide us with a more realistic picture of how agents and their environments operate to solve problems? We have initial indications on how to think about these matters, and how to progress our investigations, while acknowledging that the account offered here, following the work of Kirsh (especially 1999) and Kirsh and Maglio (1994), does complicate the picture. The fundamental difference between the classical AI tradition and the theory of cognition, as would have become clear in the preceding comments, is the assumption that "... the real world is a place we inhabit rather than visit. We live here and return to it" (Kirsh, 1999, p. 5).

An interesting consequence of the *active externalism* postulated here is that the environment, unlike Simon's formalization, can be conceptualized more realistically as an active partner, "a shifting coalition of resources and constraints, some social, some cultural, some computational..." (Kirsh, 1999, pp. 1–2). When all these resources and constraints are brought into an appropriate constellation with each other, we have managed to accomplish the task we set out to accomplish. In other words, *coordination* becomes of critical importance, and especially successful coordination that commonly involves several agents – or tasks would not be achieved nor problems solved. This could not be more different from Simon's agent-as-information-processing-system model, which permits no such activity. Indeed, in this model coordination is surplus to the requirements of the model *by design*, and the basic emphasis is on *individual* problem solving. This connectionist account also differs markedly from the situated cognition perspective in so far as it offers a *naturalistic* account of what it means to talk about "cognition in the wild" (the title of Hutchins' (1996) book), about biological organisms/agents who are partners in a much larger cognitive system which they in part determine, but which also determines them. The complexity of these interrelationships has been recognized by Tyre and von Hippel (1997), for example. While not employing the theoretical resources of the theory of cognition, these authors nevertheless exemplify how environment as activity space figures in their study of adaptive learning in practice. The details of their study are just the kind one would expect given the cognitive, explanatory framework developed above.

Describing the introduction of new production machines into factory contexts, the researchers trace the problem-solving activities that accompanied this "transfer of technology". Developing the earlier notion of stickiness further, the research assumes as centrally important the physical environment in which problem solving takes place *as a constitutive element of it*. Engineers, for example, often go to field sites to investigate problems, and do so repeatedly before the problem is solved. The question investigated is why such a shift in physical location was considered important – from development lab to the factory and back – and how actors use their physical settings to learn about and resolve problems. Thus, *where* problem solving takes place determines what actors

can do, what they can learn and know, and with whom interaction is or is not possible, and also the manner in which interaction develops. Also, because different locations afford different learning opportunities, activities in different settings have a cumulative effect. In addition to problems being solved by explaining and hearing, Tyre and von Hippel (1997, p. 73) add that "Seeing, touching, and manipulating are obviously important avenues for improving understanding ... yet they are nearly overlooked in the organizational literature on adaptive learning". The engineers they studied moved between factory and lab repeatedly because some manipulation of technologies and experimentation was necessary *in situ*, and then had to be followed up in the lab with the equipment only available there. That is, different settings offered different clues as to where the problem was, given the different technologies and other physical features available in them, and no location by itself provided sufficient insights or clues to solve the problem. Interestingly, the researchers report that problem-solving participants described their activities more in terms of watching, noticing, trying and doing than discussing or collaborating in inquiry. There are a number of reasons for why the physical setting is so critical in problem-solving activity (Tyre and von Hippel, 1997, p. 76 onwards):

1. Technical experts and users tend to be attuned to see different things in a given setting necessitating moving backwards and forwards between locations to "discover" clues that the others had not noticed/seen; clues are embedded in the contexts;
2. Skills that could be used by experts depended partly on where they stood and on the resources available there; e.g., engineers are not familiar with local factory idiosyncrasies that might affect machine performance;
3. The physical setting not only determined what problem solvers could see, it also determined what tools are available for use, which is itself important in that successful tool use is part of the engineer's expertise; in addition, the setting also influenced behavior in terms of the tacit rules and assumptions that prevail there which include interactions with the other problem solvers on site;
4. The physical setting is important in that it affords learning in, as well as between, settings.

The adaptive learning process is thus a "*dynamic* interaction between the 'knowledge in' particular settings (in the form of clues, or needed tools and resources, or relevant information) and the understanding in the engineer's head. The dynamic interaction shows up as a zigzag pattern in the location of problem solving..." (Tyre and von Hippel, 1997, pp. 79). The authors quite rightly conclude from their work that de-contextualized studies of organizational learning and problem solving "tell only part of the story" because the knowledge needed to solve problems is only partly in the heads of experts, with the physical setting/s playing a central part in finding the solution.

6.7. Conclusion

This naturalistic picture of learning and cognition developed in the preceding pages draws the radius of human cognition much wider than we are accustomed to, given the

predominance of the classical, "cognition in the head" view. The theory of cognition describes the cognitive force field in which agents maneuver and which can be considered a web of coordination of artefacts, media and processes both internal and external to the agent. In thus expanding the unit of analysis of intelligent or cognitive action in the world, what makes for successful learning or adaptation becomes a question of the internal configuration of agents, more precisely their brain states, and the modus of the reciprocal interactions with the constraints and affordances of the situation. On this account, there is no transfer of slabs of invariant knowledge from Situation A to Situation B, but there is always "learning on site", which is aided (or hindered) by past experience and mediated by the constraints and affordances of the physical, material, spatial and other features of the situation, be it in a workshop, on a flight deck, or in the bank manager's office.

Given the previous discussion, further illuminated by Tyre and von Hippel's detailed study of adaptive learning, what is described as the "problem" of transfer can more productively be re-conceptualized as a problem of the mechanics of coordination, in the sense in which this has been discussed here. If we follow the implications of distributed cognition we cannot fail but notice just how much more complex the agent's embeddedness in and interrelationship with the world is, and that the theoretical and methodological tools we currently have to analyze the agent's actions in the world are still in their infancy. Speculative though much of this work still is, it signals research directions and programs that simply have not yet been recognized in their full significance and potential impact.

Among the many interesting and important points that emerge from this discussion is one raised by Tyre and von Hippel (1997): in what sort of problem-solving situation is the physical setting especially important? They suggest that where ill-structured and unfamiliar problems need to be solved, the physical setting matters because it enables (or disallows) the "discovery" of clues that may be pertinent to problem structuring, and hence solution. Put the other way round, the kinds of clues available will determine how the problem emerges as a problem, or as what kind of a problem it emerges. Moving between settings may further contribute to problem reframing, which might also contribute to problem solution and thus create new knowledge. Where problems are better structured and known, they suggest, physical location might not play such an important role because it is largely known by what methodological means the problem can be solved, regardless of location.

A further result of this discussion is that it offers the beginnings of a new perspective on *agency*. Given that cognition is distributed as broadly as discussed, the conception of an independent agent with self-contained agency, separate from the environment and its constraints in which it acts, albeit in reciprocal interaction with "structure", is not realistic. Although it is far from clear how large the agent's cognitive "share" is in problem solving in what has turned out to be a collaborative cognitive enterprise, whatever else agency is, it is distributed across coupled cognitive systems. This raises more questions than can be answered at present; however, the conclusion follows from the premises developed in the theory of cognition (see Chapter 4). Some further thoughts on agency will be offered in the next chapter.

Finally, what of Brown and Duguid's (2000) specific question of how sticky knowledge can be shifted? On a neural net account successful "transfer" becomes a question of whether the appropriate activation patterns were activated in the new context, or not. If they were not then it might be concluded that not enough patterns were there to be activated, in other words, the person had not learnt enough in order to "make the connection", or the existing connection strengths were not sufficient to activate the pattern. Furthermore, because the base operating mode of the brain is pattern activation, the question raised applies both to an encounter with new words or theories *and* new situations or practices. Words and theories are also neuronal patterns. Understanding cognition and structuring contexts are key tasks to solve if we are to make headway with using organizational knowledge better. The concept of transfer drops out of the explanatory framework as not supported by the current best account of information processing.

There are many implications for organizational theory and research, some of which are new while for others research work is already well underway. First of all, because expertise, on the account developed here, can no longer be considered as the private and immutable property inside an expert's head, much will be gained in terms of solving organizational problems if experts are not merely "co-located" but also sent to work in multiple contexts. By the same token, more attention must be paid to the design of work space as a cognitive extension of human cognition, including the use of electronic means of communication, storage and dissemination. Furthermore, organizational researchers should be encouraged to conduct more fine-grained cognitive case studies in work settings, as well as concentrate on the requirements of effective and efficient cognitive workflow.

The dissolution of the "problem of transfer" has opened up many exciting avenues for further research, as well as provided new avenues of how to understand and manage organizational problems better. A further important step is consideration of what the discussions of the last three chapters especially entail for our understanding of the complex organizations we inhabit, and how we might design them better to reflect our natural talents. These issues are the concerns of the next chapter.

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CHAPTER 7

Organization, Emergence and Design

7.1. Introduction

Despite theoretical difficulties surrounding the new field of Knowledge Management, its arrival on the scene of organizational and management theory has served an important function: it points to the centrality of knowledge in every corner of the organization, and to the need to use knowledge to best advantage when and where required. Once the philosophically enshrined empiricist distinction of tacit and explicit knowledge is redescribed in a unified naturalistic account of human cognition and information processing, a fundamental step has been taken towards understanding individual as well as organizational knowledge. Not only does such an explanation have consequences for how knowledge "moves" within and between organizations, rendering the traditional accounts of "transfer" implausible, it emphasizes the as yet poorly understood role of context and the environment in knowledge creation and dissemination. This result in turn has far-reaching implications for understanding what is involved in problem solving, innovation and organizational learning, to name just some important organizational topics. Furthermore, what has come into focus most sharply is the role of coordination and the appropriate mechanisms that need to be brought into alignment in the solving of organizational problems as we saw in the example by Tyre and von Hippel (1997) discussed in the previous chapter.

If physical setting has a substantive input not only on how a problem is perceived, but also on what kind of a problem eventually emerges, then mainstream theories of organization and organizational functioning are in for a major overhaul in that the complex role of the environment as inextricably involved in both problem definition and solution has not been adequately recognized. Similarly, if organizational performance is in the end determined by and dependent on specificities of context, described as cognitive systems comprising shifting alliances of the knowledge of different human actors in interaction with their environments and the affordances these offer, the business of how to study organizations and organizing becomes far more complex and requires more sophisticated theoretical–methodological tools than are available under empiricism. Furthermore, interesting implications for organizational structure and design emerge that take us in new directions.

