

COGNITION  
AND  
CULTURAL CHANGE

RICHARD LEACHMAN



**COGNITION AND  
CULTURAL CHANGE**

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**R i c h a r d L e a c h m a n**

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## COGNITION AND CULTURAL CHANGE

Post-structuralism is the closest that humanity has come so far to developing a comprehensive theory of art. Although it is in fact far more like a theory of 'not-art', the influence of post-structuralism has been profound and all-pervasive, and it has come to fundamentally shape both the production and the consumption of art throughout the modern world. It has also dramatically influenced the whole subject of cultural studies. The principal tenet of post-structural theory is that all perception, knowledge and meaning is subjective and relative, and is exclusive to the individual. It is axiomatic within the theory that there are no universally knowable realities, no universally accessible meanings in art, and no objectively creative meanings. This essay suggests, heretically so to a post-structuralist, that there *are* universally knowable realities, there *are* universally accessible meanings in art, and there *are* objectively creative meanings. This implies a real world in which we can not only know much of that world's reality, but also know, through art, genuine emergence within that reality. The essay argues that post-structuralism fails to adequately account either for cultural change in the real world, or for any kind of creative relationship between art and that cultural change. It goes on to assert that there is such a relationship that is identifiable, intimate and powerful, and that is capable of being directly and precisely exploited in our understanding and management of ourselves, our society, and our interaction with the physical world<sup>1</sup>.

### **Post-structural theory**

Theorising on art only began to emerge properly as a quasi-respectable discipline in the early nineteen seventies, with the growing recognition of the power and scope of post-structural theory. Prior to post-structuralism, art theory was somewhat marginalised, of little interest to anyone outside a tiny coterie of aesthetes forever locked into their doomed attempts to define 'beauty'. The suffocating ivory-tower preciousness of aestheticism can be tasted in even the briefest glance at the few remaining academic journals of aesthetics. The reason for the perennial still-birth of aestheticism is

principally that it has never possessed a viable or serious philosophical theory that could be called upon to underpin anything of real interest. Classical philosophy itself has never offered anything other than the most half-hearted and casual of solutions, and philosophers of art have been reduced to shoe-horning what were usually extremely idealistic and subjective feelings into either a somewhat dubious metaphysical framework, or a fundamentally unsupportive objectivism. The philosophy of art always had scant backing - humoured and tolerated, but rarely respected and never honoured. In this it rather mirrored the fate of art itself, with philosophers of art and creative artists equally disregarded by polite society. It was in this context that post-structuralism presented, for the very first time, a powerful theoretical framework for explaining art. This prompted a massive and enthusiastic outpouring of writings and discussions on art which continues unabated.

The essential post-structural proposition is that there are no fixed absolute truths - *all* knowledge and meaning is absolutely relative. There is a universal subjective relativism, which leads to the necessary conclusion that nothing can ever be known objectively, and nothing can ever be communicated to another person objectively. Subjects A and B can therefore never ever know each other, or indeed know anything about their respective worlds, from within any framework of reference other than their own respective closed cognitive and experiential systems. A can only, in fact, ever communicate at all with A, and anything that B says or does merely serves to allow A to self-reflect and self-communicate about A's personal interpretation of what B has said. Any discussion between A and B takes place, simultaneously but separately, within two isolated, non-interactive and wholly self-contained and closed subjective systems A and B. And of course in such a context meaning comes to mean whatever you want it to mean - it has no intrinsic content, leaving only something that is exclusively subjectively accessible and definable. There are only ever interpretations of interpretations, in a never-ending circularity. Concepts of truth, logic or objectivity cease to have any validity, and our only knowledge and understanding is of ourselves. We are wholly, exclusively and absolutely self-referential beings.

Post-structural theory has performed the enormous service of smashing much of the confident and rigid fixity of classical objectivism, and it has significantly and invaluable led to a widespread recognition of the validities of others' different values and views of reality. Post-structuralism has, above anything else, elevated the concept of the subjectively autonomous individual to the status of being the only ultimate truth or value in life. Individual liberty has been sanctified and enfranchised far beyond any previous boundaries. It has led directly to a vastly more sophisticated, rich, fluid and multi-dimensional approach to the interpretation of meaning, and especially of symbolic, semiotic and hidden sub-textual meaning, that is at times quite thrilling. It has unleashed vast intellectual freedoms, facilitating ways of thinking and analysis at hitherto unimaginable depths and levels. It has also led to a huge increase in intelligent, informed and critical interest in art. It is also, however, profoundly unsatisfactory and flawed in terms of its philosophical logic. To sustain its assertion that *all* meaning is relative and subjective, the entire theory famously rests on the logically self-contradictory proposition that, as a fixed absolute truth, there are no fixed absolute truths. In other words, the one unbiased truth is that there is no unbiased truth. And the practical implications of this logic are no less unsatisfactory.

For example, post-structuralism definitively asserts that art is an activity no different to any other activity, except insofar as somebody has chosen to label it 'art'. Art is therefore defined as whatever anyone chooses to call art, which of course makes the word 'art', let alone the actual activity, redundant and meaningless. The only significance and value of any so-called 'art' is thus the same as that of any other activity, namely its wholly subjective meaning to each individual. But even more than this disembodiment of art as a significantly particular or different activity, post-structural theory also extends a denial of definable or categorisable meaning to literally every single aspect of our lives. The possible objective existence of *any* world out there becomes intrinsically and inaccessibly unknowable, for all times, and at any level of consciousness. And it is this proposition, which is fundamental to post-structural theory, that leads to such widespread disquiet and disrespect.

Our lived experience daily informs us that, however we manage it, we do in fact reliably know and interact with a world out there with, by any reasonable standards, considerable 'accuracy'. To suggest that we can never know that outside world 'objectively', in the sense of knowing it reliably and consistently, is flatly contradicted by the continued successful survival of human life over millennia, in what is generally an extremely hostile world. And yet post-structural theory nevertheless defies such lived experience with impressive confidence and panache, and with remarkable success in many areas of academic and intellectual life<sup>2</sup>.

The enormous success of post-structuralism, despite these very deep-seated philosophical and common sense objections and reservations, is probably owed partly to the seductive permissions it grants to us all to unchallengeably define our own subjective reality, but even more to the ruthlessly aggressive philosophical arguments of, particularly, Jacques Derrida<sup>3</sup>. Drawing on an impressive legacy stretching back through Heidegger to Husserl and Nietzsche, Derrida's analyses ruthlessly stripped out classical objectivist theories. He convincingly and devastatingly demonstrated the nudity of the objectivist Emperor in terms that have proved to be painfully difficult to rebut. As such, post-structural theory owes its success as much to the objectivists' failure to properly answer and survive its arguments as to the intrinsic validity of those arguments. It is not that post-structuralists are seen to be correct in their description of a wholly subjective cognition, it is more that they have simply annihilated the philosophical opposition and now victoriously rule by default.

Many philosophers have been frustrated by the success of post-structural theory, and particularly so by their inability to counter it effectively, even though there has long been a widespread recognition that it was fundamentally flawed in its denial of any 'objective' knowledge, and in its self-contradictory argument for absolute relativism. Given this surprisingly free run by its critics, post-structuralism has been able to build a powerful working base not only within the philosophical field, but also in the only slightly less abstract and theoretical worlds of the arts, the humanities and the social sciences. And there it has to be acknowledged that relativism has been crowned King, more or less throughout the Western world. The theory has now taken root to such an extent that to even question it amounts to a risible heresy, and merely demonstrates the questioner's ignorance and stupidity. It has indeed become the new dogma and orthodoxy, its influence is felt everywhere, and on every front we see reality disappearing in a miasma of an infinitely self-referential subjectivity.

Meanwhile classical objectivism continues to survive healthily in the not inconsiderable enclave of the sciences, but particularly vibrantly within cognitive science. And it is cognitive science that represents possibly the most exciting, dramatic and rewarding area of development in modern society. It is also in cognitive science that the seeds of post-structuralism's eventual eclipse have sprouted.

### **Cognitive science**

It is only in the last few years that the beginnings of a valid philosophical counter-argument to post-structuralism have begun to emerge. That counter-argument is in fact a result of a battle not between post-structuralists and what we might describe as anti-post-structuralists, but between classical objectivists and anti-objectivists (who are not themselves post-structuralists). These arguments have arisen from within the sciences, and in particular from what has come to be called cognitive science, which is a multi-disciplinary attempt to unravel how the mind works. Cognitive science is a grouping of the disciplines of neuroscience, artificial intelligence (AI), cognitive psychology, linguistics, and epistemology. It is interesting that cognitive science, as well as almost every area of psychology, has remained almost wholly untouched by post-structural theory.

Post-structuralism never stood much chance with the sciences. Thomas Kuhn<sup>4</sup> famously demonstrated how subjective cultural beliefs and assumptions have always shaped and underlain what had always been presumed to be an objective science, but there has also always been the awkward fact that most science actually works in the everyday world, reliably and consistently. There have in fact been post-structuralist arguments challenging the 'objectivity' of even relatively straightforward mathematical calculations, but understandably they have had very little impact within the sciences themselves, either practically or philosophically<sup>5</sup>. Certainly on the surface scientific work seems as if it is wholly operating within the parameters of an objective sort of world, and unsurprisingly classical objectivism has continued to hold sway within most scientific boundaries. Philosophically speaking, however, it is admittedly *only* in the sciences that classical objectivists continue to operate nowadays as major players.

The relatively recent emergence of cognitive science has given a whole new lease of life to classical objectivists working in the sciences. Driven principally by the desire to computationally model human cognition in AI, the great bulk of contemporary cognitive science is deeply underpinned by, and is determinedly supportive of, objectivist theory. That theory essentially holds that the human mind is rational and ordered precisely because it mirrors the rationality and order of the external objective world. That outside world is identified as discrete, categorisable and syntactic, and so it follows very easily, indeed inevitably, that the human mind has likewise had to learn to reflect those same qualities. Our minds are syntactic *because* reality is. Certainly most cognitive scientists accept unquestionably that the human mind functions computationally in terms of information processing, with syntactic binary networks that may be enormously complex, but that nevertheless can in theory be artificially modelled and programmed as computer software, eventually forming the basis of a true 'hard' artificial intelligence that will do most, even all, of what a human mind does.

The many different source disciplines of cognitive science almost all agree on this general principle that cognition is computational, and they merely choose to disagree on the precise mechanisms involved<sup>6</sup>. Their continuing failure to successfully model even

the most elementary behaviours of human cognition, however, does point out the possibility of fundamental theoretical flaws that they are unwilling to engage with. For example, one classic fatal flaw has famously been identified by John Searle<sup>7</sup>, as the inherent inability of a syntactic program to account for *meaning*. This is a wholly proper argument that has never really been satisfactorily engaged with by the objectivists, but that failure has done little to dent either their confidence, or their domination of cognitive science.

The objectivists posit a dualistic mind-independent world. The world exists out there, and the human mind mirrors that one world, recognising the objective natural properties and categories of that world, with the consequence that the mind adapts itself to the outer world as it is. The post-structuralists posit an object-independent world. We do not even know whether any world exists out there, and indeed have no way of ever knowing if it exists, nor will it be of any relevance if it does exist. The post-structuralist mind is essentially a closed system, wholly self-referential and entirely subjective, constructing models of what we think might be out there based on our developmental, personal and social experience, and our shared cultural background. We can only know ourselves in terms of our subjectively constructed models of who and how we think we are. The objectivist defines infinite potential fixed points of reference in the world out there, the relativists insist either that there are no fixed points, whether out there or in here in our minds, or that if there are such, then they are exclusively endogenous and are self-defining. Given that position, it is not altogether surprising that post-structuralists have so little to say to cognitive scientists.

Most of the opposition to the objectivist view of reality as applied to the sciences and cognitive science has come not from philosophers but from scientists. Maybe somewhat unexpectedly, this scientific opposition draws fairly deeply on phenomenological theory, and particularly on the work of the philosopher Merleau-Ponty<sup>8</sup>. Phenomenologists argue that there are no clear divisions between our cognition and the external world, and that we know the world only experientially through our active participation and involvement with it. The biologists Humberto Maturana and Francisco Varela, theorising on the emergence of life, applied what is essentially a theory of consciousness to the life sciences. They developed the theory of autopoiesis<sup>9</sup>, ‘self-making’, arguing that all organisms are intrinsically self-contained systems, self-organising<sup>10</sup> and self-generating, but at the same time in open and continuous physical interaction with an objective environment. Organisms both define and are defined by their environment, in an endlessly repetitive and reflexive feedback loop that is different to the circularity of the post-structuralists in that it specifically acknowledges and embraces the world out there. Autopoiesis has gradually grown up over the last thirty years, slowly collecting adherents in many different disciplines, from complexity theory to immunology to psychotherapy to systems engineering to management science and law<sup>11</sup>. It has, however, only started to attract a larger audience in very recent years, particularly as its implications for cognitive science have become more apparent.

Applying autopoietic theory to the theoretical problems of cognitive science leads to the suggestion that the organism *is* the mind - that the mind is embodied, literally operating within and through the cells and sense organs of the body<sup>12</sup>. This concept of the embodied mind recognises that there is indeed a world out there, and that our perception and our knowledge of it is defined both exogenously, within that outer world, and endogenously, within the inner framework of the human bodily condition. It also

recognises that our knowledge of our interaction with the world is objective in the sense that it is *viable* - it bears sufficient relationship to our actual experience of the world, and to our need to reliably manipulate it. We have fixed points in our cognition that are not exclusively exogenous (as is claimed by objectivists), nor exclusively endogenous (as is claimed by relativists), but are in a sense in between. They lie in the interaction between our organism and the real physical world out there, from which interaction we bring forth, or *enact*, meaning. We will never know, nor could we even begin to (or need to) understand, any 'absolute' meaning in the physical world (post-structuralists routinely and mistakenly equate 'absolute' with 'objective'). What we do need is to reliably and consistently know the meaning of how the outside world is likely to objectively affect us as embodied humans - we need *viable* knowledge, that works *well enough* in our objective physical environment. The fixed points are, in a sense, 'in' the medium of our human perceptual interaction with the world.

This theory of the embodied mind, therefore, suggests that we 'enact' the world, *bringing forth* meaning from our interaction with the world, meaning which is both exogenous and endogenous. And it is here that autopoiesis offers possible resolutions of the self-contradictions of objectivist 'syntactic meaning' and post-structuralist 'absolute relativism'. In effect, while arguing that both objectivists and post-structuralists are in areas wrong, it also suggests that they are also both partially correct. Vast areas of human cognition are of course subjective and relative, but at the same time that is built on the solid bedrock foundation of an objective grasp of a real world. The theory of autopoiesis offers a middle ground that acknowledges a real validity in both viewpoints, rooting the argument in biological processes that hold within themselves the seeds for the generation of all new life.

This view that cognition is embodied has, particularly over the last decade, received powerful and persuasive endorsement by various leading philosophers and scientists coming from a number of different theoretical backgrounds<sup>13</sup>. With the odd honourable exception<sup>14</sup>, however, the objectivists have chosen to remain quiet, simply ignoring the debate about embodied cognition, while of course the relativists, being locked within their own closed-loop subjectivity, have no theoretical language for embracing any part of a non-relativist argument. It is therefore ever an uphill struggle, and it has to be acknowledged that the theory of enactive cognition and the embodied mind is still in its relative infancy. The implications of the theory, however, are enormous, and not least those implications for our understanding of meaning, and particularly of universally accessible meanings and realities.