It is now time to loop back to the introductory pages of this book, and pick up the threads left at the end of the first chapter where I suggested that leadership can be considered as an attempt to find order or pattern in organizational functioning. Much of the discussion since has centered on what Resnick (2000) calls the *centralized mindset*, which describes our apparent predisposition to isolate single causes to help explain the complexity that surrounds us. Along the way, the epistemological and methodological investigations of a number of leadership models served to bring to light commonly accepted but inaccurate assumptions about human cognition and information processing, an understanding aided by connectionist research, especially neural net modeling. The resultant much broader conception of cognition allows us to consider what now seems a natural next step: the implications of a *decentralized* mindset for organizational functioning and design. Specifically, research in complexity theory, self-organizing systems and emergence offers potentially fruitful new directions in the study of organization and design. However, caution needs to be applied because the issues of emergence and self-organization are often studied in artificial environments with artificial agents that try to model how the real world works.

The objective of this chapter is to suggest that some aspects of complexity theory help us see organizing and organization in a different light. More particularly, in drawing on Kauffman's (1995) concepts of "patch logic" and "receiver based communication", interesting insights can be gained into why flatter, decentralized organizations seem to have just the kind of design that is the right adaptive response to a rapidly changing environment. In extending Kauffman's computational experiments, I conclude with some suggestions about organization design that draw on the complementary strengths of the theory of cognition and self-organizing dynamic systems.

To set the scene, the following section outlines two fundamental criteria of organizational function and design, cooperation and coordination, and how mainstream organizational theory has dealt with the tension between them.

7.2. Cooperation and coordination: the twin problems of organization

The emergence of new organizational forms, in part brought about by an increasingly interdependent global economy, subsequent greater volatility, demographic changes and competition based on superior knowledge (Spender and Grant, 1996), has been a feature of the organizational landscape for more than a decade. These new forms seem to have come about mainly through the efforts of experimentally inclined managers (Daft and Lewin, 1993) rather than as the result of a new coherent body of organizational theory that could explain them. Fascinating examples of successful restructuring and redesign are exemplified by such corporate giants as Hewlett-Packard, Johnson & Johnson, and Asea Brown Boveri, whose organizational architectures have been changed significantly to adapt to the new turbulent environments (Tushman and O'Reilly, 1996).

The challenges organizational theorists face are above all to provide theoretically solid accounts for why flatter hierarchies and decentralized decision-making may be

superior to older forms of bureaucratic organization. Despite their considerable diversity, these newer forms appear to share common characteristics such as the assumption of dynamic rather than static structures, the importance of skills, technologies and, most importantly, the creation and managing of knowledge as one of the most central organizational assets (Grant (2001, p. 154) provides a list of the most prominently discussed new organizational forms). The latter especially is at the core of Nonaka and Takeuchi's (1997) proposal for the "hypertext" organization which, they argue, offers an appropriate synthesis that merges useful bureaucratic features, such as stability, with the best features of a task force, such as flexibility in the service of creating organizational knowledge. Going a step further, Tsoukas (1996) proposes that the organization itself is a distributed knowledge system with the added characteristic of being decentered as well.

Organization, as argued previously, can be understood as the consequence of the human need to lighten computational load. The resultant cognitive specialization then requires coordination so that specific kinds of goods and services can be produced. The organizational problem of coordination is fairly simple when it comes to the production of widgets, for instance. Here the production process can be organized as a relatively simple sequence in that the production line consists of serially decomposed subtasks that restrict the actions to be carried out and thus delimit the task environment (Kirsh, 1999). The picture changes, however, when a more complex product is at issue, such as building an airplane, producing Wagner's opera *The Flying Dutchman*, or indeed writing a book such as this one! Integrating the broad range of specialist knowledge required to create these products is a rather more complex organizational task.

Traditionally, organizational theory has emphasized cooperation rather than coordination, meaning that the preoccupation of organizational theorists has largely been with issues of hierarchical control and authority relations following Weber's model (Gerth and Mills, 1978). This preoccupation, as Grant (1996, 2001) argues, might well have come about because issues of coordination – efficient integration of the specialist knowledge of individuals and groups – have been conflated with those of cooperation – acting in concert to achieve organizational goals. Arguably the most influential model of organization design in the neo-classical vein that emphasizes cooperation is found in the work of Simon (1976) and March and Simon (1958). However, issues of knowledge and cognition, that is, a cognitive distribution of labor, are also central to this model, a point commonly overlooked (see Evers and Lakomski, 2000, p. 81). Simon's seminal text *Administrative Behavior* is a *de facto* argument for a theory of rationality that implies a theory of mind and cognition, where the latter is characterized as successful symbol processing. At the heart of his proposal of administrative theory is rational decision-making, characterized as follows:

> . . . if there were no limits to human rationality, administrative theory would be barren. It would consist of the single precept: Always select that alternative, among those available, which will lead to the most complete achievement of your goals. The need for an administrative theory resides in the fact that there *are* practical limits to human rationality, and that these limits are not static, but depend upon the organizational environment in which the individual's decision takes place. The task of administration is so to design this environment

> that the individual will approach as close as practicable to rationality (judged in terms of the organization's goals) in his decisions. (Simon, 1976, pp. 240–241.)

Human agents are *satisficers* not optimizers when it comes to decision-making. There are limits on the ability of the human agent to perform across a range of dimensions, physical, psychological and cognitive (Simon, 1976, pp. 39–40). These limitations have a direct bearing on the structure and function of organization. Stated in their usual succinct manner, "... the basic features of organization structure and function derive from the characteristics of human problem-solving processes and rational human choice" (March and Simon, 1958, p. 169). Recall that Simon's theory of rationality, more fully developed in his later work, is most clearly expressed in the *Physical Symbol System Hypothesis* (e.g., Newell and Simon, 1972, 1976; Simon, 1996; for critical comment see Brooks, 1990, 1991).

An interesting consequence of the abstractness of the Simon–March model, noted by Perrow (1986, pp. 126–127), is that to change individual behavior, it is not necessary to change the behavior of an individual but merely to change the premises of their decisions. The premises are located in the structure of communication, rules, regulations, and standard operating procedures; that is, in the organization's structural components. Here it is again important to note that there is a clear distinction between ordinary human agents with their limited cognitive and computational powers and the idealized decision procedures and rationality that determine correct, that is, scientific administrative behavior. (See Evers and Lakomski, 1996, Chapters 1 and 2, for more detailed discussion of the epistemological assumptions of administration science, including Simon's views.) Of note is also the sense of cooperation implicit in Simon's proposal for organization design.

If the premises for decision-making are changed, the behavior of individuals adapts accordingly. There is no need for explicit directives. Indeed, much of organizational life happens without directives or direct commands being issued, and organizational activity is shaped by habit, socialization, routine, training or theories-in-use, to use Argyris and Schön's (1996) phrase. Specific mechanisms which according to Simon (1976) regulate organizational activity in practice – in distinction to written directives and rules – are *inter alia* organizational vocabularies, standardized routines and procedures, and the frequency of communication channel usage. Following Perrow (1986, p. 127), the form of control exerted through these mechanisms is indirect but most effective. Information content and flow is limited, which narrows the premises for decision-making; premises thus defined in turn set up expectations of what is or is not important; the search for alternatives for problem-solution is limited and this facilitates predictable and consistent solutions. Cooperation is thus made possible by subtle means that eschew the old command structure in its extreme form although maintaining hierarchical control, division of labor, job specifications, and all the other standard bureaucratic features, and more importantly, by "engineering" or "compensating" for the limited rationality of real human beings, as Simon et al. perceive it. Given these kinds of controls, or the way in which cooperation is conceptualized, innovation and flexibility, the features of most importance to facilitate adaptation to changing circumstances, would be significantly curtailed.

It is now possible to see that the Simon–March model of organization design also presents a solution to coordination. In so far as Simon's proposal for decision-making is a theory of rationality premised on cognition as symbol manipulation, it offers a solution to the need to "integrate" specialist knowledge in that knowledge is "built in" to hierarchical positions. Because his model of organization is one of hierarchy, with important decisions being restricted to the top, knowledge only flows downhill. Because decision-makers however are not omniscient, and because there are no feedback loops that allow for knowledge flows in any other but a downward direction, limited knowledge characterizes decision making with no mechanisms for error correction. This is a costly way of managing premised on a limited notion of cognition and rationality as central features of organization design.

While the Simon–March model is an example of "top down" organization design, premised on a conception of knowledge as symbol processing, the following sections are not so much a critique of this work but an initial exploration of a new approach to understand organization "from the ground up" as a self-organizing and evolved entity.

7.3. On the pheromone trail: from simple rules to complex outcomes

Returning to the not quite so humble ant that made an appearance early in this book, the study of insects and insect sociality (e.g., Wilson, 1978), facilitated by the study of complex systems and advanced computer simulation models, is most helpful in our understanding of human sociality and the natural world (Kennedy and Eberhart, 2001). Insect sociality is practically taken as the paradigm case of how global effects emerge from purely local interactions. Indeed, as Resnick (2000, p. 59) muses, "ants have become the unofficial mascots of the Alife community". Interestingly, ant examples have already been used in classical artificial intelligence, and Simon explicitly employs one in *The Sciences of the Artificial* (1996, p. 51) where he describes how "an ant makes his laborious way across a wind- and wave-molded beach. He moves ahead, angles to the right to ease his climb up a steep dunelet, detours around a pebble, stops for a moment to exchange information with a compatriot. The path . . . is a sequence of irregular, angular segments – not quite a random walk, for it has an underlying sense of direction". Sketching the ant's path shows it as "irregular, complex, hard to describe". But this complexity, Simon argues, is the complexity in the surface of the beach; it is not a characteristic of the ant, a simple critter unable to generate the kind of complexity indicated in the path it takes. Simon (1996, p. 52) proposes the following hypothesis: "An ant, viewed as a behaving system, is quite simple. The apparent complexity of its behavior over time is largely a reflection of the complexity of the environment in which it finds itself." Then, in a breath-taking substitution, he replaces "ant" with "human being" and draws the bold conclusion that "human beings" are pretty simple, and that "The complexity of our behavior over time is largely a reflection of the complexity of the environment in which we find ourselves" (Simon, 1996, p. 53). He does not include all human behavior here, but only cognition. We have encountered this kind of simplifying assumption in his treatment of organization design earlier, where the environment is constituted by the

organization's structural components that orchestrate the organizational performance of satisfying individuals "behind the scenes". Furthermore, it is such simplification that made possible the computer simulations of human behavior and especially cognition.