### **Universally accessible realities**

The idea that as humans we share common access to primitive levels of meaning has a long and distinguished history. The identification nearly forty years ago by David Hubel and Torsten Wiesel<sup>15</sup> of stimuli-specific neurons within the cortex of the cat has over the years inspired a huge body of research into similar such neurons, and this has tended to legitimise the presumption that the human brain is to some extent commonly 'hard-wired' to enable it to commonly recognise an extensive catalogue of primitive perceptual stimuli. Piagetian developmental psychology also indicates that we become in effect commonly hard-wired for many simple cognitive tasks, due to our naturally experienced sensori-motor development through infancy. A wealth of physiological, psychological, philosophical, linguistic and anthropological research now supports the view that as humans, and principally by virtue of our human bodily condition, we share

what is in effect a common culture-independent simple-level perception of our world<sup>16</sup>. However differently those many research studies are interpreted, and wherever those different interpretations variously ‘place’ reality and objectivity (or ‘reality’ and ‘objectivity’), and whether such shared perception is claimed to be innate or developmentally learned, there is general acceptance that it all indicates some kind of universality in simple-level human perception and cognition.

Consequently, it is nowadays not unreasonable to presume that we as humans universally recognise perceptual stimuli for primitive properties such as texture, colour, warmth, cold, heaviness, lightness, hardness, softness, rigidity, smoothness, separation, togetherness, distance, proximity, stasis, movement etc; gestalts such as causality, beginning, end, wholeness, energy, birth, livingness, growth, union, death etc; by more complex visual affordances such as shelter, nourishment, protection, exposure etc; possibly by archetypal images such as the sun, sky, earth, plants, animals, humans, mother, family, children, faces, hands etc; and maybe by certain basic causal relationships such as subject/object/verb, attraction/repulsion, and simple order.

It is tempting to leap to the easy conclusion that such stimuli represent independent properties ‘out there’, and that being universals they constitute verification of the representationalist viewpoint. This is the position taken by any number of different schools of classical objectivism<sup>17</sup>. The evidence is, rather, that these are not discrete and transcendent absolutes, complete in themselves as symbols of a mind-independent world. Firstly, individual neurons seem to be in fact triggered not by specific stimuli in a vacuum, but by what are in fact *relational* properties<sup>18</sup>. That is, we do not identify a property of, for example, ‘hardness’ *tout court*, independent and complete within itself as a discrete property, rather we identify it in the context of its specific and immediate environment. Indeed it is likely that it is not even possible to perceive individual stimuli per se, but only relational stimuli - stimuli in relation to other stimuli. And secondly, such contextual stimuli are almost certainly not unique or absolute referents, but are ‘good enough’ reliable working indicators of different relational properties within different contexts. For example what is correctly identified as ‘very hard’ in one context may be equally correctly identified as ‘not very hard’ or even ‘soft’ in another context. But the point, of course, is that these potentially infinite variations of relationship between primitive stimuli are accessible to us accurately *and* universally. This would surely necessarily be the case if stimuli are to be of any reliable value to us in our environmental perception.

These two points are both fundamentally at odds with the representationalist argument. It is additionally suggested, however, that the meaning that we *experience* in our perception of these primitive stimuli, i.e. the probably irreducible simple-level meaning that is experienced prior to any cultural or personal subjective loading or evaluation, further challenges the claims of the classical objectivists that stimuli-specific neurons justify their own representationalist theories.

Although any speculation on the experiential meaning of stimuli is inherently ‘psychological’, introspective and solipsistic, and therefore of course generally regarded as philosophically rather disreputable, it is also determinedly ignored in all schools of cognitive thought for a variety of other reasons. Experiential meaning is self-evidently irrelevant (and indeed fairly meaningless) within the symbolic semanticism of the representationalists. The possible universality or ‘objectivity’ of primitive stimuli

makes them an inconvenience to be conveniently ignored by most post-structuralists, despite their obsession with meaning. It is intrinsically incompatible with the idea that we perceive and interpret such stimuli in, say, mathematical, geometrical, optical or molecular terms; and Gibsonian ‘direct’ perception<sup>19</sup> seems to entirely beg the question, as does the most common (and usually unspoken) assumption, that they are ‘mere’ topographical indicators. Even the identification of stimuli with our physical interaction with them still falls short of embracing experiential meaning. Seemingly universally, stimuli are treated as if their meanings are transparent. And yet the fact remains that primitive stimuli cannot be taken for granted, they must mean something meaningful, however simple or basic. We certainly cannot claim that we experience say ‘flatness’, ‘softness’ or ‘distance’ *per se* - indeed what does that possibly mean, and what exactly are we ‘perceiving’ and ‘experiencing’?

This essay is suggesting, on the basis of enactive cognition, that primitive perceptual stimuli are experienced as *affordances of bodily sensation*, as what we might call ‘afforded sensation’. The contextual nature of primitive stimuli, in terms not only of stimuli being perceived in contextual relation to other stimuli, but also of one stimulus possibly indicating differing properties depending on context, points insistently to the body-centred enactive nature of our perception of stimuli. It is clear that we can never know what ‘absolutely’ lies beyond or behind a perceptual stimulus, and it is also equally clear that what we perceive is not in fact a discrete ‘stimulus’ out there but merely a potential interaction with whatever is there. What the stimulus actually ‘is’ in absolute terms is indeed of no concern at all to us, for the only meaning that is of any practical interest or value to us is what experience of bodily sensation it will bring forth in us as embodied humans.

In evolutionary terms we need to be able to anticipate and make plans for reliably dealing with the possible interaction that we as physical human beings might have with an environmental stimulus (or whatever lies behind such a stimulus in the ‘world out there’). Our survival demands that we understand the experiential meaning and nature of any such possible interaction with a stimulus. We need to know *in advance* the effect it might have on our physical human body, how it is *likely* to feel. At its simplest level this is surely as true for us as it is for any animal. Only the very crudest and most primitive life-forms interact with their environments exclusively through direct and immediate physical contact, and any evolutionary development beyond this stage introduces perceptual skills enabling ‘distanced’ anticipation and planning. And that ‘distancing’ is precisely to allow the entity to know, without the dire risk of actual physical interaction, what a possible physical interaction might experientially mean. Evolutionarily, perceptual meaning surely *only* exists to reliably inform of environmental affordances of bodily sensation. Appropriately in the context of enactive cognition, the Old English root of ‘afford’ is *geforthian* - to further or cause to come forth.

The suggestion is, therefore, that perceiving a stimulus of say ‘flatness’ (and I will refer to discrete individual stimuli here merely for the sake of clarity of argument), our experience of its meaning *tout court* will involve a sense of what that flatness would mean if it were in contact with a human body. We might sense, for example, the smooth, hard and slippery property of a wet marble slab, or the comforting, soft and warm property of a stretched bed-sheet. But in both cases, when we perceive flatness there is a shared and familiar afforded sensation of what it feels to lie or stand on a flat

surface. ‘Imbalance’ is likewise a property that has a clearly experiential meaning - when confronted with it we almost physically feel it as a destabilised toppling over. And ‘sharpness’, particularly the pointed sharpness of something such as a knife-point, spike or needle, is perceived distinctly in terms of potentially harmful penetrative stabbing. ‘Exposure’ and ‘shelter’ are similarly perceived as very obvious affordances of familiar sensations, and both in particular tap into a very primitive and basic emotional awareness of human need.

There is almost certainly no clear dividing line between physical and emotional sensation<sup>20</sup>. It is difficult not to feel some kind of emotional element, such as a feeling of security or protection, as we crawl into the crude shelter of a cave or a hollowed out bush. And exposure of almost any sort never quite loses its sense of dangerous vulnerability. This sort of emotion is not so much a conscious subjective response to our environment as a kind of low-level background emotion that is intimately entwined with physical sensation. Indeed it is debatable whether this kind of emotional sensation can be at all distinguished from the ‘purely’ physical - all direct sensation *is* this fully-embodied interactive sensation.

And yet, although such a suggested afforded sensation makes a great deal of sense in enabling us to accurately and reliably navigate the world, it still remains somewhat trivial and immediately local. Of itself it engages only with a level of meaning that is not too far distant from an animal perception of meaning. What is far more interesting than mere environmental survival, therefore, is the possibility that the concept of afforded sensation also offers an explanation of complex linguistic meaning.

George Lakoff and Mark Johnson<sup>21</sup> both argue a persuasive case for what they call experiential realism - for the embodied meaning of language. Their arguments revolve around the kind of primitive properties described above, defining them as basic-level concepts (universal properties such as hard, soft, light, cold, tall etc.), and as image-schemas (pre-conceptual structures such as containers, paths, links, forces, up-down, front-back, centre-periphery etc.). In three case studies Lakoff describes in great detail the constitutive role of basic-level concepts and image-schemas within the ontological structures of the emotion ‘anger’, the preposition ‘over’, and grammatical constructions. He demonstrates how, from the concrete domain of our physical experience of them, we metaphorically project basic-level concepts and image-schemas into the abstract domain of language, wherein they comprise the basic building-block components and structures of all words and all concepts, of all complex linguistic meaning.

Lakoff and Johnson both explicitly focus on meaning as the central issue in their work, which they actually present as an ontology of meaning. Insofar, however, as they both fail to venture very far into the (admittedly solipsistic) experiential nature of meaning, their work inevitably tends to comprise something more like an epistemology of meaning. They authoritatively describe the relational structures by which all complex meaning is composed and built up, but they skate over the ‘being’ and ‘knowing’ of experiential meaning. By presuming the meaning of primitive stimuli to be transparent and self-evident, they in fact leave it hovering tantalisingly out of reach. The result is a curiously intellectualised and unlived sense of embodiment. My suggestion, of course, is that by interpreting basic-level concepts and image-schemas in terms of afforded sensation, we can precisely and appropriately fulfil the proper requirements of a full ontology of meaning, embracing all of the richness and depth of meaning that is familiar

to us in our experience of everyday life<sup>22</sup>. Afforded sensation can then step into the breach, and take its place as the very living (and lived) stuff and sinews of *all* linguistic meaning (and even, maybe, of consciousness too<sup>23</sup>).

At this point, not only does all language and all complex meaning become potentially definable in terms of interactive bodily sensation, but it can also be recognised as very obviously systemically enactive in nature. Indeed the concept of the embodied mind might even be said to offer the *only* realistic framework for an evolutionarily viable experiential semantics. For example, one implication of this is that if meaning is so embodied, then of course no syntactic program or binary computer can by itself recreate the extent of human cognition. In other words, there is simply no way of communicating a sense of full meaning from within the human condition into any other context or framework, as by definition all meaning can only ever be fully interpreted through the medium of the human condition. Human meaning simply cannot exist outside of the human body.

### **Universally accessible meanings in art**

What is of particular interest to me is the implication of afforded sensation for visual art. When I first came across Hubel and Wiesel's work in 1984 I immediately recognised that it provided the evidence I needed to justify my argument for a universally accessible content in art based on primitive indicators. I thought this was an original insight until much later I came across a description by J.Z. Young<sup>24</sup> of how back in 1959, in response to Hubel and Wiesel's first published report of their work on the cat's cortex, he sent them a reproduction of a Van Gogh self-portrait, commenting 'Van Gogh seems to have broken the code'. They apparently enthusiastically agreed.

The suggestion is made that successful works of art are definable as those with a complex content of meaning that can be universally accessed, and identified directly and with great precision by anyone visually sensitive and literate<sup>25</sup>. The suggestion is that artists precisely mimic or represent primitive perceptual stimuli, recreating them as visual indicators in their paintings or sculptures with the express purpose of articulating the same afforded sensations that they might customarily indicate in everyday life. I would indeed argue that the defining skill of the artist is the exclusive representation and orchestration of such universally accessible stimuli. (This is as true in abstract as in figurative art, and, for that matter, as in music and poetry.)

Certainly the training of most artists focuses relentlessly on drawing in particular, with the aim of developing the 'innocent' eye, and of depicting *actual* spatio-temporal relationships and properties rather than habitual, presumed or imagined ones. As a direct consequence of this the artist develops a high degree of skill in isolating such actual visual relationships from subjective ones, in effect learning to consciously distinguish and filter out his or her innate recognition of what is 'objectively' there from any personal response or acquired knowledge. And similarly, we as viewers must likewise acquire this same discriminatory skill in order to appreciate art effectively. We have to learn to see neutrally, as it were, to arrest our cognition before that stage at which we 'add on' our personal response or emotional reaction to what is articulated, before we feel our possible attraction or aversion to the content described, and before we access our subjective and experiential knowledge of the images and symbols that might have been used. It is the formal visual content, constant and universally accessible, that identifies a work of art, and *not* its cultural and symbolic subject-matter.

Innumerable paintings have utilised the powerful and culturally loaded symbolism of the Madonna and Child, but few have ever been acknowledged as great works of art<sup>26</sup>.

It is in fact easy to look at a work of art and identify the battery of visual indicators used by the artist, and to recognise what they ‘mean’ as individual or local primitive stimuli. This is little different to carrying out the same exercise in everyday life. We can describe in great detail the myriad spatio-temporal properties and relationships that we can see ‘objectively’ in the world around us, in terms that we know will almost certainly be agreed with by any other normal human. The difference between art and the real world, however, is that the artist, apart from using tricks of illusion to define the primitive stimuli, combines them in a way that articulates a total unity, a coherence, completeness and integrity of *complex* meaning. And because the component stimuli are universally accessible, this compositely orchestrated complex meaning can be recognised with extraordinary unanimity by all those who are visually sensitive and literate, of whatever cultures or periods. This is regardless of whatever ‘value’ or subjective interpretation that we might all separately and differently attach to either the complex meaning itself or to its component elements, and regardless of whether we love it or hate it.

This articulation of complex meaning in art is very similar to the way in which a word defines an amalgam of different component primitive meanings integrated within a complex whole (as per Lakoff and Johnson). The difference seems to be that whereas language abstracts the meanings of perceptual stimuli, art employs stimuli whose meanings we experience intrinsically and ‘objectively’. One might say that language articulates complex meaning which we understand ‘second-hand’ - indirectly and metaphorically, whereas art articulates complex meaning which we experience ‘first-hand’ - directly and ‘literally’.

A successful work of art (that is, one that perceptually ‘works’), manages to discipline and orchestrate a huge number of different primitive meanings, compressed, manipulated and co-ordinated in such a way that they rigorously come together within a natural complex pictorial whole. That pictorial whole fluently articulates an integrated, cohesive, self-contained and convincing world of that complex meaning, as a world, universe or reality whose nature *is* that meaning<sup>27</sup>. The artist’s vision of how the world, or a part of the world, is or might be, can be experienced *directly* and unequivocally. Although a mere linguistic description of that view of reality might communicate a great deal to us, it nevertheless remains abstract and at a remove from us, and we understand its meaning only indirectly or metaphorically. Linguistic communication is always indirect and non-experiential, and it suffers all of the vagaries and imprecisions of subjective language. It is this unique capacity of art to communicate an actual *experience* of complex meaning, universally and directly, that makes it so powerful and significant for us, as individuals and societies.

It is important to remember, however, that if art does indeed employ a neutral or innate code or language that can articulate complex meaning reliably and consistently, ‘objectively’, this does not in any way necessarily validate the ‘truth’ or ‘reality’ of that complex meaning. Most artists’ views of how the world, or a part of it, is, have no greater claim to ‘truth’ or ‘reality’ than those of any other person. The *only* significant consequence of the universally accessible content in art is that it allows one person to communicate to others, with great clarity and precision, a complex meaning. Rather

than having a complex meaning merely described to us, we can know it precisely, in terms that are both mutually shared and experiential. We *directly* access the meaning. When we perceive primitive meanings in our environment those meanings are of course in a large sense ‘true’ or ‘real’, they are reliable indicators of environmental properties. But the fact that we directly access primitive stimuli in a work of art does not thereby make the composite complex meaning also ‘true’ or ‘real’. Those indicators used by the artist are *precisely* artificial, illusory and mimetic. Their value is solely that they have the capacity to convey complex information directly.

By and large, of course, most artists would hope that the content they articulate in their work *is* in some way ‘true’ or ‘real’ (whatever that means, precisely). Clearly artists do set great store by their work. Any ‘successful’ (that is, effective and viable) painting or sculpture (or music or poem) ‘works’ only because enormous reflective and critical thought and effort has been channelled into it. Many works of art take years to complete, and there are many artists who, working full-time, produce maybe only three or four works in a year. The continual re-working and reappraisal that characterises the production of any work of art is evidence of the seriousness, discipline and calculatedness of the artist. It precisely belies the proposition that the making and appreciation of art is subjective. The reason for this extended reflection during the making of art is partly that any successful art is extremely difficult to make, but it is also partly that the artist is putting his or her soul on display centre-stage, articulating a content that he or she believes in most deeply and sincerely. That content *is* the artist’s view of reality, in large or small part, an understanding of a part of the world that the artist probably believes to be ‘true’ or ‘real’, but certainly hopes may be of some value to those looking at the work. So this does not therefore mean that it *is* ‘true’ or ‘real’, merely that hopefully the viewer might subjectively find it to be so, as a view that is interesting, inspiring, creative, helpful, illuminating or healing. How the viewer subjectively responds to the meaning that is articulated, of course, is entirely the viewer’s prerogative. All that the artist can rely on is that at least he or she knows that the content articulated in the work has the potential of communicating to the viewer directly, precisely and experientially.

One problem in viewers’ appreciation of art is that they endlessly confuse their subjective response to the work with the actual content that is being articulated. It is as if somebody who loathes cats defines a painting of a cat as being about the loathing that the image subjectively provokes. This demands a conscious awareness on the part of the viewer that one’s subjective response is always a reaction *to* something objective (i.e. the content). Our response is to a stimulus in the outside world, and however confused or mistaken we might be in our perception and identification of that stimulus, it is important that we develop the ability to be able to separate out the stimulus from our response. The solution to this probably requires both artists and art commentators to relentlessly, almost religiously, point out the distinction between our recognition of a content in an art work, and our response to that content.

Another major problem, probably closely related to this blurring of the distinction between content and response, is that art is not taken seriously enough. Despite our lip-service glorification of art (which is itself largely confined to the art of past times) we in the West seem to have consistently lacked a relationship to art that either accords it proper respect as being ‘for real’, or recognises an implicit obligation on our part to deliberately explore the potential seriousness of its world-view content. If we do

approach art consciously, acknowledging that it articulates a serious possible view of reality, then *experiencing* that view of reality directly allows us precisely to ‘try it out’, to road-test it, as it were. And this is exactly what we never seem to do. The artist is implicitly begging us not just to ‘taste’ the work’s content, but to actually ‘wear’ it, to see if it does actively shift things, if it might indeed be productive and creative somewhere in our lives. In this sense the artist is in the position of being shaman or magician to his or her society, conjuring up new visions of reality, and enabling the society’s experience of creative new ways of seeing the world. The continuing tragedy is that the artist’s vision of emergent potential generally remains unheard, marginalised as mere high-brow entertainment or decoration when it in truth offers the possibility of real life-creation. The sad fact is that most members of our societies remain, thus far, essentially unmoved by art at any consistent deep level. The argument running throughout this essay is of course that, despite this almost institutionalised neglect and disregard of creative artists by society, art’s content *is* of profound and practical value to society.

So in proposing the importance of art’s facilitation of direct experiential access to the artist’s articulated vision of how the world is, it is proper, indeed essential, to define and justify the practical value of such an experience, beyond the levels of mere entertainment, curiosity or prurience. In the first instance, of course, the experience of art is appreciably different to the experience of a mere linguistic description of complex meaning. Descriptive language is indirect and abstract, and has none of the powerfully experiential quality of a meaning that is, in art, directly accessible. Such immediacy, intimacy and directness has its own seductive attraction, and this surely accounts for much of society’s veneration of (at least historic) art. And indeed it is probably true of most of us that we have, in looking at art, at times experienced great revelations, been moved deeply, or felt powerful emotions. But that in itself is *not* enough, for it still leaves art in the uncomfortable position of offering at best a haphazard and occasional enlightenment, but most frequently providing mere titillation, offering slight cognitive and affective experience by proxy. This essay is suggesting, of course, that it is the artist’s particular and individual view of reality, his or her world-view, that holds *the* key to the truly creative role that art can play in society. And to properly appreciate that, it is essential that we accept and fully engage with the idea that our understandings of reality, our world-views, actually *do* shape all of our thinking and reasoning, totally, profoundly and systemically.

### **World-views and rationality<sup>28</sup>**

Most people remain unaware that, even though we might all share an innate perception of primitive environmental stimuli and have many cognitive patterns in common, we nevertheless all understand reality very differently to one another. Seeing the world through our own paradigms, mindsets and world-views, we are all generally unconscious of our own take on reality, believing that how we see the world is actually how the world is. The corollary to this is that it also tends to make us believe that everyone else either sees the world similarly to us, or if they do not, then they are at fault and ‘irrational’, and would benefit by seeing it as we do<sup>29</sup>. We also tend to be unaware of how our own view of reality evolves from year to year, not so much in sudden leaps and bounds, but as gradual growth and development. One of the truly great insights that post-structural theory has so effectively broadcast, is precisely the

fact of these uniquely different and perpetually shifting ways that we all have of seeing the world. This has remained, however, in very large part a technical, intellectual and non-experiential victory of communication as, in the same breath, that same theory tragically and erroneously insists that we can never actually access others' different ways of seeing reality. And so in practice we all stay stuck within our own minds, unaware both of how our own world-views systemically shape our own thinking and reasoning, and of how other world-views can afford us experiential systemic access to other ways of thinking and reasoning<sup>30</sup>.

The principal role of the world-view is as a gestalt, shaping and structuring rationality<sup>31</sup>. The way we reason depends fundamentally on our understanding of the nature of the world, of how things function and operate, and of the general principles by which our environment can be successfully manipulated. These basic assumptions underpin all of our thinking and reasoning. They determine those dynamics, causal relationships and relative significances that are accorded priority over others, and that come to comprise a culture's tried and tested organisational principles. Emerging naturally and intrinsically from the rationale of the culture's world-view, these principles become deep-level and systemic, representing a structural guideline and framework for almost all of a culture's religious practices, customs, technologies, values, behaviours, thinking and reasoning. This applies even to the concept of 'pure' logic, classically regarded in the West as reflecting some kind of absolute and transcendental objectivity existing independently of a human role. The Western view of logic rests on the assumption of a reductive binary and linear order in the world, which is presumed to be transparently universal. Other cultures, however, have logics that reflect their own very different world-view presumptions of the nature of reality - indeed they even have their own interpretations of syllogistic validity<sup>32</sup>.

The existence and nature of different world-views, however, is not quite as alien to us as we might at first think. We are all, for example, familiar with the world-view of Renaissance humanism, which so dramatically accelerated the development of all parts of Western society, and that crystallised the classic Western vision of a materially mechanistic, reductive and individuating world. And we are mostly also aware, for example, that African cultures generally have animistic ancestral-spirit world-views, that Japanese culture sees the world as interdependent, as balanced harmony, that Indian culture has a spiritual-hierarchical view of reality, and that Australian aboriginal culture has (just) its dreamtime. (Not, of course, that these cultures' world-views are or ever were fixed and static, nor that they are held equally and universally by their respective populaces, nor that member individuals do not all hold their own local and personal versions of these 'macro' world-views, as well as an infinite variety of subjective 'micro' world-views.)

But notwithstanding that these descriptions of cultural world-views are crude oversimplifications, they nevertheless hold good enough, and as broad generalisations go they are all widely endorsed anthropologically, historically, art historically and philosophically<sup>33</sup>. It is nowadays also generally unquestioned that the profoundly different processes of reasoning and behaviour that are apparent in each of these cultures will of course all at root reflect their different world-view understandings of reality. Indeed it would be strange if that were not the case. And yet the paradox is that at the same time we also all manage to treat other cultures as if they do in fact share our own system of rationality, and we almost pathologically ignore the evidence, and our knowledge, that

they do think differently. There seems to be an almost genetic gap within the human condition between recognising the fact that there are different cultural world-views which do fundamentally and differently shape rationality, and acknowledging the reality of those differences. All cultures seem to experience enormous difficulty in accepting that other cultures do actually believe that their world is as they say they believe it to be, and that their reasoning processes reflect those beliefs, *for real*. Although we are able to intellectually recognise and identify the world-views, we do seem to be unable to consciously experience and engage with their reality.

In terms of this essay's advocacy for an increased awareness of the real-world role of world-views in our thinking and reasoning, we are maybe fortuitously being overtaken by events. We are all currently being faced with a dramatically accelerated pace of change that is evident throughout our modern global society. This sort of change is quite unprecedented, and it is affecting our lives at all levels. Until quite recently change was relatively stable, and it was largely perceived as local and event-driven, resulting directly from accidental, unanticipated or previously unconnected surface situations. And any underlying adaptive changes in world-view evolved only very slowly and gradually, almost imperceptibly. It is increasingly evident, however, that what is happening now is indicative of rapid change that is taking place at a far deeper systemic level. It is as if the very nature and constitution of our world is changing. And as a result of this we are at last beginning to accept that the only way of dealing successfully with that change will be to adapt our thinking and reasoning, and identify new world-view understandings that might meet these challenges more effectively.

Whatever the reasons underlying these new patterns of change, it is clear that the organisational principles by which we in the West used to manage the world are no longer effective. By the same token, most of our conventional techniques of management and administration will increasingly fail, designed as they were for a world that operated differently, and that was relatively easy to manage at surface level. It follows that if this new change is as fundamentally constitutional and systemic as it appears to be, then it is imperative for our survival and prosperity that we identify those organisational principles which are genuinely appropriate to it, and that we adapt our management techniques and decisions to them. It seems that at last, forced by the crisis of events, we are going to have to consciously and intelligently engage with world-views other than our own. Fortunately this is an imperative that is already widely acknowledged within management theory. The understanding of processes of adaptation to change, and of the crucial part played by mindsets and world-views within those processes, has become highly developed, particularly in areas such as organisational development and strategic planning, as well as in cultural briefing. But rather surprisingly, and certainly sadly, this practical understanding still seems to be fairly unique to management scientists<sup>34</sup>.

It is clear that if we are to survive and prosper in the future then our world-views need to be evolved with great care. And of course it is artists who, throughout the ages, have excelled at articulating the emergent world-views of their time. Today's artists are no exception. Many of them are identifying and articulating world-views that are persuasively appropriate to the world today. These typically incorporate such varied principles as flux, uncertainty, ambiguity, paradox, self-organisation, reciprocity, reflexivity, interconnection, and interdependence. And it is at this point that it finally becomes a little clearer why artists are so essential to society. Our old world-views no

longer serve us, once emergent they are now tired, worn-out and obsolete, and in our desperation to know what to replace them with we might just have to belatedly turn to our artists for real-time help. Now that, in our urgent race to manage the changes overwhelming us, we are all suddenly conscious of needing to explore new ways of looking at reality, it is maybe that much easier to embrace what art can offer us *here and now*.

The concept of, and need for, emergent world-views is becoming increasingly commonplace and is now widely accepted, particularly within management science. The fact of a world-view being articulated in a work of art means nothing of itself, however, and whether any particular world-view does or does not facilitate genuine emergence therefore becomes a question of extreme significance. What is required with some urgency is almost some kind of emergent touch-stone, that can reliably identify emergence at birth. Certainly the nature and process of emergence, and in particular of emergent world-views, needs to be explored and mastered rather more comprehensively than it has been to date.

### **Emergence**

The concept of emergence has only in very recent years come prominently to public attention, principally through its association with the science of complexity<sup>35</sup>. Apart from studying complex non-linear processes of change, the science of complexity classically researches those areas of natural science in which the first two laws of thermodynamics fail to function predictably. Fundamentally contradicting the principles of conservation of energy and of entropy that are enshrined as sacrosanct in those laws, complexity confronts the inconvenient fact that there is in fact a massive burgeoning of new life all around us, emerging almost from nothing into richness and abundance. The science of complexity has identified a narrow band of complex activity lying between the relative stasis of the entropic conserved-energy system and the collapsing change of chaos, within which there is a potential spontaneous emergence of growth. Having set out to produce a non-linear mathematical definition of the processes involved in the emergence of new natural organisms, complexity's understanding of emergence has now developed to the point of modelling relatively simple genetic algorithms. Without being pre-programmed for growth, these algorithms have evolved patterns and attributes of self-generation and self-organisation that can only be described as characteristic of life, resulting in a veritable menagerie of self-evolved computational forms.

Autopoiesis, on the other hand, has over the last thirty years studied the process of emergence biologically, looking at it not mathematically as in the science of complexity, but structurally and processually. In particular autopoiesis examines the principles by which a cell (and by extension an organism) functions successfully within the environment, how it interacts, and how it replicates and evolves. What complexity and autopoiesis both share in common is the acceptance that firstly, genuine emergence *does* objectively take place, and secondly, that its process *can* be penetrated and understood. Further, they both recognise that in principle a greater understanding of the process of emergence will lead to potentially major applications in probably every aspect of human society. Certainly, if indeed we could understand the secrets of generating new life, society could surely produce truly phenomenal results. With such rich prizes on offer, the search for what emergence is, and what it might actually mean, is one of the most exciting areas of contemporary science.

This essay is not concerned with the comparative potential applications of either the science of complexity or autopoiesis. These are all in a sense technical applications of the process of emergence, wherein that process is either modelled and simulated, or directly manipulated. The essay is rather looking at what we might call our cognitive relationship to emergence, at that part of our general thinking and reasoning that might reasonably be called emergent, and that does enable us to generate new life in our society, and to manage our interaction with our world in such a way that it leads to real emergence. This is of course what we normally describe as creative thinking. The essay is not, however, attempting to explore and unravel the full process of creativity and creative thinking, but instead focuses only on the role played in creative thinking by emergent mindsets and world-views.

There has actually been remarkably little academic research into creative thinking. Most has been depressingly lightweight, and curiously missing the adventure, scale and far-reaching grandeur of high-level creative thinking. Much of this research has focussed on either the psychometric ‘measurement’ of creativity, or on examining creative achievers’ lives, achievements and domains in search of their supposed secrets<sup>36</sup>. The result has been that until very recently the bulk of what has actually been published on real-world creative thinking has tended to be of the ‘popular’ ‘think/manage/create more successfully’ type of manual, describing exercises and techniques for so-called creative thinking that are in fact usually characterised by extraordinarily trite and banal outcomes. There is a huge number of such books, but thus far not one seems to have generated a major creative solution to any material problem that gives one even pause for thought, let alone impresses. This may well be due to the fact that virtually none of them seems to rest on any comprehensive, let alone reputable, body of cognitive, linguistic or epistemological theory. Also, very few of these manuals seem to have been written by people with much personal experience of genuinely creative thinking - at best they seem to be mildly imaginative adapters, tweekers and polishers who are often also excellent marketeers. This may well account for their common equation of creativity with local and small-scale adjusting and improving, and for their frequent neglect of ‘reality’, of emergence, and even of ‘big’ issues of creativity (and our interest here is of course very much in high-level creativity). What the most ambitious of these manuals do tend to have in common, however, is their focus on the role of mindsets and world-views. Their techniques almost universally instruct one to ‘get out of your box’, ‘think laterally’, ‘wear a different hat/shoes’ etc.<sup>37</sup>. Many of these techniques begin (not unreasonably) by showing the individual how his or her existing mindsets block out new ideas by enforcing all sorts of out-dated and ill-suited assumptions, and this is then followed by engineering a ‘breaking’ of the pattern or mould<sup>38</sup>. And of course one *must* ‘step out’ of a constraining mindset. As far as it goes this is in principle fine and fully in tune with what we have discussed so far, but with most creative thinking manuals that, in essence, is it - presented as being all that is required for full-blown creativity, it cannot help but lead to predictably dismal and chronically uncreative results.