But the point here is not to study the individual ant, but ant colonies or swarms, in order to understand the remarkable results of their collaboration and get some pointers for the successes of human collaboration. Hofstadter's *Ant Fugue* (1979, pp. 311–336) is a wonderful account of the lives and fortunes of ants and their colonies and the basic rules they live by.

The ant example is only one of the many available in the contemporary study of emergent behavior or self-organization where simple processes lead to complex results (Kennedy and Eberhart (2001) provide excellent accounts of some major studies; see also Webb (1994, 1996); Webb and Scutt (2000); Holland (1998); Clark (1997a, 2001); Resnick (2000)). Studies of emergent behavior are about both biological creatures and their artificial cousins, such as, for example, Brooks's (1990) famous robot Herbert who is able to maneuver himself through space without colliding with objects while locating and picking up soda cans. The distinction between "real" and "artificial" is not so easy to make depending on the definition one gives of "artificial life". But this is a discussion that must await another time.

One of the best known examples of emergent behavior, which is also most beautiful to watch, is Reynolds's (1987) simulation of the flocking behavior of birds which he calls *boids.* (His website has more fascinating animated examples. The following description follows Reynolds's website text.) Reynolds created a computer model of coordinated animal motion such as bird flocks and fish schools based on three-dimensional computational geometry used for computer animation. The basic flocking model consists of three simple steering behaviors for every *boid*: (1) avoid crowding local flock mates (Separation); (2) move towards the average heading of local flock mates (Alignment), and (3) move toward the average position of local flock mates (Cohesion). When these simple rules were followed by each *boid*, the patterns that appeared on the screen resembled closely the flocking behaviors of biological birds; they looked quite real. Even more amazingly, when the *boids* encountered an obstacle they parted, swept around it, and rejoined behind it! It seems that flocks maintain a kind of dynamic equilibrium that does not require any central control, as discovered in the empirical work of Heppner (Heppner and Grenander, 1990). This result puts paid to the idea that leadership is a phenomenon found in nature, at least where birds are concerned!

Just as there are no logged flight plans including instructions for dodging unexpected obstacles in bird flocks, there are no architectural plans that give instructions on how termites are to build their nests. Termites are superb arch builders, a feat considered a milestone in the development of human architecture. As Kennedy and Eberhart (2001, p. 103) observe, we rely on an architectural map, that is, a symbolic representation of the project, and later a group of workers supervised by the architect or builder who know how to read the plan, all that termites do is follow the pheromone trail and two basic rules: (1) move towards the place where pheromone concentration is strongest; (2) deposit the mud balls you are carrying where the pheromone smell is strongest. Following what are called *stigmergic* routines; that is, routines that seem to indicate oft-repeated termite-environment interactions that direct and control collective construction

(see Clark, 2001, p. 108 for a more detailed account), arch construction is a decentralized, socially distributed accomplishment, achieved in an individually bumbling and disorganized manner. Considering the elegance of arches and the beauty of flocking behavior, the observation made by the mathematician Stephen Wolfram comes to mind, "It is possible to make things of great complexity out of things that are very simple. There is no conservation of simplicity." (Quoted in Kennedy and Eberhart, 2001, xviii.)

A final fascinating example of emergent behavior is represented by Sims's work (1994a, 1994b) of computer-generated creatures that evolve into life-like beings. Sims created an artificial three-dimensional world in a research project that simulated Darwinian evolutions of virtual block creatures. The appropriate exploratory tool is the genetic algorithm, because, as Clark (1997a, p. 89) put it, you have to "set a tinkerer to catch a tinkerer".

Sims created a population of several hundred creatures in a supercomputer, and each creature was tested for its ability to perform a given task, such as the ability to swim, or to compete to gain access to a cube, a resource to all. Pairs of individuals engage in one-on-one contests to gain control over the cube. The most successful creatures get higher fitness scores and survive, and their virtual genes are copied, combined and mutated to create offspring for the new population. Their fitness is again tested and through an ongoing cycle of variation and selection creatures with increasingly more successful behaviors emerge. Sims ran mostly two-species evolutions where individuals of one species competed with the competing species. While there were significant differences in the rate of evolutionary progress, Sims noted some truly remarkable results:

> A variety of methods for reaching the cube were discovered. Some extended arms out onto the cube, and some reached out while falling forward to land on top of it. Others could crawl inch-worm style or roll towards the cube, and a few even developed leg-like appendages that they used to walk towards it. (Sims (1994a, p. 36. Figure 9, p. 37) shows the amazing diversity of moves and strategies of the evolved critters.)

However, it gets more amazing still:

> The most interesting results often occurred when both species discovered methods for reaching the cube and then further evolved strategies to counter the opponent's behavior. Some creatures pushed their opponent away from the cube, some moved the cube away from its initial location and then followed it, and others simply covered up the cube to block the opponent's access ... (Sims, 1994a, p. 36.)

Sims thinks this research can be extended to more complex and more realistic environments where many creatures simultaneously compete and/or cooperate with one another, rather than pairing off in the way his block creatures did. The upshot of this would be that the application of the techniques applied, such as a genetic language, that lead to the evolution of creatures of increasing complexity would lead to a system whose details would be difficult to understand. Sims's (1994a, p. 38) conclusion is apt for present purposes, "... it might be easier to evolve virtual entities exhibiting intelligent behavior than it would be for humans to design and build them".

The different examples related above of both biological creatures and their simulated cousins serve to indicate that the latter manage rather well to find their way in realistic

environments. They exhibit complex and sometimes astonishingly strategic behaviors, and build amazing structures by following only the simplest of local behaviors. Although successful simulations can be very useful and cheaper than real-life modeling, if that can be done at all, care must be taken not to treat them as if they represented real world interactions. Simulations do however teach us a lot about where to look for better explanations and solutions.

These examples demonstrate what is known as *swarm logic* or *intelligence*, which issues in emergent behavior or *self-organizing* systems. These concepts have been used implicitly, and it is now time to spell them out in more detail.

7.4. Swarm intelligence, emergence and self-organization

The concept of *swarm intelligence* is credited to the work of the Santa Fe Institute (Bonabeau, Dorigo and Theraulz, 1999). In their definition, a *swarm* is the term given to any kind of loosely structured collection of agents that interact with one another. A traffic jam thus qualifies as a swarm, because it comprises agents such as people and cars that interact in a special way, as do schools of fish or the immune system. An agent in this context is normally an artificial entity generated by a computer program; it is able to perform some actions that are independent of the actions of other agents, and it is thus said to have a degree of autonomy. This earlier definition has been expanded in an important way in that swarms can also be defined as occurring "in high-dimensional cognitive space, where collision is not a concern" (Kennedy and Eberhart, 2001, p. 102).

7.4.1. Emergence

The concept of *emergence* and the meaning of *emergent* are not easy to pin down. Following Holland (1998, pp. 121–122; also pp. 225–231); also Odell (1998), emergence

> is above all a product of coupled, context-dependent interactions. Technically these interactions, and the resulting system are *nonlinear.* The behavior of the overall system *cannot* be obtained by *summing* the behaviours of its constituent parts. We can no more truly understand strategies in a board game by compiling statistics of the movements of its pieces than we can understand the behavior of an ant colony in terms of averages. Under these conditions, the whole is indeed more than the sum of its parts.

This description contains an important feature: the results of emergent behavior are of a qualitatively different kind than the locally produced interactions that gave rise to it. There is indeed no "conservation of simplicity". On a general level there is agreement that emergence is a defining feature of non-linear or dynamic systems (for an overview of dynamic systems theory see Port and van Gelder, 1995; a critical discussion is offered by Clark, 2001, Chapter 7), but it might also mean that we just do not understand the relationship between causes and effects, and are not able to predict some action or behavior of a system under investigation. The term might also refer to the fact that complex open systems are able to maintain or return to something like equilibrium, stability

or regularity – without involvement of the proverbial "invisible hand" (see Kennedy and Eberhart, 2001, pp. 19–20). Clark provides a more fine-grained analysis (2001, pp. 112–117; 1997a, pp. 103–128).

It is possible to distinguish between four senses of emergence found in the literature: (1) emergence as collective self-organization; (2) emergence as unprogrammed functionality; (3) emergence as interactive complexity, and (4) emergence as uncompressible unfolding. While we intuitively believe that emergence has something to do with collective effects, it is not the case that every collective effect is necessarily a case of emergence; nor does it mean that emergence necessarily issues in a collective effect (Clark (2001) cites some examples on p. 112). The important issue here is that we find a tight enough account of emergence that "pick[s] out a distinctive way in which basic factors and forces may conspire to yield some property, event or pattern" (Clark, 2001, p. 113).

When we consider Reynolds's account of flocking, as well as termite arch building, the first definition of emergence as collective self-organization seems to fit best in that many essentially identical elements are involved that obey simple rules and give rise to new behavior or patterns. It seems less applicable to Simon's ant marching across the beach, in which case the second definition seems more appropriate. The ant's path arises from the unplanned, incidental sequence of repeated interactions with the environment. Its behavior is not the result of some explicit or direct control structures. Again, while this works well for the ant case, it is less applicable to examples of collective self-organization that allow for some form of control by manipulating some parameter, as, for example, in the case of applying heat to cooking oil in a pan (Clark, 2001, p. 113; 1997a, 1997b, p. 107) which does change the oil's behavior.

The third case, emergence as interactive complexity, makes it possible to account for both of the preceding cases once we consider emergent phenomena as "the effects, patterns, or capacities made available by a certain class of complex interactions between systemic components" (Clark, 2001, p. 114). We can speak of emergence where complex cyclic interactions give rise to "stable and salient patterns of systematic behavior". The point of stressing the complexity of interactions, in Clark's view, allows us to think of emergence as occurring in degrees. A strongly emergent phenomenon on this account is one that results from "multiple nonlinear, temporally asynchronous, positive feedback involving interactions" (Clark, 2001, p. 115).

The final conception of emergence as uncompressible unfolding is somewhat different from the others. A "systemic feature or state is considered emergent if and only if you can predict it, in detail, *only* by modeling all the interactions that give rise to it" (Clark, 2001, p. 116). The problem with this definition is that only those phenomena that resist attempts at low-dimensional modeling are allowed to count as emergent. But, Clark (2001, p. 117) notes, "emergent phenomena are often precisely those phenomena in which complex interactions yield robust, salient patterns capable of supporting prediction and explanation, that is, that lend themselves to various forms of low-dimensional projection". This account is thus far too restrictive.

The tentative conclusion one might draw from this is that phenomena can be weakly or strongly emergent, that emergence may be a matter of degree, and that the sense of

emergence with the most comprehensive reach is the third example provided above. It is clear that the specification of emergence remains a task for further work.

7.4.2. Self-organization and complexity

The examples presented above display features of self-organization and complexity (see Waldrop, 1992; Nicolis and Prigogine, 1989) where self-organization can be defined as "the spontaneous creation of a globally coherent pattern out of local interactions" (Heylighen, n.d., p. 1). Complexity theory is then concerned to study such evolving patterns or structures, that is, the "fundamental logical properties of the behavior of nonlinear and network feedback systems, no matter where they are found" (Stacey, 1995, p. 480). Because such non-linear systems are distributed systems, it is not easy to perturb or change them. When self-organized systems receive positive feedback they grow exponentially and growth only ends when all components have been absorbed into the new structure. More specifically, feedback is said to be positive "if the recurrent influence reinforces or amplifies the initial change. In other words, if a change takes place in a particular direction, the reaction being fed back takes place in that same direction" (Heylighen, n.d., p. 10). How this works is nicely demonstrated in Resnick's (1998, 2000) StarLogo program.

StarLogo is a computer program that allows for the control of thousands of acting and interacting creatures/*turtles* on screen that, guided by simple rules, model interesting and unexpected behaviors, such as traffic jams, or the clustering of slime molds. Positive feedback, as Resnick (2000, p. 29) observes, is often associated with the screeching sound made by a microphone placed near a speaker. But unlike popular belief, it is not negative in the sense of allowing things to spin out of control, but rather it helps establish the patterns and structures of decentralized systems. Take the example of slime-mold clustering. In this simulation, a few cells move close to one another, and form a small "chemical puddle"; this puddle in turn attracts more cells, which drop more chemical, and so the puddle grows. The process keeps repeating itself, and in the end an aggregate organism is created (also Kennedy and Eberhart, 2001, p. 98).

Another StarLogo simulation is the forming of a traffic jam. The system was made up of a one-lane highway with a radar trap that was to catch drivers who went over the speed limit. There were only three basic rules the "drivers" had to follow: (1) if you come within two car lengths of the car in front of you, slow down; (2) if no cars are within two car lengths in front of you, put your foot down until you reach the speed limit; (3) if you detect a radar trap, slow down. As expected, jams formed behind the radar trap, but, most unexpectedly, jams also formed in its absence. With no radar trap to worry about, and thus operating under two rules only, traffic was expected to flow smoothly. Surprisingly, however, traffic jams occurred nevertheless. As Resnick (1998, p. 28) notes, "When a few cars, by random chance, happened to get near one another, they slowed down, making it likely that even more cars behind them would have to slow down, leading to a jam." (More fascinating examples are found in Johnson, 2002, such as the feedback cycles that determined the growth of towns in Europe from the Middle Ages on; for a delightful vignette see especially p. 112 which has to do with the recycling of waste products, particularly those deposited by humans!)

Negative feedback is also involved in the emerging systems just described. In general terms, feedback is negative "if the reaction is opposite to the initial action, that is, if change is suppressed or counteracted, rather than reinforced" (Heylighen, n.d., p. 10). In other words, returning to our slime-mold cell example, because cells are limited in number, as the cluster grows, fewer and fewer cells can join in, until all have been absorbed into the cluster, and a stable state or equilibrium has been reached. The new configuration marks the end of growth. Any new change means a change that reduces the current configuration, but this is resisted and the forces that created the stationary state now help maintain it. All non-linear, complex, self-organizing systems contain several positive and negative feedback loops that weave in and out of each other and mean that these systems are always in flux. Changes develop in some directions while changes in other directions are reigned in. Not surprisingly, this makes it difficult to predict the system's behavior. Considering both aspects of feedback, neither has a necessarily negative meaning. Positive feedback allows new patterns and structures to emerge (as in magnetization), while negative feedback stabilizes the new structure. There is a further feature that plays an important role in self-organizing systems: randomness. Again, it is rather a more positive notion than assumed in everyday talk. Without the introduction of randomness into StarLogo's traffic jam simulation, for example, there would not have been any traffic jam because cars would have moved at their initial equal speeds and even spacing on the highway. Many everyday phenomena are characterized by this combination of random fluctuations and positive feedback (e.g., synchronized clapping at concerts).

Given this description, it follows that self-organizing systems adapt to their environments; that is, they demonstrate "fit". The stable configuration into which the system settles means by definition that it is adapted to its environment. For living systems such as social organizations, adaptation becomes a critical issue when boundary conditions change. If changes are large the existing stable state is threatened, and if severe enough might lead to the system's disintegration, and the process of self-organization might have to start again. But all complex systems must be able to cope with the problem of maintaining stability while also adapting to changes or they would not exist. They manage this task naturally. The problem is to find out exactly how this happens, and whether this naturally occurring behavior can be explored further by means of advanced simulation models. Stuart Kauffman (1993, 1995), a theoretical biologist, hypothesizes that complex systems manage to maintain order while adapting to changes at "the phase transition", which characterizes the point where a complex system is nearly ready to succumb to chaotic activity, when it is, in his famous phrase, "at the edge of chaos". Systems at that particular point may be "best able to carry out ordered yet flexible behaviours" (Kauffman, 1995, p. 90). Although the edge of chaos idea appears to account for a very large number of features of ontogeny, Kauffman (1995, pp. 90–91) is cautious to call it "a fascinating working hypothesis".

In the following section I want to consider Kauffman's basic model of "order for free", the emergence of patterns or structures, and how this applies to decentralized complex organizations as the optimal ways of organizing for competitive advantage. More specifically, Kauffman's concepts of "patch logic" combined with "receiver-based

communication" are of interest in that they offer some suggestions on why this is the case. This model provides some intriguing suggestions for a new theory of decentralization and implies a proposal for naturalistically adequate organization design.

7.5. The logic of patches and why one should ignore some of the customers some of the time

The idea that complexity theory, knowledge of self-organizing systems, and emergence might have useful things to teach managers and organization theorists is not new. Wheatley (1999); Wheatley and Kellner-Rogers (1996) created much interest with her book *Leadership and the New Science* when it first appeared in 1992. She argued that post-Newtonian science had much to teach business managers and leaders, especially that complex organizations do not function according to the classical machine model that had dominated organizational theory for so long. If we want to find out what the principles of organization are, she claimed, we need to engage in the larger search for how the universe organizes. Subsequently, a new journal, *Emergence*, appeared and its second issue was dedicated to the discussion of the value of complexity theory to management (see especially Coleman, 1999; Lissack, 1999; McKelvey, 1999a). The topic was considered as equally important by the long-established journal *Organization Science*, which also dedicated a special issue to it (1999, 10[3]; see especially the detailed contribution by McKelvey (1999b)).

Kauffman is one of the most-cited writers on complexity. He has challenged the Darwinian doctrine of the primacy of selection, and added complexity as a feature that may frustrate selection effects. Could it also be the case that complexity affects organizational phenomena in this way? As Kauffman (1995, p. 246) sees it, "Organisms, artifacts, and organizations are all evolved structures. Even when human agents plan and construct with intention, there is more of the blind watchmaker at work than we usually recognize. What are the laws governing emergence and coevolution of such structures?" To provide some answers to this question, and thus to the practical problems of organizations, he suggests applying the *logic of patches* and *receiver-based communication*. The results of his work of 30 years are surprising, as well as counterintuitive. They

> ... hint at something deep and simple about why flatter, decentralized organizations may function well: contrary to intuition, breaking an organization into "patches" where each patch attempts to optimise for its own selfish benefit, even if that is harmful to the whole, can lead, as if by an invisible hand, to the welfare of the whole organization. The trick, as we shall see, lies in how the patches are chosen. (Kauffman, 1995, p. 247.)

To understand the logic of patches, we first have to understand the conception of NK fitness landscapes, which are examples of combinatorial optimization problems. Optimization in this context refers to "the process of adjusting a system to get the best possible outcome" while conceding that sometimes a "good" outcome may just be good enough (Kennedy and Eberhart, 2001, p. 49). This process applies both to evolution and to minds. A fitness landscape is the parameter space in which to search for optima, and its complexity is determined by two factors, N and K, that make a problem hard.

N is the size of a problem and K the amount of interconnectedness of the elements it is composed of. Optimization is fairly easy where variables are independent of one another because adjusting one does not affect any of the others. But where variables are interdependent, as is the case in real-life examples, adjusting one will have ripple effects on others and make one or more less effective. Furthermore, if N increases, the complexity of the problem explodes in that the number of possible states of the system grows exponentially. It is thus not surprising that this factor determines how hard it is to find an optimal "configuration of elements". Because it becomes unwieldy to test all possible combinations, there is need for an efficient algorithm that makes the search easier. (How the NK model works in biology is described in Kauffman, 1995, pp. 171–172.)

The most interesting point of this model, according to Kauffman, is that when the number of epistatic inputs per gene, K, is altered, the topography of the landscape changes accordingly; it becomes more rugged and the number of peaks grows. He says that altering K [amount of interconnectedness of the elements] "is like twisting a control knob". The reason this happens is because the model organism is caught in a network of conflicting constraints. The higher K is the more conflicting constraints there are, with the result that the ensuing landscape gets ever more rugged and shows ever more local peaks (see Kauffman (1995, p. 172, Figure 8.5), which depicts building a fitness landscape). It follows from this that where many conflicting constraints exist, there is no obvious optimal solution. Rather, we have a number of more modest compromise solutions. The more rugged the landscape, the more difficult adaptation becomes.