Fatally, what all of these approaches consistently fail to grasp is the fact that one can never *just* ‘step out’ of a mindset or world-view. ‘Stepping out’ or ‘stepping sideways’ is merely the first and very small stage in the process of thinking creatively. It is indeed not even possible to *just* do that - one can only leave one mindset by actively stepping into another. A ‘non-world-view’ ‘just outside’ of one’s habitual world-view simply

does not and can not exist. Thought can only ever even begin to take place within a broader world-view gestalt or schema of some kind or another. Reasoning just can not happen outside of the structural frameworks of an underlying assumption, or set of assumptions, about reality. These assumptions range from one's 'macro' cultural-philosophical world-view (for example one's belief that the world is mechanistic, interdependent, animistic or whatever) to one's 'micro' personal-local assumptions and premises (for example one's ideas and subjective feelings about cars, cats, candlesticks or whatever, or for that matter about oneself, one's own feelings, one's own sense of significance). This indeed is the very essence and nature of thinking and reasoning - above all it needs to systemically unify, to occupy a gestalt view, concept or understanding that gives it place, order and meaning. We literally live by our underlying deep-level structural assumptions about life and the world, and *all* thinking and reasoning takes place within those frameworks. And this is precisely why it *is* so important to step out of old out-dated assumptions (and why it is also so difficult and frightening to do that), but also why to do that actually requires one to step into *another* such framework<sup>39</sup>. And herein lies, I think, the nub of the problem of creative thinking. What new mindset/world-view in any particular situation *will* lead to genuine emergence?

Everything that we know about creative thinking indicates that the mindsets and world-views involved are very far from being haphazard and chance, despite what many would have us believe. Looking at groups of creative thinkers, for example, those within a particular culture at a particular time clearly seem to relate their thinking and reasoning processes within world-views that are not only different to other more conventional contemporary thinkers, but that also share much in common with one another. One can look back and recognise, for example, that the Western Renaissance humanistic world-view was, in one variation or another, commonly engaged with throughout the dominant classes of Europe. Its fantastic success was not, however, simply because of that shared commonality of recognition, it was more because it was also in some way emergently appropriate to the time and place, enabling thinking to emerge in almost every area of European society that was, by any reasonable (although necessarily non-post-structuralist) standards, enormously creative. Three hundred years later, however, although those Renaissance world-views were still evident (indeed they are built in to the whole edifice of modern Western ways of thinking, and as such are therefore very much still with us), they had already lost their extraordinarily creative edge in favour of a world-view of natural power and energy, which was so intimately associated with the world-shattering developments of the Industrial Revolution.

It seems to be historically the case that the emergent qualities of world-views are indeed particular to time and place. It also seems quite evident that culturally endogenous world-views rarely work exogenously, when transplanted to another culture. And it seems that distinctive world-views *are* actively, commonly and synchronistically tapped into by the creative thinkers of particular times and environments, and that with hindsight those world-views can be generally and broadly described as 'objectively' more emergent than others of those same periods and places, significantly generating abundant new life and energy.

This is probably as far as one can intelligently pursue the attempt to define an 'objectively' creative meaning. Clearly there *is* objective human creativity, it is going on all around us in one way or another all of the time, it is simply that its precise

identification is to say the least elusive. Notwithstanding that, the presence of emergent world-views can nevertheless be reasonably clearly identified within most societies, embodied within most of their major contemporaneously creative achievements. This is not to imply, however, that within those respective societies there were no other creative achievements associated with a different world-view, nor that creative thinking within a particular emergent world-view could only be creative within that same time and place, nor that thinking and reasoning within an emergent world-view automatically leads to a creative outcome. Probably all that can be acknowledged is that high-level creative thinking brought to fruition in the real world is in fact quite rare, and that emergent world-views represent only one element (albeit a crucial one) within the very complex process of genuine creativity.

Accepting that it is evident at least in common sense experiential terms that we can broadly identify certain ‘macro’ world-views as historically objectively creative and emergent, and that these actually did ‘work’ at a particular time and place, the question might then be posed, what in fact do we actually *mean* when we talk of a world-view of, say, humanism, interdependence, hierarchy or whatever? Classical objectivists might say that these descriptions represent dynamic properties in the outside world that are wholly independent of us, in which case they should presumably always be equally emergent. As our experience indicates that this is not so, then by what process does the quality of emergence come and go? Relativists might say that these are clearly man-made concepts existing only within our own subjective human minds, in which case any one world-view should presumably be as equally potentially emergent as any other world-view, and probably equally at any time and any place. *Prima facie*, neither of these arguments would seem to be justifiable, nor do they match with our lived experience of creative thinking. Enactive cognition, however, does seem to offer the beginnings of a workable insight that goes some way towards explaining the meaning of world-views within a context that also allows for a quality of emergence particular to time and place.

Creative thinking is often thought of as plucking something entirely new out of thin air, so to speak. Within the perspective of enactive cognition, however, we can recognise creative thinking more as emergent adaptation, as tapping into the natural emergence that lies within what is already present. Enactive cognition defines the bringing forth of meaning from within the organism’s real-world interaction with the environment, and emergent meaning by definition must presume the existence of real-world emergent interactive properties. Those properties are clearly not, however, discrete isolated aspects of our environment, but comprise or represent complex relationships within it. In psychological terms it is clear that we will perceive these emergent properties as gestalts, as overarching patterns and schemas that present a unified whole image to us. Indeed we go to considerable (sub-conscious) lengths to force our perception of the world into acceptable gestalts, so the fact of the key role of these emergent gestalts-as-world-views is not really contentious. But it is very clear that in a real world the emergent world-view gestalt must also relate to real-world emergence in some way, so the question remains, what exactly is the emergent world-view describing?

The science of complexity provides some clues. It is becoming increasingly evident that complexity demands analysis at a macroscopic level, reflecting global features that cannot be understood by analysing the parts separately. Interactive properties seen in isolation tell us virtually nothing about global complex behaviour - in neural networks,

for example, self-organisation can be identified *only* at the global level. Indeed neural networks seem to function almost wholly through systemic world-building properties, linking, combining, associating and relating the discrete minutiae not only within deep fundamental and generic principles, but also within identifiable global macroscopic patterns<sup>40</sup>.

If non-linear global features are identified so very closely with emergence in the science of complexity, and if we can say that empirically certain world-views are emergent and others are not, then it is maybe not too fanciful to suggest that emergent world-views are indeed tapping into emergent global interactive properties and dynamics in the environment (remembering that we humans too are integral members of the environment). So one might presume that a working world-view such as, for example, Japan's broad concept of an interdependent world, does relate to real-world interactive properties and dynamics, in some way and at some level systemically linking and configuring a multitude of salient discrete primitives within the environment. And if that world-view of interdependence is also (empirically) emergent, that would presumably also indicate that that systemic global patterning is also itself emergent in some way (although how we might *know* it to be emergent is another matter)<sup>41</sup>.

Certainly, given that our interaction with our environment is, by any reasonable definition of the word, real, and given that the properties we perceive are real, those properties that are defined by a world-view will presumably likewise be real. Indeed without that reality our world-views would be little short of useless. So the suggestion is made that most practical world-views almost certainly are 'real', relating to and linking real interactive properties and dynamics, and that emergent world-views are likewise almost certainly 'real'. Which makes a nonsense of those creative thinking manuals that merely suggest little tricks of perspective or arbitrary changes of viewpoint, without acknowledging that creativity can only take place by relating to real-world systemic patterns of emergent interactive properties. World-views are far more than just cognitively necessary perceptual gestalts, they involve *real, emergent, global and systemic* features<sup>42</sup>. Complexity is even now barely understood, however, and the problem of how cognitive world-view properties actually operate emergently is surely a long way from being answered. (In fact the science of complexity should probably at best be regarded as providing only an analogy, albeit a compelling one, for understanding the nature, process and content of emergent world-views.)

Why one world-view works, in the broadest sense generating new 'life', and another does not, will probably never be answered. All that we can say with any confidence is that we know from experience that some world-views *are* temporarily and locally emergent, but that most are not. The more practical, and probably more urgent, question of how we come to know what world-view is emergent and when, is almost as tenuous and unsatisfactory. From the rather scattered literature that is available, it seems that most creative thinkers first have a 'gut' feeling, an awareness or intuition that an emergent pattern or dynamic exists, and that they then pursue their exploratory thinking processes within the loose guideline framework of that intuition<sup>43</sup>. There is a conviction, or maybe just faith, that the 'answer' is there to be found, although it is only dimly sensed and it is still without form or identity, hovering tantalisingly just out of reach. It seems that creatives dig out that answer by endlessly focussing, meditating, sampling and engaging with the various deep-structural patterns and subtleties in the respective situation until eventually they tease out some clarity or conviction regarding

what might be 'real' and emergent. It might seem somewhat unsatisfactory to rely on something as nebulous, deeply introspective and fundamentally questionable as intuition. Given that genuine emergence is probably as close to any source or spark of life and growth that we might find, however, it might be strange if we did not possess some kind of natural inner faculty or innate aptitude for intuitively sniffing it out. And experience indicates that most people are happy to attribute some kind of role to intuition in their everyday lives. Certainly, however uncomfortable this might be as an explanation, almost every great creative thinker over the centuries has at some time or another explicitly acknowledged a profound debt to his or her intuition.

### **Art and emergence**

Accepting, if we can, that creative thinking is dependent on identifying and relating to those dynamic properties and patterns that systemically characterise emergent relationships within a particular world, then clearly if we can locate and define such emergent relationships then that is of enormous significance and value to society. The problem is that such a world-view is by definition 'enactive', its systemic dynamic properties are 'in' the medium of our interaction with the world, and as such can be described only inadequately by conventional language. Language can define them intellectually, but not experientially. And of course as a gestalt that is ideally going to shape all of one's thinking and creating, an emergent world-view is particularly in need of being *experienced* as a way of directly and systemically 'seeing' and 'being' in the world. It is never sufficient to just intellectually 'know' a world-view, or to have it linguistically described to one - above all else world-views demand to be experienced. And this essay has of course argued that it is precisely art (and music and poetry) that has the probably unique capacity to articulate world-views in such a way that they can be universally accessed and experienced. The impulse to directly communicate this experience of intuitively identified emergent world-views is probably what drives and sustains most artists - indeed one might even say that it defines the artist.

In looking at art we can indeed experience the artist's world-view, or at least that world-view that the artist has articulated in the work. But of course that world-view content can differ enormously, as can the skill and power with which it is articulated. Art is nothing if not varied. The world-view might be 'macro', in the sense of being a major world-view embracing all or a major part of one's understanding of the outer world, or it might be 'micro', in the sense of being a view of a small, local or personal part of the world. Within this micro range of world-views, for example, many works of art focus very much on the individual's inner feelings and sense of identity. Some world-views, 'macro' or 'micro', are 'healing', or even 'spiritual', in the sense that their experience helps the individual to feel calmer, easier, or enriched and more complete, whereas others are 'educational' in the sense that they teach how the bigger outside world is. Weaker art articulates world-views more weakly, with maybe just an impression or 'taste' of the world-view. Probably all younger artists, by definition immature in both technical skill and vision, make work with a somewhat 'thin' or 'lightweight' content. Some art articulates a relatively banal or low-level content but very powerfully so and with much fanfare and conviction, often successfully reaching a large audience. And there is art that is either profoundly negative, depicting nihilistic or hopelessly depressive pictures of life, or even downright dangerous, depicting world-views that are violent, degrading or corrupting. And particularly in these post-modernist times, starved by a deliberate withdrawal of any universally accessible content, a lot of art is either swamped by an utterly introspective and self-indulgent content or completely

snowed under by cultural symbolism and referents, or by pastiche and parody<sup>44</sup>. It is also probably true that the vast majority of art has a content that is only barely emergent, if at all. And so on. None of which, however, in any way detracts from the enormous systemic power and influence that truly emergent art can exert, and that art at its best seemingly effortlessly brings into our experience.

The whole point of great art is surely that we can then potentially see and experience the world emergently for ourselves, with clarity, precision and directness<sup>45</sup>. The professionalism of artists requires that they remember that, at their most ambitious, it is this universal human need for emergent world-views that they are trying to meet. And in this context it might be fair to say that the more emergent the world-view that is articulated, *probably* the better the art. (And of course how we actually know the fact and ‘degree’ of that emergence with any reliability is another matter entirely, and comprises a legitimate subject for debate<sup>46</sup>.) Making art is a hazardous activity with no guarantees, and until the artist’s product is finally presented to its market and subjected to review and criticism there is no telling of its value to society. It is only at this point of exposure that we the viewers can first directly experience the world-view that the artist feels and believes to be emergent, and then decide whether it might be of any interest to us. And if we feel that it does offer something, we can then explore it, familiarising ourselves with it, and experimenting with it. We can at that point begin to engage with the world-view seriously and with intentionality, as a view of reality that is maybe capable of generating real life and emergence, and we can begin to think and reason within it as if our world *is* indeed that. And it is by experiencing this other possibly emergent view of reality in the art work, that we can if we wish start to shift our whole being towards the new framework, literally moving into a potentially more emergent and creative mindset<sup>47</sup>. And it is at this point that we might ourselves all consciously try to become more proactively and creatively emergent members of our society. And, no doubt, the greater the art, the more profoundly creative we might be<sup>48</sup>.

### **Conclusion**

This essay set out to argue that, contrary to what conventional post-structural theory claims, there *are* universally knowable realities, there *are* universally accessible contents in art, and there *are* objectively creative meanings. In other words, we humans can not only know and access objective realities, we can also intuitively know and access locally emergent realities. Relying principally on the phenomenological theory of enactive cognition, it has argued that post-structuralists have been barking up the wrong tree, denying the two things that make art what it is, namely denying both its universally accessible content and its genuine high-level creativity. But there is far more intimately known reality in human experience than post-structural theory ever allows, and art is far more intimately involved with reality and genuine emergence than any relativist could ever bear to contemplate. It is to the lasting shame of post-structuralists that their theories have helped contribute to the low and risible status of artists as self-indulgent and self-referential propagandists or, worse, as trivial (and usually not very entertaining) entertainers. Artists are, and should be recognised as, the intuitive shamans and magicians who show their societies emergent ways and paths, and as such they should rightly be acknowledged as an élite of enormous and crucial value to society. It is to be hoped that they come to be recognised as such, and allowed to operate as such.

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## NOTES

<sup>1</sup> This essay offers a theoretical background to the *Artworlds* catalogue of archetypal, emergent and cultural world-views. *Artworlds* uses contemporary visual art to enable users to experience and explore a wide variety of new and potentially creative deep-level world-view assumptions about the real world. It is intended for those working in cultural change management generally, but most specifically for those in areas of management that fit under the broad descriptive umbrella of action research and the so-called ‘learning organisation’ (see Note 34). It is anticipated that readers will be senior managers, management consultants and management science researchers. Although the essay is principally on the theory of art, that theory is inextricably entwined with, and is fundamentally relevant to, many important aspects of the learning organisation. In particular the essay seeks to map out some kind of explanation of how the world-views, deep-level mental models and basic assumptions that are the foundational building blocks of all learning organisations (and that are also articulated in art) actually function within our cognition.

These Notes are designed to briefly explain and flesh out the various subjects and ideas covered, and to enable the inquiring reader to get into the respective literature quickly and easily. The sources referred to are virtually all mainstream, well-respected and oft-quoted, and many are near the cutting-edges of contemporary philosophy and of cognitive science. That does not mean that they are unchallenged within their respective fields, or that there is not a vigorous and healthy debate concerning the interpretations of

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their various conclusions. Nor does it mean that my interpretations of those sources are agreed with by their authors. That is of course the whole essence and excitement of research - nothing is ever written in stone, and no doors are, or should be, closed.

I hope that this essay might also be of value to the general arts student and arts practitioner with an active interest in the theory of art, but who is probably uncomfortable with post-structuralist theories.

Please note that this essay does not comprise a philosophically argued theory of art. It is certainly, however, a synthesis of various theories that together comprise a proposition for a philosophically-based theory of art. The philosophically argued justification of that theory will have to wait.

<sup>2</sup> Post-structuralists' capacity to contradict their own logic is notorious. For example, they explain cultural or group behaviours as instances of shared cultural meaning, unconcerned that the existence of any non-arbitrary shared or participatory meaning is ipso facto grounded in some degree, thereby intrinsically undermining the proposition of an absolute subjectivity. It is important to remember that post-structuralism relies *absolutely* on the *absolute* unfalsifiability of *absolute* subjectivity.

<sup>3</sup> See Derrida [1976, 1978]. Derrida's great contribution to philosophy has been to demonstrate that neither the real origin nor the precise meaning of a text can ever be clearly explicit. Origins and meanings in a text always depend on past instances of the reader's interpretations, and on the historical and contextual relationships of the text to those other texts to which it is a response. And of course those texts in turn intrinsically refer back to and diverge from the meanings of still more texts. Any sense of 'true' meaning is always deferred, always resting elsewhere - meaning is never anchored, but is always 'slipping' from moment to moment. Derrida described this as *différance*, a play on 'différer', and meaning both to differ and to defer. The result of this difference and deferral of meaning is that the reader can by definition never fully and identically 'meet' with the 'real' intention of the author. (This essay argues that there is precisely a possibility of meeting at least the author's *product*, if not necessarily his or her intention, through the formal visual medium of art.)

The process by which *différance* is unpicked, so to speak, is called deconstruction. Deconstruction aims to demonstrate what the text 'does not know', to find some meaningful path through the open-ended indefiniteness of textuality. This is of course intrinsically doomed to failure as one can never reach any closure of knowledge. Deconstruction endlessly deconstructs deconstruction, in infinite regression. It is indeed a perpetually self-deconstructing movement that is permanently inhabited by *différance*. We can *never* fully deconstruct, and we can never not deconstruct, or not be deconstructed.

Derrida [1987] writes on art. Totally true to his own theories of meaning, he not so much describes a theory of art as writes from deep within the *différance* of meaning, playing endlessly with shifts and puns and word-plays of meaning. His writing draws one into that area of slippage, into a world where meaning is forever undefinable, seeming somehow and somewhere to be meaningful, and yet probably not. Reality recedes into the mist, and one is left snatching at mere ghosts of meaning which transmute or evaporate like will-o'-the-wisps in mid-grasp. Derrida conjures up a strange inner mental world of absolute indeterminacy and elusiveness which at its best offers a very real experience of post-structuralism as it is. Indeed he often comes across more as an artist than a philosopher.

Other leading post-structural theorists are Roland Barthes, Jean Baudrillard, Michel Foucault, Jacques Lacan, Jean François Lyotard and Richard Rorty.

<sup>4</sup> See Kuhn [1970]. This is the classic book on the relativist approach to science, and it has been enormously influential. It focuses principally on how contemporaneous beliefs and value systems influence the acceptability or not of a new scientific proposition. This point was powerfully made, and is now almost universally accepted. Kuhn's arguments for the necessarily relativistic assessment of change is more contentious, and is the focus of most opposition to his ideas.

<sup>5</sup> Most relativist writing on science has taken place under the banner of the sociology of science. Collins [1985] is a leading advocate of relativism who takes a fairly hardline relativist view of inductive reasoning. His scepticism concerns our perception of any sort of regularity at all, and he examines the process by which certain regularities, orders and sequences become scientifically 'validated'. His position is described in Barnes et al [1996] (p75) - 'Inductive confirmation requires that the confirming aspect of experience be "the same" as something that has gone before. But experience does not tell us what is the same as what; it is a matter for us how similarity is weighed against difference. Hence coherent judgements of sameness, and consensually agreed relationships of confirmation and replication in science, only occur when the judgements are institutionalized and ordered as social conventions.'

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Livingstone [1986] takes an extreme view on mathematics, claiming that there is no need even to rely on historical or cultural interpretations. He argues that any proof depends on the logic of that same proof to justify itself - in other words, a logical proof is in effect a study of its own system of proof, and therefore only serves to 'prove' itself. This results in an infinite self-reflexivity and circularity within any proof that implicitly undermines any kind of claim to a transcendent or absolute reality. This argument against the validity of a proof being used within its own proof actually has a long and respectable philosophical history, but Livingstone has extended that to include *all* mathematical proofs.

Livingstone's mathematical arguments are beyond the reach of non-mathematicians, but an accessible (albeit critical) review is Bloor [1987]. Barnes et al [1996], although committed to the institutionalised influence of societal and cultural convention in the sciences, argue a careful line between the excesses of the more extreme idealist accounts (of which in years past they themselves were well-known advocates), and the certainties of the classical objectivists, proposing an embodied biological naturalism in logical reasoning. Amongst other subjects they discuss the sociological dimensions of the mathematical proof for  $2+2=4$ , examining different interpretations and judgements of the validities of different proofs, and particularly of the underlying premises of those proofs.

Although there is general acknowledgement that culture can influence the acceptability of a proof, and even that cultural premises underpinning logical reasoning might differ, it seems that the relativists offence is to extend that to imply the subjective nature of *all* proofs. The fact that a proof is not transcendentally absolute does not therefore mean that it is 'wrong', nor that it is subjective and entirely in the mind of the individual. Also on mathematics, see Lave [1988] and Watson [1990].

<sup>6</sup> There is a huge literature on the objectivist approach to cognition. Some of the best, and most accessible, entry points are Fodor [1975], Churchland [1986], Jackendoff [1987] and Dennett [1991]. Gardner [1985] describes the historical and philosophical background to cognitive science, and provides an impressive overview of the various contributions and positions of the major players in the field.

<sup>7</sup> See Searle [1980].

<sup>8</sup> See Merleau-Ponty [1962]. Phenomenology describes the world as the field of experience within which we find ourselves. We can only ever define either ourselves or the world in terms of our experiential, and largely sensational, interaction with it. For a rewarding contemporary view of phenomenology that is closely tied to Merleau-Ponty's work see Abram [1996].

<sup>9</sup> See Maturana and Varela [1980] (the seminal work on autopoiesis), [1992] (the most accessible introduction to autopoiesis), and Varela [1979] (Varela's major work, but technical and mathematically oriented).

<sup>10</sup> The concept of self-organisation is explored in Jantsch [1980]. He draws heavily on the concept of dissipative structures, developed by Nobel Laureate chemist Ilya Prigogine (Prigogine and Stengers [1985]). Capra [1996] provides an excellent and accessible synthesis of dissipative structures, autopoiesis and systems theory, drawing attention to Bateson [1972] as a precursor of the application of systems theory to cognition, and specifically of the concept of the feedback loop.

<sup>11</sup> See Randall Whittaker's autopoiesis web-site for extensive discussion papers and a comprehensive bibliography, currently at <http://www.acm.org/sigois/auto/Main.html>.

<sup>12</sup> See the classic work by Varela et al [1991]. Also see Maturana [1988], on the epistemology and ontology of cognition. Varela [1992] comprises a brief outline of enactive cognition and the embodied mind. Other primary sources are Núñez [1995] and Thompson [1995].

<sup>13</sup> The embodiment of cognition is explicitly argued by leading neuroscientists Edelman [1992] and Damasio [1994], and most famously by linguistic philosophers Johnson [1987] and Lakoff [1987] (see Note 21). See also developmental cognitivists Thelen [1995] and Thelen and Smith [1994], anthropologist Csordas [1994a,b], and mathematics educationist English [1997]. Barnes et al [1996] argue for a partial embodiment in the sociology of science, as does Lave [1988] in mathematics.

Dery [1996] makes a fascinating critique of contemporary cyberculture, which he accuses of being in terror of the human body. This apparent fear of the body is characteristic of both classical objectivism (particularly so in cognitive science and AI, in the argued replicability of a disembodied human

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intelligence) and in post-structural theory (in the idealisation of an abstract self-contained and wholly subjective mind). This same terror might also partially be reflected in the academic community's widespread reluctance to engage with the possibility of the embodied mind. Lakoff [1987] (p355) alludes to the seductive call of a transcendental mathematics - 'Much of the appeal of mathematics for many practising mathematicians is the satisfaction of being able to *prove* which mathematical propositions are absolutely and ultimately *true*. From this point of view, part of the glory of being a mathematician is to be able to transcend one's humanness, to plug in to the transcendent rationality of the universe and discover some of its ultimate truths.'

Many writers have pointed out that deep-level roots of this flight from the sensual can be identified in the Christian concept of an other-worldly human- and Earth-independent God, later reinforced and codified by the Cartesian 'proof' of mind-body duality. These concepts contrast starkly with many non-Western world-views, and Abram [1996] offers a rich anthropological account of the sensual embodiment of the origins of human language, and of the gradual loss of that embodiment leading inevitably towards the tragedy and dangers of our (largely Western) modern disconnection from the natural environment. He persuasively traces the source of this Western disembodiment right back to the decline of the oral (and deeply embodied) Homeric epics, in response to the revolutionary challenges raised by Socrates' and Plato's identification of eternal, unchanging 'Ideal' forms that alone truly exist independent of Man. He particularly associates this 'new' abstraction of meaning with the increasing use of writing, progressively divorcing meaning from its embeddedness in corporeal and sensual (largely tactile, oral and aural) interaction with the environment, and encouraging a new awareness of an autonomous self that exists and thinks independently of the body (pp101-123). Tarnas [1991] explores at some length the profound impact of this dualistic Greek sensibility on early Christian thought. Berman [1990] describes the historical synthesis of the sacred and the somatic, contrasted with the Western culture's progressive denial of our physical senses over the last five hundred years, resulting in our increasing alienation from the spiritual.

The neuroscientist Colin Blakemore is quoted in Coveney and Highfield [1995] (p283) 'The interesting parts of the brain are driven by the senses, right through to language, which surely evolved from sensory categorisation.' And Taylor and Wacker [1997] (p243) quote a nice axiom from Alcoholics Anonymous - 'bring your body and your mind will follow'. In fact most schools of psychotherapy now acknowledge the at least partial role of an embodied cognition, albeit usually on empirical rather than rigorously and comprehensively theoretical grounds.

The rather more broadly 'ecological' or 'reflexive' idea that meaning lies in our mutual physical interaction with a real physical world is espoused by personal construct theory, see Kelly [1955], by ecological realism, see Gibson [1968, 1979] (see Note 18 below), by radical constructivism, see von Glasersfeld [1988], by ecological psychology, see Shotter [1984], and by the systems approach to the mind of Bateson [1972, 1979]. The cognitive developmentalist Kohlberg [1969] argues for a mutually interactive cognition, as do the evolutionary biologists Levins and Lewontin [1985]. In the later years of his life Piaget [1971] seems to have come to occupy a very similar position. Lincoln and Guba [1985] argue that the inseparability of knower and known within a real physical world demands a 'naturalistic' social science methodology that will engage the active participation of subjects in research projects that involve them. Harré [1986a,b] focuses on the philosophical problems of reconciling an independently existing reality with our epistemological access to that reality in a way that is neither representationalist nor relativist, as also do Dreyfus [1992] and Searle [1995]. Although Searle eccentrically chooses to describe autopoiesis as relativist, accusing Maturana of arguing that all reality is an exclusively socially constructed consensual domain, his otherwise excellent book makes the point that all other mainstream theories and approaches are *either* wholly representationalist *or* wholly relativist. (Autopoiesis is an extremely subtle theory, and it seems to be often misread as suggesting that the mind and body is a closed system *tout court*, forgetting the intrinsic embeddedness and structural coupling of the individual within a real-world environment.) Nagel [1974, 1986] tackles this same issue, identifying it as the philosophical problem of 'how to combine the perspective of a particular person inside the world with an objective view of that same world, the person and his viewpoint included'. Bohm [1985, 1992] embraces the same broad concept, but presents an isolationist quantum-based theory that fails to engage satisfactorily with any other significant scientific, psychological or philosophical research community. After more than a century and a half of neglect, even ridicule, Goethe's various theories of science and nature are at last beginning to be more widely recognised as prescient forebears of contemporary participative and ecological approaches to cognition - see Bortoft [1996].

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<sup>14</sup> Having teased Varela about the all-embracing catholic approach of enactive cognitivists in his review (Dennett [1993]) of *The Embodied Mind* (Varela et al [1991]), Dennett [1996] then co-opted many of the enactivist concepts and insights within his own representationalist version of cognition.

<sup>15</sup> See Hubel and Wiesel [1959].

<sup>16</sup> Hubel and Wiesel were awarded Nobel Prizes for their work on stimuli-specific neurons, and their papers are among the most important and most quoted of all sources in neuroscience. DeYoe and Van Essen [1988], and Livingstone and Hubel [1984] both quote large numbers of sources on different stimuli-specific neurons. Enquist and Arak [1994] even suggest that there are specific neurons that underlie our perception of beauty. Useful books are Hubel [1988], Young [1987] and Zeki [1993].

A great deal of the research on perceptual universals derives from or refers back to Jean Piaget, who is the unquestioned founding-father of developmental psychology. Piaget's central proposition was that children universally develop common perceptual skills, in exact chronological stages, due not to innate knowledge of some kind but to the fact of their commonly developing sensori-motor systems. Much of the recent research on perceptual universals has been based on cross-cultural psychology, comparing simple-level perception in different cultures, often with the declared aim of demonstrating that cognition is learned, and that Piaget was therefore wrong. Segall et al [1966] presented the most influential arguments for the cultural (and therefore subjective) nature of perception, relying for the most part on studies of optical illusions. There are also classic anecdotal evidences such as the reports of forest tribes unable to 'see' game in the open plain, and these were originally taken as evidence of environmentally-influenced perception. This relativist approach has generally been discounted, however, superseded by an acceptance of biological species-uniformity. (This is not to deny that there are differences in the sensitivities of individuals to different primitive properties. There is even evidence that darker pigmentation results in decreased sensitivity to blue light, and it has been suggested that such marginal differences can account for detected perceptual differences in respect of optical illusions - Bornstein [1975].) Piaget's reputation remains generally intact, therefore, and relativist attempts to demonstrate that primitive basic-level perception is subjectively and culturally learned are generally agreed to have been unsuccessful.

Most of the following sources would agree with Piaget's presumption that 'all knowledge presupposes a physical structure' - Piaget [1971](p2). They almost all focus on defining the distinguishing differences between the universal and the cultural, and on understanding the ways and mechanisms through which the objective and the subjective mutually interact.

On developmental psychology, see Butterworth [1981], Kohlberg [1969], Piaget [1955] and Wellman [1990]. On the perception of basic emotions, see Ekman [1982, 1992], Izard [1984], Johnson-Laird and Oatley [1992] and Russell [1991]. (More complex emotions are very clearly culturally influenced - see Harré [1986b].) On the perception of colour, see Berlin and Kay [1969], Hurvich [1981], Land [1983] Rosch [1978], Thompson [1995], and Thompson et al [1992]. On the perception of space, see Gibson [1968, 1979], Gregory [1990], Maturana et al [1972], Neisser [1976] and Piaget and Inhelder [1956]. On language, see Chomsky [1975], Jackendoff [1993] and Piaget [1960]. On cognitive universals, see Bruner [1986], Bruner et al [1966], Cole and Scribner [1974], Lloyd and Gray [1981], Piaget [1955] and Rosch [1978].