Since social organizations can be characterized as NK hard problems, good solutions often have to be found when time is scarce, and we have to accept that we "all try to do our best, but fail a lot of the time" (Kauffman, 1995, p. 252). The most appropriate procedure that accommodates these features is the *Patch Procedure*. In general terms, it is easy to understand:

> take a hard, conflict-laden task in which many parts interact, and divide it into a quilt of nonoverlapping patches. Try to optimize within each patch. As this occurs, the couplings between parts in two patches across patch boundaries will mean that finding a "good" solution in one patch will change the problem to be solved by the parts in the adjacent patches. Since changes in each patch will alter the problems confronted by the neighbouring patches, and the adaptive moves by those patches in turn will alter the problem faced by yet other patches, the system is just like our model coevolving ecosystem. (Kauffman, 1995, p. 253.)

The aim of the patch procedure is, just like that of the NK model, to find good optima given the vast amount of possibilities. But what is the optimum patch size?

In broad outline, Kauffman works through four different strategies of patching, beginning with the simplest, the "Stalinist" limit where the whole system is one patch, based on a 120×120 lattice, and considers what happens at the other extreme when we divide the whole lattice into 100×1 patches, the "Leftist Italian" solution. The first outcome of Kauffman's simulations is that breaking up the lattice/problem into patches results in patches co-evolving with one another. Co-evolution, then, seems to be a powerful advantage of patches. Furthermore, this meant for the Stalinist solution with its

"one patch for all" design that the whole system "freezes" while in the Leftist Italian solution with its numerous, small patches the outcome was chaos. This then leads to the all important question of how we get the "right" size.

The answer is that where *K* [the amount of interconnectedness of the elements] is low and the landscape "smooth", the Stalinist solution is best. In other words, when we encounter simple problems with few conflicting constraints, it is relatively easy to settle on an optimum solution. However, where landscapes become more rugged, or conflicting constraints grow and become more severe, the best solution seems to be to break down the problem, or to divide the whole system into patches "such that the system is near the phase transition between order and chaos" (Kauffman, 1995, p. 258). How do we get it to go there? Kauffman conducted many simulations that involved iterative patch subdivisions that did result in an optimum, where each patch reached a local minimum which was also that of its neighbors. This meant the whole lattice settled into equilibrium, and the system settled on one global solution. (Kauffman's (1995, pp. 80–92) light bulb experiment illustrates this point nicely.) How then does Kauffman think such a technical procedure applies to complex, social organizations?

If it is the case that systems with various local autonomies, the analogues of patches, might constitute the fundamental mechanisms underlying co-evolution even of economic and cultural systems, Kauffman speculates, then we might have found new tools in design problems, as well as for the management of complex organizations. Every modern artifact design runs into the problem of having to satisfy conflicting demands for it to work, but not all of them can be solved; we encounter the boundaries of complexity, such as in the case of supersonic transports. The compromise solutions reached are typically worked out by different teams or task forces, who determine optimal solutions for their own "patch"; one part of the design is proposed and developed which then means that other parts are "frozen". As a result of this choice, the overall design is frozen at this point; the local solution is not one that can apply to the global task. The recognition that an increase in patch size might lead to an optimal overall solution might have the consequence of "chunking bigger", as Kauffman (1995, p. 265) puts it, of combining perhaps several design teams. But which teams, or combination of teams, to combine to generate optimal outcomes depends on what we think the problem is. And we have no surefire way of telling. So how do we know how to parse patches properly? The answer Kauffman gives is general.

Problem specification is usually difficult and complex, and humans routinely misspecify the problems they think they need to solve, and then go ahead and solve the wrong ones. Assuming human fallibility at the outset is thus prudent. Because we never know all the knowledge required to solve a complex problem even our most elegant computer simulation would not help, since it incorporates a misspecified problem in its premise. The way forward, Kauffman proposes, is not to implement the suggested solution but to implement the optimal patching the model proposes, because the solution would most likely be the wrong one anyway. It is much better to "learn how to learn in the face of persistent misspecification" (Kauffman, 1995, p. 267). Hence, we should work with the optimal patching proposed of the misspecified problem, apply this to the real world case, and then try to optimize performance within each well-defined patch.

This may still not give us the correct solution to the problem, but it helps us to learn more about how to go about approaching it in the real world. There is a further consideration of how humans deal with the many and conflicting organizational constraints that exist in their attempts to find optimal solutions to organizational problems, the issue of communication as a means of coordinating behavior.

The idea of *receiver-based communication* roughly means this: "all the agents in a system that is trying to coordinate behavior let other agents know what is happening to them. The receivers of this information use it to decide what they are going to do. The receivers base their decisions on some overall specification of 'team' goal. This, it is hoped, achieves coordination" (Kauffman, 1995, p. 268). This procedure has been adopted by the US Air Force so that pilots can coordinate their mutual behaviors largely without the input of ground control. As pilots talk to each other and respond to those closest to them first, and continue to communicate following this rule, they achieve the kind of overall coordination encountered in the example of flocking behavior. In a simulation of this behavior, again based on the NK lattice model, what emerged was that we seem to find good solutions to complex problems (i.e. correct flight coordination) when we disregard some constraints at different moments, such as only communicating to agents closest to us and thus ignoring others further away, in the first instance. This is reminiscent of the everyday observation that we cannot please everyone, and that we ignore some constraints some of the time, but not all of them all of the time, just "like real life" (Kauffman, 1995, p. 269). Taken together, the patching procedure combined with receiver-based optimization seems to tell us how we "really try to coordinate complex, conflict-laden tasks" (Kauffman, 1995, p. 269). While this much simplified account does not do justice to the intricate and complex detail of the model, and while it leaves many questions open, it nevertheless allows us to draw some tentative conclusions.

7.6. Patching, real world, and organization design

So what do we make of these computational experiments, especially as applied to organizational reality? An immediate off the cuff answer might be that decentered organizational forms with flatter hierarchies have come into existence, and to the extent that they continue to exist, they demonstrate adaptive "fit". Therefore, it might indeed be the case that in some way Kauffman's computations have captured reality. Another way of putting this is to say that if we abstract from the computational complexities of patching and receiver-based communication, we are left with no more than what we already knew through our untutored intuitions. But that might just be the point. The very fact that these experiments model what already exists might be an indication that multi-coevolutionary processes work right inside organizations/firms, at the level of their parts or patches. If so, our untutored intuitions might become properly tutored and receive some scientific backing, albeit still of a promissory kind. What Kauffman proposes is that complexity, added to natural selection as an evolutionary feature, can be a consequence as well as a cause. Where organizational interdependencies are complex, and the ensemble of conflicting constraints large, better "fit" or competitive advantage is increased by reducing

global complexity. If any overriding design principle emerges from Kauffman's work, then this is bound to be it. Moderate complexity yields best fit.

However, while the patching model works at a high level of abstraction it requires a lot of filling in. For example, how would we specify "coupling" between organizational entities or units and what would be the specific details of co-evolution within even one organization, let alone several? When it comes to how we should break down complex organizations into various patches there seems to be no straightforward way. Experimentation with whatever might be optimal size when compared with whatever organizational departmentalization or subunits exist at a given point in time and within a given social and economic context seems the best bet. "Chunking bigger" is an option that does not appear to have any other backing but organizational experience, and that is perhaps all that is available. We seem to be doing this by trial and error, possibly guided, or hindered, by our assumptions of "what goes with what" to create a better outcome or product. But somehow we seem to be doing it, as told in the story of Boeing's problems in managing the sharp increase in the production rate of some of its aircraft (Roy, 1998). Boeing's supply problems were solved by replacing centrally controlled supply chains with a distributed, self-organizing local one that in fact acted like a market. That the de-centralized solution worked, as Roy (1998, p. 32) notes, is not really a surprise. "After all, John Holland has pointed out that, with only locally made decisions, New York maintains a two-week food supply. Why not envision the Boeing solution this way?"

The explanation for why large, well-resourced and experienced companies fail to adapt to changing conditions, such as RCA for instance (Tushman and O'Reilly, 1996), might well be available by drawing on complexity. Instead of advancing standard explanations for failure, such as managerial ineptitude, opposition to change or excessively high staff turnover, it may just be that the amount of interconnectedness, or K, is too dense. Failure to change might be the result of " 'dino'-complexity", as McKelvey (1999b, p. 314); also Levinthal (1997) puts it, and cannot be sheeted home to individual shortcomings (although that might well be part of it). This again is an important consideration for organization design. Complexity, rather than human cognitive limitations, thus undermines a company's competitive advantage and cause-effect relations may be rather more circular than traditionally assumed. Before we proceed, there is, however, one issue that now needs to be tackled in order to forestall what might otherwise be considered an inconsistency.

The discussion in this chapter so far has been supportive of the notion of self-organizing dynamic systems and emergence, but has not related this to the account of cognition advocated previously. The question then arises as to the relationship of (the theory of) complexity and self-organizing dynamic systems and (the theory of) cognition in the expanded, externalist sense in which it was presented in previous chapters. It is important to provide a brief account of how the relationship should be viewed, especially in light of the cognitive perspective taken in this book, and as it affects how to understand organization and organization design.

As described earlier in this chapter, we have learnt much from recent work in robotics, artificial life, and evolutionary simulations in terms of the intricate interplay between environmental-physical features, body, timing and motion in real problem solving situations. Given these accounts of how creatures, including biological ones such

as ourselves, manage to maneuver and problem solve in the absence of any discernible inner representations, there seems to be little need of an explanatory framework based on cognition that includes (some form of) inner representation and computation. To put the matter slightly differently, is the explanatory framework of self-organized dynamic systems perhaps a better explanation than that of distributed and environmentally embedded cognition, which might sink under the weight of all the extensions it recently acquired? The assumption in this book is that we should stick with the expanded view of cognition, and that an ecumenical and complementary view is appropriate. Here I side with Clark's assessment (1997a, Chapters 6 and 8 especially), and (2001, Chapter 7) of the relationship between these two accounts.