<sup>17</sup> Churchland [1986] represents a standard neuroscientific reductionist viewpoint.

<sup>18</sup> Although at first sight stimuli-specific neurons look as if that is precisely what they are, *tout court*, it is important to remember that the great bulk of such research has been carried out on anaesthetised animals in extremely simplified and artificial surroundings. Varela et al [1991] describe (p93) how in experiments conducted when animals are awake and in a more normal sensory environment, neuronal response often becomes highly context sensitive, dependent on other behavioural factors and stimulations. It seems evident that there is no unambiguous and exclusive one-to-one matching of neurons to individual distal stimuli, and that neurons therefore have to be studied more as members of large ensembles, within which 'every neuron has multiple and changing responses in a context-dependent manner'. The brain is a highly co-operative connectionist system both at local and global levels, and at its very simplest this means that if A connects to B then B connects reciprocally back to A. Many neurons clearly are stimuli-specific, but neuronal firing is not quite as straightforward and discrete as that might seem to indicate.

The point is also made in Hurvich [1981] that our capacity to distinguish differences or relationships between colours is vastly greater than our ability to type-identify them as atomistic discrete absolutes. (The same point is made in relation to aural pitch, in Burns and Ward [1982].) Our perception of categories, Rosch [1978], while allowing us to reliably (and universally) identify many different levels of category, also implicitly acknowledges our immense skill in identifying the subtlest differences of relationship between different properties, and our relative inability to type-identify them individually. Davidoff [1991] argues that we do not judge colour independently of the environment, but in relation to its shape, and to its spatial and temporal contexts, its purpose being principally surface property detection and object recognition, endorsing Land [1983].

The perception of colour is one of the most richly rewarding areas for cognitive scientists, and Thompson [1995] impressively and exhaustively explores the ontology of colour from an essentially phenomenological basis. He marshals a persuasive case for the embodiment of colour perception, specifically arguing against the representational and computational approaches to colour. He presents colour perception as fundamentally relational, context-dependent, interest-relative and categorical, and suggests that the biological function of colour is principally the identification of surface texture, but in such a way that it 'presents the world to the animal in a manner that satisfies the animal's adaptive ecological needs' (p203).

<sup>19</sup> Gibson [1968, 1979] has been enormously influential in the area of visual perception. For a representationalist critique of Gibson see Fodor and Pylyshyn [1981], and for a Gibsonian response to that, see Turvey et al [1981]. Also see Harré [1986a] and Thompson [1995].

See Varela et al [1991] (p203) for an explanation of the subtle but crucial differences between enactive cognition and Gibson's ecological realism. Both approaches deny the representationalist approach to perception, both arguing that perception is perceptually guided action within an environmentally mutual context. Gibson, however, claims that the environment is in fact independent, with ecological properties directly and optically detected, whereas Varela et al claim that the environment is enacted through *co-determined* physical sensori-motor interaction. Gibson's ecologically-mutual animal/environment properties are invariant, are 'grounded' in the real world, and are informationally encoded in the ambient light. Enactive cognition claims that the environment itself is enacted by the structural coupling of animal/environment, with the result that each animal will have its 'own' enacted real environment. In other words each animal perceives its real animal-dependent environment in its own-animal terms, not in the environment's 'own' intrinsic terms as Gibsonians would have us believe. And as such, in their attempt to uphold direct realism in the face of an isolationist relativism, Gibsonians side-step the animal-dependence of the environment and *in fact* end up perilously close to the representationalists, who would wholeheartedly endorse the concept of environmental invariance (while generally disagreeing with the concept of encoded ambient light).

<sup>20</sup> Damasio [1994] is an accessible neuroscientific account of a fully embodied cognition, including the intrinsic role of emotion within all cognition.

<sup>21</sup> See Lakoff [1987] and Johnson [1987]. After a slow start both of these books are proving to be increasingly influential. Related work, describing principally the spatial and spatio-temporal nature of language, is Langacker [1987, 1990], Mandler [1996], Regier [1996], Sweetser [1990], Talmy [1983, 1988] and Turner [1991]. Also see Harré [1986b] and Maturana [1978], and on a linguistic/semantic approach to mathematics, Lakoff and Núñez [1997].

<sup>22</sup> It should be emphasised that this proposal of afforded sensation is hypothetical, and is yet to be fully tested, explored or endorsed by other researchers.

<sup>23</sup> Varela [1996] argues that what he calls neurophenomenology offers a rigorous method and an explicit pragmatics for the exploration and analysis of conscious phenomena, but that such an approach needs to be cultivated within the wider cognitive science research community. See also Núñez [1997].

<sup>24</sup> See Young [1987](p123).

<sup>25</sup> It is interesting to note that the influential art philosopher Nelson Goodman [1984] writes - 'I am a relativist who nevertheless maintains that there is a distinction between right and wrong theories, interpretations, and works of art. I believe neither that a literary work is determined by the intent of the

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author nor that all interpretations are equally right;...I am an anti-realist and an anti-idealist - hence an unrealist.' (Preface). While sympathising with his position, I am still a little unclear as to quite how Goodman theoretically justifies the middle ground, or reconciles the contradictions.

<sup>26</sup> This is not to deny or decry the power, richness and enjoyment of symbolic and cultural referents in art. It is simply that, precisely because they are subjective, their meanings can not be controlled and manipulated in the way that universally accessible 'objective' meanings can. And this essay is about that robustly and reliably 'objective' type of content. It could also be argued that the more powerful the cultural referent, the more that is likely to reflect the local significance of that referent within a specific culture, and therefore the more inaccessible and less potent is its meaning to those of another time and culture. Cultural referents are not 'wrong' in any way, they are simply not constant, and not universally accessible.

<sup>27</sup> Fritz [1991] describes this simply and succinctly (p280) - 'In the arts, a creator is able to bring into being a separate and distinct universe with each individual piece she creates. The stronger the art, the more concrete the universe that artist has formed. You may or may not like the universe that the artist has created, but if the creation is successful, you will have a definite experience of that universe.'

<sup>28</sup> The notion of the *weltanschauung*, the world-view, emerged in the nineteenth century as a very broad descriptive framework for different philosophical approaches to life, for example distinguishing a materialist from a religious or an idealist approach, or a cultural from a historical or a scientific approach. In the early twentieth century the gestalt school of psychology was founded by Max Wertheimer, Kurt Koffka and Wolfgang Köhler. In gestalt psychology form or pattern is deemed the primitive unit of perception, and all that we can legitimately describe are the 'laws of organisation' underlying these forms or patterns. The mind is intrinsically a pattern-making and pattern-using system, and although many of the gestaltists' ideas and propositions were subsequently either disproved or superseded (and especially those relating to visual perception), the concept of cognitive patterning has been fully absorbed within mainstream psychology. The key argument of the gestaltists is that the nature of the parts is determined by, and secondary to, the whole. We do not therefore work atomistically, synthesising the elements from below-up, rather we examine the whole to discover its constituent natural parts. As such we perceive the simplest and most homogeneous organisation that will fit an organised coherent whole, the constituent parts of which are determined by laws or patterns that are intrinsic to the whole. In other words, we perceive the organisation that is structurally and synthetically most coherent.

Nowadays gestalts are referred to by any number of different labels - archetypes, constructs, frames, models, paradigms, patterns, scenarios, scenes, schemas, schemata, scripts, structures, systems, world-spaces, world-views, etc.. These gestalts can describe wholes from the smallest local and personal concept up to a culture's 'widest' fundamental understanding of how the universe is and how its members fit within it. But it is the large 'macro' patterns and paradigms, 'world-views' at one level or another and in one domain or another, that have given rise to particular interest from many different disciplines over the last two or three decades.

Much of that interest can be directly traced to Kuhn [1970]. First published in 1962, *The Structure of Scientific Revolutions* has been hugely influential across many different disciplines, not least in promoting the general concept of the paradigm and the 'paradigm shift' - the process of changing from one paradigm to another. Kuhn focuses exclusively on the paradigms of scientific communities. He discusses the role and nature of paradigms at great length, but although he often exercises considerable latitude in terms of his definition of what a paradigm is or might be, his central thesis in fact virtually equates the terms 'paradigm' and 'scientific community'. Despite his insistence on linking the paradigm with the scientific community, however, from very early on the popular notion of paradigms and paradigm shifts extended to loosely embrace *any* kind of community sharing not just a set of tightly defined and distinct beliefs and preconceptions, but also a set of very much more vaguely defined *world-views*. (This interpretation arose largely from within the relativist camp, delighted at Kuhn's implicit debunking of a rigidly classical objectivist science, and anxious to extend it across the entire social and cultural field.) In the Postscript to his second edition Kuhn elaborates on the definition of a paradigm, suggesting that a better inclusive term of description for his purposes would be 'disciplinary matrix', with three sub-divisions of symbolic generalisations, models and exemplars. Kuhn [1977] points out that he originally used the word paradigm principally in its philologically correct sense of 'exemplar', and he regrets readers' re-interpretations (or hijackings?) of paradigm into that broader meaning that he now describes as disciplinary matrix. It is clearly too late, however, and the new 'Kuhnian' meaning of paradigm as an all-embracing world-view of some kind has acquired its own status, and has become

applicable across all fields. Common usage now dictates that paradigms and world-views have become virtually synonymous, and talk of them has become everyday, even somewhat clichéd.

The difference between a gestalt and a world-view, at least in the context of this paper, is worth exploring. A gestalt describes a pattern or structure of meaning, and as such might be said to 'outline' that meaning, to circumscribe its respective boundaries - 'closing the circle' or 'making it whole'. A world-view seems to be far more akin to a common synthesis of properties, describing a complex property that is *systemic* to the respective world. To draw an analogy, a world-view might be said to describe holographic, or maybe more correctly *fractal*, properties - however 'deep' one delves the same world-view property will be synthetically and systemically present and evident. For example 'copse' is an adequate gestalt describing a small grove of trees, but its meaning does not inhabit all parts, elements, aspects and scales of that grove. But 'woodiness', 'livingness' or 'nature' *can*, for example, represent synthetic and systemic descriptions, valid and appropriate at all levels and in all areas. In the terms of and for the purposes of this essay, therefore, for a gestalt to be a world-view, whether 'micro' (such as, say, a family, a company or an industry) or 'macro' (such as British, Indian, Western, humankind or whatever), its defining property needs to be valid and appropriate *fractally* - immanent *throughout* the world that is bounded and described. Every major culture in history evidences precisely this quality, with its world-view property holding good synthetically throughout every area and level of the parent society. And this is of course precisely why it *is* a world-view, and why the respective culture's inhabiting principles *can* be identified, and can be used as a reliable interpretative framework for *all* of the culture's thought and behaviour. And this is why it is only synthetic world-view gestalts that offer systemic access to a culture, and through which one can actually experience a culture's cognitive framework.

Given that gestalts and world-views have for some time been a part of common parlance within, particularly, psychology and the social sciences, there is a generous literature that can be referred to. The following sources offer a reasonably broad scope of access to that literature.

On gestalts generally, see Bruner [1986], Bruner et al [1966], Gregory [1990], Köhler [1969], Neisser [1976] and Piaget [1955]. On universal and evolutionary world-views, see Bateson [1972], Foucault [1970], Habermas [1984], Lévi-Strauss [1966], Piaget [1977] and Wilber [1996]. On general cultural gestalts, schemas and world-views, see Casson [1983], D'Andrade [1981], Diesing [1972], Goodman [1984], Hanson [1958], Holland and Quinn [1987], Rorty [1980] and Schank and Abelson [1977]. On specific cultural world-views, see Doi [1981], Douglas [1975], Geertz [1983], Hall [1969], Kluckhohn [1949], Kroeber [1944], Peckham [1986], Shweder and Levine [1984] and Whorf [1956]. Tarnas [1991] is masterly in his tracing of the philosophical and religious ideas that shaped the Western world-view as it developed over the last three millennia. On scientific world-views, see Bortoft [1996], Harré et al [1985], Kuhn [1970] and Needham [1956] (vol 2). On 'emergent' contemporary Western world-views, see Bateson [1972, 1979], Capra [1983], Harman [1979, 1988], Jantsch [1980], Laszlo [1983], Naisbitt [1994], Prigogine and Stengers [1985], Schwartz and Ogilvy [1980], Tarnas [1991], Taylor and Wacker [1997], Toffler [1980, 1985] and Wilber [1996].

'Emergent' Western world-views often seem to congregate around holistic concepts such as interrelatedness, interdependence and connectivity. This has to some extent been associated with the widespread growth of Western interest in Eastern religions, but 'causes' are surely far more subtle than that. These concepts underlie many of the major scientific discoveries of the past few decades, and are intrinsically characteristic of complexity. The explicit imperative of Prigogine's work, for example, is that we must no longer focus on things but on patterns, and one could say that the emergent Western world-views all seem to be very consciously emphasising the development of patterns, relationships, links, connections and networks. Certainly, both economic and ecological developments are emphatically and increasingly pressingly confirming the global and synthetic nature of many of humanity's most pressing problems, and are very publicly drawing attention to the need to attend closely to the complex patterns underlying those problems.

Having claimed such a considerable literature on the subject of world-views, however, it has to be said that almost all of it is based within the realm of abstract concepts or wide-ranging and generalised interpretations. In particular there has been very little serious theoretical research on the detailed cognitive structure, process and role of world-views. Their all-encompassing and macroscopic nature seems to deter close scrutiny, probably with justification. Also, although patterns such as world-view beliefs and assumptions are the very essence of post-structuralism, most relativists interestingly seem to adopt an atomistic approach and refrain from looking too closely at wider and more synthetic patterns. There seems to be a profound reluctance to venture beyond the local and small-scale, maybe as a reaction against the blatantly colonialist attitudes of the recent past, or maybe fearing either the implied exercise of an outsider's judgement or the appearance of being prescriptive. And certainly there is a deep resistance to actually *acting* on any such perceived world-view. In the context of this essay's ambitions

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in respect of the cognitive theory and behavioural practice of world-views, the phrase ‘fools rush in’ does occasionally spring to mind.

<sup>29</sup> Our inability to see the world in terms other than our own has had considerable (and dire) consequences for intercultural relations. Until fairly recently it was received (Western) wisdom that primitive humanity passed through a pre-logical phase (this idea was particularly associated with the anthropologist Lévy-Bruhl). It then became accepted that rationality and logical inference is common to all humanity and to all societies, but that social and cultural world-view beliefs (both local and global) fundamentally shape that rationality. This led to attention being focussed on the distinction between false-but-rational and true-but-rational, between the subjectively (i.e. essentially non-Western and therefore ‘false’) rational and the objectively (i.e. essentially Western and therefore ‘true’) rational. This represents the perennially egocentric (and seemingly universal) conviction of the presumed exclusive ‘truth’ of one’s own endogenous world-view. This resistance most commonly comes into prejudicial play when a particular world-view happens to deeply offend Western beliefs, for example if it involves something such as dragons, witches or evil spirits. (Recalcitrant critics, incidentally, might be wise to recall firstly that we have our own quaint Western notion of a life everlasting at the feet of God in Heaven surrounded by angels, and secondly that there is in fact not a single culture that does *not* believe in a disembodied afterlife of some kind of another. There is also no proof whatsoever that such other ‘spirit’ worlds do not in fact exist.) These outdated chauvinisms are, however, thankfully beginning to die out, and the ‘truth’ or not of a respective world-view is no longer so much of an issue. A more contemporary (and more honourable) approach acknowledges that if a belief-system works for a particular culture then it works *tout court*. Indeed as most cultures’ world-views have in fact worked very successfully for centuries, often in extremely hostile environments, on purely empirical grounds they have real claims to ‘validity’. It is also irrelevant in this context whether the Western culture is ‘better’ or ‘more’ rational than others, whatever that might actually mean (although we have certainly proved to be more powerful than other cultures over the last 500 years). It has in fact been one of post-structuralism’s greater triumphs to stamp on this kind of Western colonialist judgement, and to assert the cognitive and rational integrity of other cultures. (Notwithstanding all this, however, the reality is also that many cultures’ traditional world-views are in fact failing them, in that they no longer seem to work. One of this essay’s principal suggestions is that a society’s artists could consciously play a major role in the identification of new emergent local world-views.)

For discussions of rationality within different world-views see Billig [1987], Brown [1988], Finnegan and Horton [1973], Harré [1983], Hollis and Lukes [1982] and Wilson [1970]. Abram [1996](p303) categorises his whole book as an animistic account of rationality.

<sup>30</sup> Having said this, we nevertheless can and do inhabit multiple world-views. For example, non-Western scientists and technicians by necessity have to adopt a Western world-view, which then has to run alongside their own often wholly contradictory endogenous world-view. Unsurprisingly it seems that this is usually neither easy nor particularly comfortable. There is also anecdotal evidence that interpreters can experience difficulties as a result of constantly shifting from one linguistic world-view to another. And less extremely, we are all familiar with the duality of our personal and domestic world-views contrasted with what are usually our somewhat harsher professional and ‘corporate’ world-views. But then world-views are by their nature both hybrid and in flux, and cognition is never as clear-cut, unequivocal and tidy as theory might tempt one to presume.

<sup>31</sup> Although rationality clearly underlies all of human thinking and behaviour, our understanding of it is extremely sketchy, not to say murky and confused. The confusion seems to hinge particularly on the relationship between logic and rationality. The concept of logic was invented by Aristotle, as a means of developing formal rules of inference that would thereby improve rationality. Even though such rules of inference are notoriously difficult to define, the apparent power and authority of formal logic has led to the all-pervasive presumption that logic in some way precedes and underpins rationality, as its ‘purest’ form, and that it therefore provides a *validation* of rationality that ordinary everyday reasoning does not possess.

The seductive temptation of an ‘absolute’ or ‘correct’ reasoning seemingly offered by classical logic has created enormous problems over the centuries that are only just beginning to be clarified. The supposed ‘superiority’ of logic has overshadowed the whole question of rationality, and until fairly recently has been the touchstone for most rational thinking. It is now widely accepted, however, that logic can be defined as the application of rationality or deductive competence to formal rules of inference, *and not much else*. No general principles of everyday rational thinking are known to be based

on such formal rules, and it is very probable that such formal rules exist only in the heads of logicians. For example, the application of formal logic to mathematics has produced stunning mathematical (and hence scientific) results, but the attempted application of formal logic to non-formal and non-normative contents has been conspicuously (and probably inevitably) unsuccessful. Rationality=logic is very clearly a misleading falsehood.

The allure of logic has always been its implication of some kind of validation of rationality, and the desire for that validation is as strong as ever. Even though the straightforward relationship of formal logic to rationality has been increasingly undermined, psychological researchers have still tended to try to identify some kind of formal system as a standard against which to assess rationality. (This may well be driven at least in part by their shared desire for a computational mechanism of rationality.) See Evans et al [1993] for a general introduction to the psychological approach to rationality.

This persistent siren-call of formal logic is somewhat curious, especially given that few theorists still believe in the existence of innate principles or rules of inference (as opposed to innate deductive competency - see Piaget and Inhelder [1958]), given that the internal processes and mechanisms of the deductive process are unavailable to us, and given that most also agree that we reason from premises, which are themselves semantic and not formal. Semantics enter the picture as soon as, and whenever, logic embraces a real-world content. This is so even in the phenomenon of syllogistic reasoning, which no semantic-free rule theory has yet been able to account for. Most rational arguments, however, hold within themselves semantic complexities of premise and assumption that are far greater than those in any syllogism, and which render any formal rule-based computational analysis utterly intractable. And it is axiomatic that unless some means of translating verbal premises into abstract syntactic structures can be produced, this situation will not change. And yet despite this common recognition that the semantic nature of rationality fundamentally limits the influence of formal logic, researchers are still trying to develop models of reasoning processes and strategies that will in some way formally validate them.

Such proposed psychological processes and strategies of reasoning, all presuming that we humans do possess *some* kind of a (fairly minimal) core of rational cognitive principles, and all designed from a potentially computational viewpoint, are the mental models of Johnson-Laird and Byrne [1991], the pragmatic reasoning schemas of Cheng and Holyoak [1989] and the social contract theory of Cosmides and Tooby [1992]. Johnson-Laird and Byrne [1991](p209) conclude that 'there *is* a central core of rationality, which appears to be common to all human societies. It is the semantic principle of validity: an argument is valid only if there is no way in which its premises could be true and its conclusion false'. In other words, an argument is rational if it holds good within the premises of its own terms or, if you like, within its framing world-view. And Evans [1993] has consistently tried to bring rationality back within the real-world arena in which it properly exists, namely in understanding and explaining the world, in problem-solving, and in decision-making. Which brings us full circle back to validity, but we are at least now talking of (a fairly relativist) *semantic* validity, which is a very long way from the classical objectivist concept of an absolute validity.

In the philosophy of science the question of the validity of rationality has likewise been problematic. Kuhn [1970] famously described the social and cultural attribution of validity to scientific theories and breakthroughs, and Feyerabend [1975] argued all-embracingly that all scientific theories were simply 'other' ideologies. Their arguments of the subjectivity attending scientific acceptability have been almost universally accepted, but the corollary to those arguments is that change is generally arbitrary, and that there is therefore no basis for any validation, either of the rationality of a theory, or of its relationship to either other theories or to the world at large. But of course if change is *not* arbitrary, and if there is in fact some way of 'proving' scientific 'progress', then all of a sudden we do have a basis for establishing a level of validity of rationality. The principal arguments all hinge on the incommensurability of different scientific theories, classically comparing Newton's theories with those of Einstein. In many respects different theories flatly contradict one another, and this is glaringly self-evident in the case of Newton and Einstein. Formed from different premises that are themselves incommensurable, it is extremely difficult for the theories to engage with one another on any common terms, or to find any basis for direct comparison. Barnes [1977] and Bloor [1976] of the so-called Edinburgh school were fluent advocates of the relativist approach, while in the other camp Lakatos [1978a,b] and Laudan [1977] were arguing that, despite agreeing with much that Kuhn says, there nevertheless are static and universal ahistorical models of rational science which offer absolute criteria of validation.

The various arguments are complex, subtle and often difficult to follow, but given the inescapability of the evidence that different beliefs lead to different premises of rationality, arguments tend to ultimately rest on the question of whether one can achieve some degree of validation at some point or another. Newton-Smith [1981] lays out the span of different arguments with clarity, and concludes that contrary to what the relativists argue incommensurability offers no threat to rationalist science, and that the validity

of one scientific theory does not preclude the validity of another. In what he terms ‘temperate rationality’ he seems to anchor the idea of validity in the simple experiential fact that most science actually works. This is in very broad terms not too far removed from Johnson-Laird’s concept of semantic validity, at least in spirit. He argues that definitions of ‘scientific’ rationality in this context are inappropriate, and that we should be more concerned with *explanations* of the beliefs and actions of those working in science. He puts forward a minimal notion of rationality in terms of beliefs explaining actions (regardless of whether those beliefs are ‘true’ or not), suggesting that rationality is validated as a result of the evidence of both goal-achievement and scientific progress. And he proposes that scientific progress is confirmed by evidence of increasing predictive and manipulative powers, which is usually clear for all to see.

This idea of the pragmatic (and generally progressive) validation of a rational process is gradually becoming accepted as a second-best solution, avoiding both the self-referentiality of relativism and the truth-demands of classical objectivists. Brown [1988] makes the point that for a conclusion to be ‘true’ it requires deductive validity *and* true premises. The former is relatively easy to ascertain, but the truth or not of one’s premises is almost always shrouded in doubt and mystery, and this leads inescapably to the possibility that all of our conclusions may be false. The identification of only true premises is not within our grasp, which means that all we have to fall back on is the rationality of the argument, grounded (or not) by the practical outcome. So the only criterion is whether or not the argument is verified by the results. Brown argues that as rationality provides *reasons* for accepting decisions, *judgement* based on such reasons necessarily has a role in determining the validity of an argument. The outcome of this is a ‘rational’ decision or belief, but one in which the distinction between reason and experience is distinctly blurred. The relation between rationality and truth is clearly much weaker here than within the classical model of rationality, but of course it is also far stronger than that within the relativist model. As with Newton-Smith’s pragmatic validation this reliance on judgement is a bit of a fudge and is not wholly satisfactory, but it is probably more or less what we have to settle for.

This kind of verificationism is becoming more widely embraced, although it has come in for particular contempt from Rorty [1980], one of the most influential American anti-realists. Basing his arguments on Heidegger, Dewey and Wittgenstein, he scornfully makes the point that an experientially ‘accurate representation of reality’ is merely a qualitative description that verificationists attach to any belief that has been successful in helping them to do what they want to do. Saying that rationality is in effect ‘whatever works’ becomes an empty and self-justifying circularity. Brown [1994] (no relation) is an extended riposte to Rorty, again heading for a middle ground somewhere between realists and anti-realists.

In Barnes et al [1996] the Edinburgh school also appears to have finally reconciled themselves with physical reality, arguing for a level of embodiment of scientific rationality within the natural world. The study and understanding of rationality at last seems to be drawing back to the real pragmatic and experiential physical world, which is probably where it was before Aristotle tried to improve upon it (which is not to suggest that the whole logical exercise was fruitless - clearly that is not so). But disentangling ourselves from the seductive tyranny of formal logic, with its dead-handed expectation of absolute validation, we can now try to focus on identifying semantically valid explanations of our beliefs and actions within the experiential world around us.

Rationality, however, remains bafflingly impenetrable, and is still far from fully understood. By way of example, having spent centuries cast as the apotheosis of irrationality, the intrinsic role of emotion within rationality is now attracting increasing attention. See Damasio [1994] for a neuroscientific analysis of emotion in rationality. Also on emotion and reason see Bateson [1972, 1979], Churchland [1996], D’Andrade [1981], De Sousa [1987] and Johnson-Laird and Oatley [1992].

<sup>32</sup> A classic example of a simple syllogism is ‘All men are mortal; Greeks are men; therefore Greeks are mortal’. The different validities of syllogisms in different cultures are due primarily to the non-universality of the Aristotelian definitions of quantifiers (such as ‘some’ and ‘all’) and propositions (in terms of subject and predicate). For example, in the Chinese language what we call nouns function more as verbs, and in the Japanese language emphasis is almost wholly on the predicate, usually omitting the subject altogether. The linguistic result is that the logical certainty of the Western syllogism inevitably becomes distinctly more tenuous and fragile. Needham [1956] (vol 2) discusses at great and detailed length the differences between Chinese and Western logic, and the different contributions to Chinese philosophy and science of Hindu and Buddhist logic. See also Matilal [1986] on categories and perception in Indian logic, and on the difficult question of how to guarantee the validity of a premise or generalisation. And see Fakhry [1983] and Hallaq [1993] on Islamic logic, both drawing attention to the key role of the epistemology of mysticism in logic, and of how that undermines Aristotelian logic. See

Scharfstein et al [1978] for a general comparison of Western and Eastern philosophies and logic, and for brief introductory overviews of different cultures' philosophical systems see Honderich [1995], and Solomon and Higgins [1993].

Some cultural logics defy any understanding - for example in Ireland: 'I'm thirsty, he said. I have sevenpence. Therefore I buy a pint... The conclusion of your syllogism, I said lightly, is fallacious, being based on licensed premises.' Flann O'Brien, quoted by Johnson-Laird and Byrne [1991](pviii). (This whole subject can be extremely dry, and this is probably the only example of a decent joke involving syllogisms.)

The cognitive nature of logic, and particularly of cultural logics, might well be impenetrable, but clearly it has much to do with unequivocal distinctions between different properties, objects, individuals and concepts. For example, the actual notion of Western-type distinction, category and separation, in terms of the uncompromisingly black *or* whiteness of either/or, plus *or* minus, attraction *or* repulsion, good *or* bad, spirit *or* matter, Man *or* Nature, me *or* you, has its origins in Aristotelian rationality. And without such an adamant dualism to underpin it, classical Western logic rapidly breaks down. (Hegel directly challenged the classical approach, pointing out that A can never be self-contained. Absolute distinction is impossible, because in the act of distinguishing A from B, A is distinguished from, and therefore intrinsically related to, B.)

In essence, many of the categories that seem natural and intrinsically logical to the Western mind simply do not even exist in many other cultures. These differences often relate very closely to and have their origins in the cultural notion of the 'self'. The Japanese concept of the individual, for example, is profoundly different to that of the West, being defined very considerably in terms of dependence on, or relationship to, others, as opposed to the relentlessly-pursued independence of the Westerner - see Doi [1981]. (One might well specifically challenge the dualism 'me *or* you', and ask what actually *is* an individual, and what on Earth is it that makes us think that any one of us is indeed an individual?) Other discussions of the self in different cultures are to be found in Csordas [1994a,b], Hallowell [1955], Harré [1983], Marsella et al [1985], Shweder and Levine [1984] and, from an evolutionary perspective, Wilber et al [1986].

Even modern mathematical logic abandons the (Western) classical objectivist claim to the abstract transcendental absoluteness of formal logical rules. Russell, for example, questioned classical mathematical proofs and found them to be profoundly unreliable, indeed fallacious. In particular he found that the truth natures of the axioms of geometry and arithmetic were not logically inevitable. He famously failed in his quest to identify absolute trivial-level axioms and a purely logical reason that could underpin mathematical proofs, and had to accept that all such logic ultimately relied on empirical theories, and on fallible explanations of the terms of that logic. He even gave up on proving that the axiom of reducibility is logically necessary or justifiable other than empirically, and accepted that there are no self-evident truths within logical axioms.

And Gödel's incompleteness theorem demonstrated that absolute limits exist in terms of what can be achieved by reasoning within a formal logical syntax. By expressing symbolic logic in terms of arithmetical numbers, in a sense producing an arithmetical code for logic, Gödel showed that there is no consistent formal system or model in which every mathematical truth is provable. Any such system involves an infinite regress in proofs, forever allowing in elements that might undermine the underlying propositions of the system. Almost the whole of modern mathematics, and particularly set theory (on which, for example, most computer science relies), is made possible and legitimised by Gödel's disproof of a universal and absolute logical certainty of proof (in crude terms, different 'sets' can rest on different axioms - single holistic axioms are no longer possible, thus allowing infinite numbers of sets to 'co-exist'). This does not, of course, mean that mathematical logic is therefore all of a sudden subjective and relative, rather that it now inhabits a slightly strange and indeterminate 'middle ground' that is real, but not 'absolute'. In other words the formal syntactical concept of a transcendental proof has had to surrender in favour of an empirical and semantic concept of proof. (Gödel actually assumed that there *is* a transcendently true mathematics - what he proved was that such a mathematics is *unprovable* by a single transcendent process of mathematical reasoning.) In the absence of formal 'proofs' of logical axioms, mathematicians have in the final analysis to ask us to rely on their 'intuitive' convictions of logical admissibility - see Lakatos [1978b](p23). The abiding mystery and intangibility of logical rationality remains intact, and we are forever forced back to look at the cognitive belief structures that underlie and define the basic premises of our rationality.