Considerable time was spent earlier in describing a variety of naturally occurring behaviors and their simulations. This was important in order to demonstrate the workings of central features of self-organizing systems. What these simulations make clear is that there is significant congruence between how self-organizing systems work and how cognition was presented earlier in this book. The emphasis of the former is on how complex interactive systems work, beginning with simple local rules, routines and random behaviors that evolve into complex outcomes which, after emergence, can no longer be disaggregated into their earlier component parts. While cognition can be said to do pretty much the same thing in terms of its environmentally embedded nature that issues in complex organization, the theory of cognition does not give up a notion of internal representation although views differ on what exactly it is, and what contents it has (central references that discuss these issues from the dynamic systems side are Kelso, 1995; Port and van Gelder, 1995; van Gelder, 1998; see Clark, 1997a, 1997b, 2001, for a sense of "soft" representation). The notion that agents might have inner representations of outer cognitive events seems to play no part in self-organizing dynamic systems where representation is understood as consisting of static configurations of symbol tokens; that is, where it follows the manner of classic computational cognitive theory. The place of inner representation in dynamic systems theory is taken by what constitute its central features "including parameter settings, system states, attractors, trajectories, or even aspects of bifurcation structures in cognitive science itself" (van Gelder, 1998, p. 622). In its most austere form, the dynamic systems theory can be presented as follows:

> For every kind of cognitive performance exhibited by a natural cognitive agent, there is some quantitative system instantiated by the agent at the highest relevant level of causal organization, so that performances of that kind are behaviors of that system; in addition, causal organization can and should be understood by producing dynamical models, using the theoretical resources of dynamics, and adopting a broadly dynamical perspective. (van Gelder, 1998, p. 622.)

This definition ramifies all the way down, or into, brains or minds as self-organizing dynamic systems in that brains are just one factor among others that determine cognitive performance. The main bone of contention appears to be the issue of whether the complex neural instructions issued by the brain "force orderly behavior from multiple muscles, links, joints, etc.", as Clark (2001, p. 133) puts it. Because self-organizing systems self-organize, and because the brain falls into this category, the additional neural element can be considered redundant as an explanation of cognitive performance. If we

did indeed operate with complete sets of neural instructions then the above account is credible, and talk of computation and internal representation might make way for the dynamic systems view as the superior account. But it seems we do not, operating rather with "partial programs" – "minimal instruction sets that maximally exploit the inherent (bodily and environmental) dynamics of the controlled system" (Clark, 2001, p. 133).

We, that is, our brains, appear to be working with neural instructions that shift in amount and specific detail, in reciprocal interaction with environmental systems which are collaborative actors in cognitive performance. Clark (2001, p. 133) reasons that, even if we accept that the dynamics of the body-world system may be such at times that neural contribution may be limited to simple applications, and where the system might be said to be most responsible for cognitive load, there may still be the simpler explanation that some motor activity just requires less detailed neural instructions. This solution can admit to emerging global complex behavior without needing to give up the notion of computation where "stored programs" just are not spelt out completely. Clark suspects that it is precisely in those partial programs, the place between the extremes of determinate neural programs on the one hand and self-organizing systems on the other, "*that we may expect to encounter nature's own programs*" (2001, p. 133; emphases in original), and that this is what dynamic systems theorists really want to find out about.

The other important distinction, the treatment of the brain as just another system, needs at least some consideration here. The difficulty this issue raises was already hinted at in Chapter 6, where environment and brain and their shifting interrelations were discussed in connection with task execution and problem solving. The issue was not resolved there, other than noting that relations between brain and environment are not entirely characterized as equal partners in the cognitive enterprise, although I admittedly come close to doing so on occasion. I will not pretend to be able to settle the issue here either; it is much too complex to do in the present context. However, in so far as our evolved brains allow us not only to adapt to the environment but also to develop knowledge of it, and to use it to plan action, both present and future, it does appear to be a different kind of system when compared with other physical systems. How to distinguish between brain system and other physical systems in the sense just indicated is a crucially important task to determine agency and purposeful action within the cognitive force field in which we move and solve our problems. We would need to develop a terminology more differentiated than that of dynamic systems theory, which does not make any differentiation of any kind between the systems. It seems that this is a task left over from the critique of the *Physical Symbol System Hypothesis*, which did contain such an account that was subsequently amended by connectionist cognitive science's emphasis on pattern recognition inside and outside the skull. However, this now also needs to account, on its own terms, for what the neurological instantiation of agency might be (but see Damasio, 1996 for a beginning). Let me conclude this part by agreeing to the kind of "dynamic computationalism" Clark (2001, p. 135) suggests, that both recognizes the details of the flow of information just as much

> as the larger scale dynamics, and in which some local dynamic features lead a double life as elements in an information-processing economy. Here, then, is one way in which dynamic and computational analyses may proceed hand in hand. The dynamic analyses may help

identify the complex and temporally extended physical processes that act as the *vehicles* of representational content.

Furthermore, after Simon and the *Physical Symbol System Hypothesis*, and building on the external pattern recognition expansion of connectionism, it might well "take the full fire power of dynamic systems theory to reveal the rich and complex space of possible content bearers" (Clark, 2001, p. 135). A dynamic computationalist account of agency and purposive action is thus a necessary feature of organization and organization design. And here we might again draw on Hutchins (1996a, 1996b; see also Chapter 3) whose work, while not addressing the notion of agency and purposive action, implies an account of agency in his distinction between evolution and design. Adaptation, he argues, does not necessarily rule out change by design, and this point provides some important insights for organization design.

The evolution/design distinction is discussed in the context of how a navigation team discovered the solution to a mechanical breakdown, a solution that turned out to be just the sort of solution expected from a designer. The difference between both is, of course, that evolutionary search happens "inside" the system for its own purposes, nature does not operate by design, while design as search is conducted from the "outside" by an agent on the basis of representations of it employed in the service of hopefully successful later adaptations. Roughly, organizations change by a combination of "adaptive search without representation", much in the manner described by self-organization and emergence, and a process that "lies between evolution and classical global-perspective design" (Hutchins, 1996a, p. 401). I suppose we might say that unlike the flocking behavior of birds or arch construction by termites, human agents not only order their organizational environments through local adaptive interactions of organizational subsystems, but through their abilities to make representations of adaptations, also *design* solutions. Adaptive emergence of solutions supplemented by local design decisions may interactively lead to both new local designs as well as new and undesigned consequences. Whether one considers organizational change as having evolved or as having come about by design is a matter of the degree of awareness of subsystems, and the ability to represent and foreshadow the consequences of change. Changes at the system level are more likely the result of evolution than design because the overall change, having emerged from a combination of local adaptations as well as design decisions from subsystems, has never been represented. Global system change was never present as a blueprint but "emerged" in the manner described. The lesson for organization design is simple: top down, hierarchically structured, *a priori* blueprints are doomed to fail because this is not how the world works.

If we extrapolate from the specific case Hutchins (1996a, pp. 379–380) describes, there are some considerations that ought to be built in to organization design. Organization members need to be able to carry out their routine tasks and at the same time be able to get a new job done efficiently. This is a non-trivial task because, as Hutchins (1996a, p. 379) notes, "there are so many possibilities for permutations and combinations of distributions of human effort across the many components of the computational task". Breaking the task down, as in modularizing work activity, is a common option (see Grant, 2001, pp. 159–161). But while modular organization is generally accepted

as an efficient integration of knowledge in work teams, how should the activities be organized? The design task, developed from the bottom up, has to take account of the following issues:

1. workload distribution across the members of a team or unit to avoid cognitive overload of any one person;
2. sequence control measures to avoid "dissonance-coordination" in which group members undo each other's work;
3. measures to avoid collisions, where team members want to use a single resource at the same time;
4. conflict avoidance where team members are working at cross purposes;
5. exploitation of the potential of temporally parallel activity, and avoidance of bottlenecks where possible (adapted from Hutchins, 1996a, pp. 379–380).

7.7. Conclusion

Attention to the fine-grained specificities of biologically realistic cognition, implicit in work activities, and its consequences for organization and organization design, determined both by emergence and representation of emergence, has taken us a long way away from the kind of rationalist conception of organization and organization design proposed by Simon et al. Because self-organization is the "natural 'default' behavior" (Coleman, 1999, p. 34) of dynamic systems, and because cognition is as described, what is required of organization design is that it be flexible; that structural features of the formal organization and its processes and procedures "fit" the goals, rewards, and structures of the informal organization" (Coleman, 1999, p. 38). In this respect the newly evolved forms of the firm represent a natural tendency of complex systems, just as what might be expected if they had come about as the result of intentional design.

Kauffman's patches or "cell organizations", with their interconnections and individual autonomies to develop even selfishly, represent a computational pattern of, generally put, how knowledge flows between agents; of learning from one another, of getting knowledge from wherever it is to be had for "own" organizational benefit, to the eventual benefit of the whole organization. Supplemented with the conception of distributed environmentally embedded cognition, the model might be suitably expanded as an explanatory framework for why decentralized organizations with flatter structures might indeed be optimal. Another interesting consequence of both Kauffman's model and dynamic systems, which is quite as should be, is that managerial control or control by a leader are superfluous. What are needed, says Coleman (1999, p. 39), are "senior managers to act as the central nervous system by coordinating the activities of the parts and monitoring the overall health of the system so that each cell is free to be entrepreneurial".

Organization design, as envisioned here, has a role for leaders as coordinators, in the cognitive sense in which "coordination" has been used previously. In light of complexity, formal leaders might well choose and plan the organization's path, but they have no control over the outcomes. Long-term outcomes emerge as a result of self-organizing

processes, including local design, and the future cannot be known until it happens. Thus, the question of who is ultimately in control has received one considered answer: it is not the leader.

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CHAPTER 8

A Road Map to Managing without Leadership

It would be an understatement to say that this book has covered a lot of ground. It has traversed a huge space – beginning with hierarchical theories of leadership, considering the problems of culture and change, passing substitutes for leadership and distributed models en route, and ending with suggestions on how we might think about the activity of organizing, of organization and organizational design. The landscape, in Kauffman's (1995) eminently quotable terminology, has been rugged, with quite a few peaks, as well as valleys, visible. The journey through such different and difficult terrain has been guided by key features of naturalistic coherentism, a new conception of science that, following Quine and Dewey, is "epistemology naturalized". Our theory of knowledge is only as good as the evidence we have to support it, and that evidence must be compatible with our natural ways of learning about the world. The feature that exerts most pull and imposes remarkable discipline is the simple demand for coherence, itself a standard feature of scientific theorizing.

Put at its most simple, the objective of this book was to drive a wedge between people's everyday, taken-for-granted understanding of leadership, a notion constantly reinforced by our embedding cultures, and to ask whether this understanding squares with how leaders and organizations really work given what we know about human cognition and information processing. Because humans are not presumed exempt from the way nature has evolved, the fundamental question asked of the leadership theories discussed was whether the claims made about leadership itself and its efficacy were compatible with how actual leaders learn to be leaders, that is, whether these claims cohere with the natural capacities of leaders to acquire and process information. To make as clear as possible how the theoretical machinery used helped to reach the conclusions advocated, let me retrace the main steps taken and present a kind of theoretical road map in this last chapter.

The predominant scientific paradigm of leadership studies, old and new, was that of logical empiricism or positivism that also came with its own specific methodology for how to go about studying leaders in practice, its hypothetico-deductive account. The intuition of early leadership theorists that science might have useful things to say about leadership (based on the hidden premise that there is such a thing in nature) was right, although the empiricist model was not.

The problems with logical positivism and empiricism are many, but most important here is the conception of evidence as *empirical adequacy*, a conception that does

not allow for other than observation-based criteria to play a role in the justification of a scientific fact or theory. However, because we know that all our observations are theory-laden, or dependent on what we have learnt to see, there is no theory-free way to establish the "facts of the matter", observationally or indeed experimentally. For empiricism, the assumption of a theory-free way to apprehend reality came at the price of not being able to establish a fact "for real" because every observation statement is always already an "interpreted" statement. Uncertainty was thus built into its foundations, and there was no independent way to get out of the infinite regress that starts when you begin drawing on more and more observation statements in order to justify your claims. Truth does not accrue incrementally. This is the sense in which the claims made outran the resources of empiricist leadership theories to support them.

The flip side of empirical adequacy is that values, for example, because non-observable, could not be part of the scientific framework. Herbert Simon's *Administrative Behavior* (1976) is an exceptionally clear presentation of how administration and policy can be separated according to the prescriptions of logical empiricism. The so-called fact/value distinction wreaked havoc, especially with those models that argue for the leader's uncanny ability, say, to "read" the economy, to know what an organization needs to "turn around", and in general, to demonstrate whatever additional transformational qualities a given model specifies. Because these qualities share the property of being internal to the relevant leader, they could not be established by means of empiricist methodology in whatever form, from observations to surveys or questionnaires. They fell through the observational grid. The invention of operational definitions was an interesting attempt to render "visible", and hence amenable to observation, what was not. For example, while you cannot "see" a leader who rates high on collaboration you can observe a behavior that the model defines as an example of such quality. Following the model, all the observer has to do is to match observation against the definition. But the fundamental problem of theory-ladenness crops up here just the same because the observed behavior is similarly infused with the observer's frame of reference. As a consequence, any claim for the existence of transformational leadership, for example, cannot be supported, given the empiricist frameworks applied to "find" it. It thus remains no more than an interesting and subjective notion supported by folk psychology but not science.

Another fundamental problem of empiricism is its implied theory of mind, some set of beliefs in how leaders actually become leaders seeing that they are not born with the requisite qualities and have to acquire them somewhere in their professional careers. Actually, any theory of knowledge implies a theory of mind, because for humans to have such a theory means that they had to have learnt it somehow, they had to have come by knowledge in some way. This aspect is usually implied and not normally recognized as important. We tend to subsume it in the phrase "learning from experience". In empiricism, as in the case of many disciplines, learning was assumed to happen as the result of successful symbol manipulation on the assumption of the primacy of language. Here the postmodernist perspective takes an interesting but ultimately self-defeating position.

It is of course loose talk to speak of *the* postmodernist perspective because there is not one unified body of writing that is representative of the one view. Nor is it likely

that there will be one. The term "perspective" indicates a collection of views of diverse writers who nevertheless share at least one important doctrine: they are opposed to science. If logical empiricism or positivism sits at one extreme on the philosophical–epistemological continuum, then the postmodernist perspective inhabits the other as the most explicitly anti-science approach in administration and organization studies and the social sciences at large. Nevertheless, much of its critique directed at the problems of empiricist science is well founded, especially in regard to the theory-ladenness of observation, following Kuhn (1962) and Rorty (1979). Postmodernist views get into difficulty because they overshoot the mark: from the warranted critique of empiricism as denying the interpretation of reality to the unwarranted conclusion that subject to theory-ladenness objectivity is impossible. There can only be narratives upon narratives, but no metanarrative. What is given up in such laissez-faire theorizing is *any* notion of representation. On this view, science no more represents natural phenomena than does literary criticism. What follows from such a strongly anti-representationalist stance is that postmodernist theories are unable to defend their own claims, by the rules of the game they themselves developed. For on what grounds would they be able to defend their views as better? How could a postmodernist leader defend his or her actions in the absence of any yardstick that would permit a distinction to be made between better and worse? But such an extreme conclusion is not necessary to draw because modern non-foundational theories of knowledge, of which naturalistic coherentism is an example, have presented more compelling arguments that still afford a view of representation and objectivity that is not beholden to empiricism.

More interesting still is the *strong thesis of discursive construction of self* on the assumption of the primacy of discourse. In accepting as *constitutive* of the self the human ability to process symbols, postmodernists display a lingering attachment to the Cartesian understanding of self in that the rational being was constituted by the very ability to manipulate symbols and symbol systems such as language. The death of the rational Cartesian subject, then, appears rather premature. Owing to the research of connectionist neuroscience, especially neural net modeling, the Cartesian conception of the human mind and of rationality can now be seen as too narrow and limiting. One might well ask why the move to contemporary neuroscience is so important. If we want to find out about theory of mind, and how we really acquire knowledge and process information – actually, how we do anything, really – then the best current knowledge available is that delivered by neuroscience. This is just another way of continuing epistemology by scientific means.

What we learn from a better (although far from complete) account of how our minds or brains work, by-passing the philosophical quagmire that a discussion of the distinction invites, is that language is a late-comer in our evolutionary development, that it does not have the primacy traditionally assumed, although it is central to the creation of culture. A lot more brain activity goes on below the sub-symbolic threshold that bypasses our consciousness. Brains are excellent pattern recognition engines rather than symbol crunchers, and the symbols we use in our commerce with one another and the world are themselves neuronal activation patterns. Cognitive, intelligent activity thus covers the whole spectrum from the conscious application of, say, the rules of logic, to

the skilful handling of a difficult business meeting, to the creation of a tasty new dish, or dancing the Salsa.

Although the results of neural net modeling and subsequent extra-cranial explorations of the theory of cognition seem highly abstract and far removed from the issue of leadership, assumptions of theory of mind are, as we saw, always implied in leadership theories where they do their work behind the scenes. Hence, the symbol processing model, as exemplified in Simon's work, has defined rational behavior for a long time and it suffuses organization and leadership theory still. The neural self, so beautifully described by Damasio (1996), provides a biologically more realistic way of thinking about autonomous agents, agency, culture, organizational change and the business of organizing itself. Above all, because the theory of cognition went "walk-about" as discussed especially in Chapters 5–7, our understanding of the distributed, embodied, and environmentally embedded mind is beginning to help us see just how "at home in the universe" we are, to borrow the title of Kauffman's book (1995).

Once we have a better grasp of how human agents cognize and interact with their social, physical and technological environments, the traditional conceptions of culture and organizational change can be recast in accordance with our present best accounts of human cognition. Such recasting presents the beginnings of a unified account of culture and cognition. It also allows for a more realistic understanding of what constitutes change, in culture at large and within organizations. What has been described as the paradox of culture, the tension between change and stability, can be explained by the plasticity of mind, by the schemas we construct, and by the way they become reconstituted, reinforced or deleted, given the stimuli received from the environment. Linguistic behavior does play an important part in culture production, but humans display many other non-verbal behaviors as well that reinforce cultural patterns and meanings. We usually express this by the phrase "the way things are done around here", or, as Argyris and Schön (1996) would put it, in our theories-in-use.

Culture, understood *as cognitive process*, is perhaps just another way of describing how people live with, make meaning of, and adapt to each other in their specific time-bound contexts and using whatever tools, technologies, and artifacts they have available to solve their problems. Given the embodied and embedded nature of cognition and culture, there is no vantage point outside it or above it from which we could study its doings as if it were a "thing apart". The methodological consequence for the study of culture is then quite clear: it needs to proceed from "the bottom up"; context and specificity are central. For formal leaders who believe that they are causal agents of organizational-cultural change the news is not encouraging. While it is always the case that there are impressive, charismatic and knowledgeable leaders, causal relations are much less clear where fine-grained interdependencies between humans, and between humans and their many artifacts and technologies, determine how things get accomplished. Simple attributions fall short of explaining vastly more complex processes that have not been theorized well enough to allow firm conclusions to be drawn. The centralized mindset is a mere fiction, although it seems to serve some people's purposes well some of the time.

Just as organizational theory's concern for culture served to broaden what was considered legitimate research in the explanation of how organizations might or might not

change, conceptions of substitutes for leadership and distributed leadership presented different challenges to traditional hierarchical views. The former join with advocates of distributed leadership in that factors such as organizational context, subordinate characteristics or group processes are considered possible candidates to substitute for leadership, and might even neutralize leadership effects. This model is concerned with explaining that sometimes individual, task or organizational variables rule out either positive or negative leadership influence. Given certain combinations of situational-organizational factors, leadership just does not figure. This is not to say, on this view, that leadership does not exist, but at times we just cannot find it and it might simply not have come into play at all. Leadership continues to be accepted as a real phenomenon, and in this sense the substitutes model continues in the footsteps of the traditional mould. Subject to its commitment to empiricist principles, it is hardly surprising that the model gets into difficulty methodologically in its quantitative attempts to make the relevant identifications between various substitute variables, or to determine which particular effect was attributable to which influence. At the point where the substitute model has to be able to support its claims it is not able to do so. In this respect it suffers the same fate as distributed leadership. The most significant contribution of the latter is the *de facto* acknowledgement of organizational reality that contradicts hierarchical leadership models offered in the literature. In this respect, theorizing in the leadership domain has taken an important step towards the destabilization of traditional models.

The idea that leadership is something many people may be able to exercise reflects what people experience in their workplaces, where different leaders seem to emerge from time to time. The reality of organizational functioning, in the highly specialized and subdivided modern division of labor, is indeed characterized by distributed forms of leadership. But insofar as "distribution" in this context means functional distribution, it differs substantially from the conception of *cognitive distribution*, that is, the cognitive distribution of labor. In other words, the point of *cognitive* distribution is to indicate that distribution is an essential characteristic of human cognition whose "sediments" or manifestations are exemplified in the modern division of labor as the consequence of the human necessity to outsource cognitive load. The functional sense of distribution does not capture the sense of distribution relevant to task accomplishment for which leaders and leadership practices were postulated in the first place. We have distribution but it is not cognitive in the required sense.

In everyday organizational life different actors can indeed take the lead in accomplishing work tasks. However, if these are to count as examples of leadership practices than the theory needs to be rich enough to make the requisite distinction between practices of this kind and other non-leadership practices, otherwise the distinction would lose its point. The same applies to the assertion characteristic of the model that everyone can be a leader depending on circumstance. Here, the methodological assumptions of empirical adequacy take their toll, for such distinctions could not be made given the methodological resources of the model. This is critically important because it raises the question: what is to be gained by continuing with either a substitute or a distributed leadership framework as an explanatory category if non-leadership organizational practices get the job done?

The different models of leadership discussed in this book end up short in terms of accounting for themselves and for organizational functioning. Finding out how organizations really work and change is a task that can be tackled better without the "advance organizer" of leadership as an explanatory framework, because our views of organizational functioning would be determined *a priori* by whatever basic assumptions the models make. Acknowledging that organizations are cognitive economies, and focusing on the knowledge of the many rather than the knowledge of the one, affords us a much richer and more realistic insight into what makes an organization work the way it does. Given the discussion of the properties of the theory of cognition, organizations are in a fundamental sense the results of outsourced and materialized human thought, and while the perspective of Knowledge Management has not been formulated in connectionist terms, its attention to *organizational* knowledge is a more constructive approach than leadership.

We are in an age where fast growing knowledge is seen as a competitive resource, and where companies either change fast, or perish. The attention of Knowledge Management to what knowledge is, what organization members know and must know to carry out their tasks, and what steps need to be taken to reshape organizational structure to facilitate knowledge sharing is thus of central organizational importance. Understanding how human agents learn provides the best hedge against uncertainty and enables organizations flexibly to exploit their niches; that is, to adapt in turbulent times. Although this is recognized in the Knowledge Management field, the conception of knowledge most operative is one shaped by traditional empiricist assumptions that partition knowledge into the well-known dichotomy of "know-what" and "know-how", of propositional and tacit knowledge. It is no accident that Knowledge Management, originally understood as the skilful application and exploitation of IT-based expert systems, has been as successful as it has. We are expert language users, and strings of symbols and symbol systems can be codified. The information we are able to share via computer is phenomenal, but we do not therefore share knowledge. The recognition that the ability to use symbols is part and parcel of a much broader view of cognition has made it possible to make the important distinction between the way we are able to *represent* our knowledge, and knowledge itself. What shows itself in our talk, in organizational memoranda, mission and vision statements is that part of knowledge that we can represent in this way. Other aspects of our cognition show themselves in our abilities *collectively* to get complex and unexpected problems solved, as nicely shown by the now much quoted XEROX technicians of Orr's case study (Orr, 1996). Representation does not equate with symbolic representation.

One major challenge for modern organizations, as for Knowledge Management as a field of study, is to absorb this broader conception of knowledge and to accommodate organizational structure to make best use of human natural potential. If organizational knowledge is to be mined productively, then it is critical for organizations to understand how knowledge "travels", a notion usually described by the concept of *knowledge transfer*. Although there are significant differences in the views of researchers who study the "transfer problem", a common assumption is the view of knowledge and knowledge acquisition that underlies it, the symbol system hypothesis.

On this view transfer is expected to take place when a learner is able to apply knowledge acquired in one context to another when it is appropriate to do so. Transfer is said to have failed when this does not happen. This notion of transfer is grounded in individual accumulations of knowledge where "chunks" of it could be moved from situation A to situation B in unchanged form. Specifically, the problem of transfer is phrased both in terms of agents' inability to transfer *explicit* (propositional) *knowledge* between situations (classical view) and in terms of the specificity of the situation and its contingencies, which generates *tacit knowledge* (situated action perspectives). Both sets of approaches rely implicitly on the symbol system view.

Although situated action theorists rightly emphasize the situatedness of knowledge with its affordances and invariants, aided by the concept of communities of practice, the end result is that theorists in this mould place themselves at the other extreme of the transmission/transfer model occupied by Simon and colleagues, for whom cognition and knowledge is private and individual property, located within the skull. For situated perspective advocates, knowledge and cognition is all out in the situation, and thus external to the agent. While situated learning or cognition writers expand how we view knowledge and its creation on the basis of context, situation and other interactional features, their strong version of the local production of knowledge ends up supporting an account for why knowledge does *not* transfer. If it is "situatedness" that allows knowledge to emerge, and since situations with their affordances and variants differ from one to the next, it is not to be expected that there could be transfer from one to the other. Although the argument for locally produced knowledge is an important departure from classical and behaviorist conceptions of knowledge and transfer, and while advocates of social cognition are right to stress the importance of the features of the situation, what is left out is the knowledge-acquiring agent.

The reason that humans are able to pick up cues of cognitive relevance made available in their engagements with specific situations is that they have the wherewithal to do so. It is not the situation that creates knowledge "behind the backs" of agents, but it is agents immersed in the field with all its available cues who do the constructing. Situations do not have brains. Perhaps we can now say that knowledge "co-evolves" in this sense. It needs to be stressed at the same time that explicit, codified knowledge plays an important role, because we do not discover everything anew from the situation but learn from others who may be temporally and geographically distant or, for that matter, standing right next to us! Language has thus been described as a compression algorithm in that it makes available the experience of others.

Consider the following example. A manager who has to deal with a difficult staff meeting in which downsizing is the issue benefits from the knowledge of colleagues who have had similar experiences, and who may have written this down, or told the manager. In picking up cues from her colleagues, who may be angry, anxious or depressed, she sifts what she has learnt, perhaps in a management course, or been told by experienced managers, and intuitively adjusts her behavior, not only her comments, to the situation. This is not normally a conscious process. What of transfer here? The situation in which the manager finds herself is different from any other, although she may have experienced "downsizing" situations elsewhere as participant but not as manager.

In principle, every situation, despite overt similarities, is always subtly different – you cannot step into the same river twice – and in this sense knowledge needs to be "transferred" all the time. The "problem of transfer" has been declared a pseudo-problem because no transmission is involved; the real issue is one of the integration of knowledge, or simply, learning. We should therefore pay greater attention to the importance of both organizational learning and the nature of the situation and practices that make up the organizations we inhabit. Understanding cognition and structuring contexts are key tasks to solve if we are to make headway with using organizational knowledge better. It is thus imperative to direct our attention to the complex issue of organizations, organizing and the question of optimal organization design, equipped with a sounder understanding of our natural capacities. Specifically, the implications of a *decentralized* mindset for organizational functioning and design, as indicated earlier in the book, need to be spelt out in more detail.

Turning to recent work in complexity theory, self-organizing dynamic systems and emergence, fruitful new directions in the study of organization and design develop. While different disciplines contribute to what is somewhat loosely called complexity theory, of particular interest in the present context is the work of Kauffman (1995) whose concepts of "patch logic" and "receiver based communication", are offered as a possible explanation for why flatter, decentralized organizations are just the kind of design that is the right adaptive response to a rapidly changing environment. Because all organisms, artifacts, and organizations are evolved structures, the laws that govern emergence and coevolution in a deep sense also govern complex organizations, although we do not know much of the detail yet. The fascinating insight Kauffman adds to Darwinian selection is that complexity may thwart selection. Complexity is seen as both the result of evolution as well as a cause. Translated into the context of social organization where interdependencies are complex and the ensemble of conflicting constraints large, better adaptive fit is achieved by reducing complexity, by creating smaller units.

Although this is a vast, uncertain and even speculative field of study, with many claims yet to be tested, and despite the fact that Kauffman's computational experiments abstract from real world conditions, the results appear to support the move from bureaucratic, hierarchical structures to decentered forms of organization with flatter hierarchies as optimal design for turbulent environments. From the viewpoint of complexity, given the features of self-organizing dynamic systems, intentional action also appears in a different light. There is more of the blind watchmaker at work than we wish to realize.

We learn from examples in robotics, artificial life and evolutionary simulations just how intricate the interplay is between environmental-physical features, body, timing and motion in real problem-solving situations. Such interplay, not surprisingly, indicates significant congruence between how self-organizing systems work and how distributed cognition works, as presented in this book. The emphasis of the former is on complex interactive systems, beginning with simple local rules, routines, and random behaviors. These evolve into complex outcomes, which, after emergence, can no longer be disaggregated into their earlier, simpler parts. While socially distributed and environmentally embedded cognition can be said to do pretty much the same thing, it differs from the dynamic systems view by maintaining some notion of internal representation. And this

is important in that the brain, while being a self-organizing system, is a self-organizing system of the kind that makes it possible for us both to adapt like other biological creatures *and* to reflect on adaptation. While solutions to problems often emerge as just the kind a designer might have chosen, we are also able to represent solutions, and thus to design decisions that in turn might lead to better adaptations, and so on. Organization and organization design thus emerge as significantly different from the kind of symbol processing based, hierarchically structured view of organization that has dominated for so long.

The study of organizational functioning in all its complexities will keep us intrigued and busy for a very long time. If a book could be said to have a big toe, then this one has merely dipped it into the water, and created a few ripples. It has raised some big issues, offered some solutions, and certainly left many problems behind. In one way or another, we have more than enough to be getting on with – without worrying about leadership.

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Subject Index

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