Staying with mathematical logic, Lakoff [1987](chapt.20) argues that mathematics is not the Platonic ideal of a transcendent rationality that is beloved of mathematicians, existing as a unique body of absolute truths that are independent of the understanding of any being. He challenges the classical claim that a single transcendently true mathematics actually exists, claiming (largely via set theory) that if there is

indeed any transcendent truth in mathematics then it is not unique. And if it is not unique then there can be no *single* logic, no *single* transcendent rationality. He then questions why mathematics ‘works’ in the real world, and why substantively different (but equally valid) branches of mathematics work (mutually exclusively) for different phenomena (e.g. for counting, measuring, calculating, shaping etc.). This refers directly back to the problem of how and why different sets in set theory actually exist, and Lakoff suggests that the answer might lie in the relation of those sets to tangible formal systems that have arisen from real human activities. He speculates that experiential realism might provide a solution based on cognitive structures, inherent within our pre-conceptual system and emerging from our bodily experience, such as metonymy, metaphor and image schemas.

Lakoff and Núñez [1997] explore this possibility of the embodiment of mathematical rationality. In an extended and surely seminal essay they lay the foundations, or at least sketch out the battlefield, for the development of what they describe as a cognitively based philosophy of mathematics. This involves nothing less than a fundamental re-thinking of what mathematics *is*, starting from the bottom up, and questioning what is actually meant by mathematical terms such as plus, minus, equals etc.. In a broad-ranging analysis of such terms they argue that ideas are intrinsic and central to mathematics, not extraneous, but that ideas cannot be rigorously translated into symbols within mathematics. ‘Neither formalism, nor constructivism, nor Platonism has any room for an account of mathematical ideas.’(p85). The fact is that ideas are not part of formal mathematics, and the link between symbols and the ideas they represent can only be seen as part of the study of the mind - ideas are part of cognitive science, not formal mathematics. The great task is therefore that of *understanding mathematical ideas*. The existence of classical ‘mind-free’ mathematics is demonstrated to be a myth, and a mind-based embodied and experiential mathematics is offered by Lakoff and Núñez as offering the beginnings of the possibility of liberating mathematics from its hegemonic attempt to seek absolute transcendent and literal foundations. They suggest that such a release will enable mathematics to be better understood (and, not least, better taught) in profoundly enriching ways, and will create opportunities for the emergence of even greater and more exciting new mathematical discoveries and theories.

The purpose of this sequence of extended Notes on world-views, rationality and logic is to demonstrate that there is no one transcendental logic, and that all we can say is that we apply what might be loosely called rational and logical principles within whatever world-view framework we choose to view the world through. By itself this indicates the inappropriateness of classical objectivist theories, which can only ever allow for one ‘right’ principle of rationality and logic. It also indicates the inappropriateness of post-structural theory. Apart from its failure to account adequately for shared world-views, post-structuralism allows multiple rationalities but then denies their ‘reality’. And of course if world-views are to be anything other than purely subjective fantasies, they have to be anchored in the real world at some point. In this context it is therefore probably not unreasonable to make the claim that the *only* cognitive theory that is extant, that does embrace multiple world-views, rationalities and logics within the scope of a real world, and that does offer a full-blown, comprehensive and successful theoretical explanation of the whole subject, is that of the embodied mind, as argued principally by Lakoff et al and Varela et al.

<sup>33</sup> This type of generally held and experientially valid belief, that yet does not rest on a logico-deductive theory, falls within the domain of folk psychology, which is still in some areas employed as a somewhat derogatory term for common-sense. Folk psychology describes the role of intentionality in cognition, and specifically the explanation that people act as they do because they have certain beliefs, wants, fears, dreams, plans or goals. The vocabulary of folk psychology is in fact now a distinctive feature of cognitive science, and it is increasingly accepted philosophically as having a proper and workable validity, not least as a result of the active role of beliefs in much scientific discovery. Stich [1983] argues that the status of folk psychology is in fact seriously questionable, both as a basis for rationality and in the context of cognitive science, in that empirically folk psychology is often unreliable and inadequate as an explanation. Certainly, the actuality is that people very frequently fail to act on their beliefs, and knowledge of another’s beliefs often fails to help one to anticipate or explain that person’s rational thinking or behaviour. Fodor [1987] argues from a connectionist and representationalist viewpoint in favour of folk psychology, while eliminativists (such as Churchland [1986]), who are usually hard-core neuroscientific materialists, contrive to deny its validity. A useful collection of the various different approaches is in Greenwood [1991]. Obviously, as this essay relies on the idea that our world-views fundamentally structure our thinking and reasoning, the subject of folk psychology is of some interest. As yet, however, there has not emerged any clear *philosophical* justification for the intentional role of beliefs, however convincing the empirical evidence is. (And there is even less theoretical understanding of the cognitive nature of the macro-beliefs involved in world-views.)

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I suspect (as per the final paragraph of Note 32) that the philosophical argument that does eventually justify folk psychology will prove to be closely related to the concept of the embodied mind.

<sup>34</sup> The concept of corporate culture has been around for some time, and there is now a huge and detailed literature concerning the influence of a company's group beliefs and mindsets on the style and structuring of its management. Schein [1992] is one of the most mature, sophisticated and clear descriptions of organisational culture, and of the nature of its management in response to change. Since the 1980's the corporate culture approach has become comprehensively absorbed within the 'popular' management market. The results have often tended to be somewhat atomistic, comprising lists of different strategies/mindsets for different circumstances. These lists of all too frequently very simple do's and don'ts seem to be the very lifeblood of the more popular management writers, the best of whom, the so-called management gurus, compile these lists under single-solution 'holy grail' headings such as 'chaos', 'excellence' or whatever, and sell their books by the million. Cross-cultural approaches have also increased general awareness of the varying influences on corporate management of different macro-cultures, and this has stimulated a whole new area of expertise - see Hampden-Turner and Trompenaars [1994], Hickson [1997], Hofstede [1980, 1994], Maruyama [1976, 1985] and Trompenaars [1993]. Many writers, however, still tend to focus on the different behaviours within different world-views, rather than on the basic principles of reasoning that underlie those differences of behaviour. They look usually at the surface-level patterns of 'what' and 'how' rather than at the deep-structure world-view 'whence'.

A highly sophisticated approach to the planned (self-)education and engineered (self-)development of corporate decision-making is described in Senge [1992] and Senge et al [1994]. Senge outlines how systems thinking can be applied by what he calls 'learning organisations' in the successful management of change. A learning organisation is one that recognises that appropriate planning in a constantly changing world requires a state of constant and conscious *learning*, at every level. It acknowledges that the old economic model within which management applies standard techniques can no longer work, and that the presumption that managers already possess the intellectual and technical skills to handle any eventuality is simply incorrect. The old prejudice that 'learning' comprises an admission of ignorance and hence incompetence *has* to give way to a recognition that all managers by definition have to focus on learning about both the nature and substance of new changes, and how best to manage them in the respective circumstances. And implicit within this is the proposition that any significant change is intrinsically systemic, and therefore demands a systemic response and adaptation. The concept of the learning organisation, wherein planning is recognised as synonymous with learning, has been extremely influential and is now well-established both academically and managerially, although actual practical application of the concept generally seems to lag some way behind the theoretical acceptance.

Chris Argyris is the seminal researcher of organisational learning, and has published on the subject for over twenty five years. His work describes 'action research', which is based around the concept that individuals construct their own realities through the use of theories of action (see Argyris [1980]). These are theories of what kinds of action will work within a given situation, and they function as mental models structuring and shaping the individual's thinking and behaviour within that situation. The essential problem that action research sets out to resolve is the dilemma that although we need systemic theories of action that can synthetically adapt to and stabilise a vast range of different actions and environments, once such theories become established we in turn become their prisoner. Locked within our own theories of action we are intrinsically unable to perceive the world within the terms of other theories of action, to recognise when our theories are in fact conflicting with other theories, or to recognise when our theories of action are not actually appropriate to a particular time and place. Action research encourages the examination and understanding of the diverse and conflicting theories of action within an organisation, and offers techniques and processes by which the members of an organisation can learn to develop more commensurable, and more harmoniously shared, mental models.

Argyris and Schön [1996] analyse the history, methods and practices of organisational learning. They question the widely presumed beneficence, feasibility and meaningfulness of much of what passes for organisational learning, and are somewhat cool in their assessment of Senge, accusing him of Utopianism. They demand a more rigorous and exacting approach to the practice of organisational learning, but although it is axiomatic to them that success depends on an organisational ability to see things in new ways, within new understandings and new patterns of behaviour, and on an ongoing basis as a kind of habitual in-house 'paradigm-breaking', their interest seems to be very heavily concentrated on the detailed processes of identifying differences within existing cognitive models and of defining their influence on action. They examine the difficulties of overcoming these differences, and focus in particular on the double-bind of how such attempts at organisational learning often produce inhibitory feedback 'loops'. This 'fundamental flaw' of organisational learning arises because, as part of the

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process of attending to their disparate mental models, organisations tend to develop group avoidance behaviours, adopting new consensual mental models that conspire to screen out precisely those areas of difference that most need to be reconciled and resolved.

Argyris and Schön describe this as the ‘learning paradox’, whereby uncomfortable areas of fundamental difference are not discussed, and are simply left outside of any new theory of action, locking the learning organisation back into a new cycle of frustrating non-communication and thwarted action. Maybe as a result of concentrating so heavily on the minutiae of differences of mental models, Argyris and Schön never seem to make the crucial leap into genuinely creative theories of action. All that seems to be on offer in practice is a more effective matching of *existing* mental models. This is of course in itself no mean feat and should not be diminished, but it clearly fails in terms of identifying *new* mental models that might creatively adapt to fundamental and radical change. They almost seem to have become victims of their own learning paradox, attempting to find agreement at such times of great change, but only within the status quo of established organisational beliefs and values rather than by breaking out into any kind of dramatically new creative territory that might be beyond immediate and local experience. Only in their final paragraph do they suggest that the envisioning and enacting of unfamiliar ‘rare events, possible worlds’ might be a fruitful area for future research.

Torbert [1987] adapts the ideas of action research, and re-packages them as action inquiry. He advocates the explicit testing of the appropriateness of an action, enfolding within the process an empirical measure of an outcome’s creativity and effectiveness. Recognising that feedback loops are almost inevitable within a matching of existing mental models, Torbert argues that an organisation needs to transform from being in the *right* (matching) frame of mind to having a *reframing* mind. This explicitly requires the introduction of radically *new* mental models that can actively break the tyranny of the old organisational paradigms. This sort of continual restructuring is an important step along the way towards genuine organisational creativity, wherein new mental models are identified that are particular and appropriate to time and place, and which are in turn replaced with ever newer models that are likewise particular and appropriate. Torbert [1991] draws attention to this faculty of constant renewal within what he calls the ‘self-transforming manager’, and this is echoed in Reason [1994], who describes processes of intuitive attentiveness that might lead to the identification of new theories of action that are more creatively appropriate to times of dramatic change. This call on the intuition is surely correct, and in fact this essay goes on to discuss the central role of the intuition in identifying potentially creative mental models. It has to be said, however, that in terms of it developing into the status of a standard management technique the intuition is almost certainly some way off in the future. (But it must also be acknowledged that many industrial and financial leaders are often anecdotally credited with highly effective intuitional faculties - the practice may well be preceding the theory, at least in respect of prescriptive leadership.)

Also recognising the limitations of merely adapting to what already exists, Schein [1992] and Senge [1992] insist on the necessity for learning organisations to engage with reframing and transformative shifts of mind, attitude and perception. Both ascribe primary significance to the basic deep-level assumptions that systemically inhabit an organisation, to the need to break free of those basic assumptions (which may well prove to be the most problematic aspect of change-management), and to the need to introduce radically *new* deep-level ‘learning’ assumptions into the organisational culture, usually prescriptively. This finally focuses clearly on what is surely the key problem for action research and learning organisations, namely *what* new assumptions? This translates into essentially three questions. How can we identify new basic assumptions, new theories of action, that might be genuinely appropriate and creative within a real-world time and place? Are these assumptions deep-level enough, or are they mere local or surface variations? And as mental models can they be accessed, experienced and engaged with successfully? This essay sketches out a theory of how contemporary art might offer some kind of partial solution to these three questions (most specifically within the context of the *Artworlds* catalogue of world-views). Indeed, that is the principal purpose of this essay.

In his book *The Fifth Discipline* Senge credits Arie De Geus with introducing him to the concept of the learning organisation. De Geus [1997] presents his very considerable and clear insights on corporate management. In particular, he describes how long-lived companies are all characterised by their ready accommodation of reality, that is, by their intelligent, creative and appropriate learning from, and adaptation to, change within their environments. A shared common understanding of corporate nature, values, purpose and world-view is typically endorsed and expressed throughout all levels of the long-lived company. De Geus was one of the originators of scenario planning, and Schwartz [1991] and van der Heijden [1996] (both former colleagues of De Geus) make the point that scenarios are designed not to predict the future, but to develop processes that enhance creativity, and that lead towards inventiveness and innovation in anticipation of possible future change. Scenario planners take it as axiomatic that the

patterns of future events and circumstances are firmly rooted within the dynamics of here and now. By attending to and projecting the possible developments of those dynamics we can hopefully identify their latent emergence, and can thus harness their potential (good or bad) in structuring our current decision-making more creatively.

For examples of related approaches involving the roles of world-views, mindsets, schemas and basic assumptions within organisational development and strategic planning, see Bate [1994], Brown [1997], Fairtlough [1994], Handy [1994], Henry [1991], Morgan [1989, 1993, 1997] and Sims and Gioia [1986]. Corporate and policy management futurists Naisbitt [1994], Schwartz and Ogilvy [1980], Taylor and Wacker [1997] and Toffler [1980, 1985] all describe the emergent world-views that managers must engage with in the coming years, with a remarkable degree of consensus.

There is as yet no clear philosophical explanation of the cognitive role of mental models and basic assumptions within learning organisations. As per the final paragraphs of Notes 32 and 33, when that philosophical argument does finally emerge it will surely rely heavily on theories of the embodied mind.

<sup>35</sup> Waldrop [1993] is a good narrative account of the history and background of the science of complexity. Coveney and Highfield [1995] comprises an impressive, comprehensive and accessible history of the theories and discoveries around complexity, especially in the areas of AI and connectionism. The biologist Stuart Kauffman [1995] is one of the original pioneers in complexity, and he powerfully and enthusiastically affirms the collective nature of vast realms of spontaneous emergent order. Commenting ‘Thermodynamics be damned’ (p10) he sketches out the potential of a deep theory of emergence for economics and management. Capra [1996] places complexity within a slightly different perspective, relating his systems approach more closely to work by Bateson [1972, 1979], Prigogine and Stengers [1985], and Maturana and Varela [1980, 1992].

<sup>36</sup> For the psychometric approach to creativity, see Vernon [1970]. For creative thinkers’ lives, achievements and domains, see Csikszentmihalyi [1988], Gardner [1993], Gruber [1995], and Weber and Perkins [1992]. For classic, and still fascinating texts on creativity, see Hadamard [1945], Poincaré [1952] and Wertheimer [1959]. Koestler [1964] takes an interesting but very speculative and maverick trip through his ideas on creativity. Hofstadter [1995] writes on the subject of creativity from a sophisticated computational and AI viewpoint, conspicuously avoiding the over-blown claims of so many of his colleagues in AI.

<sup>37</sup> Edward De Bono is the acknowledged doyen. A closer examination of his approach is quite fruitful in that it highlights the hitherto extraordinarily amateurish and haphazard nature of much thinking on creativity. De Bono [1969] proposed that networks of neurons are involved in thinking, and specifically in determining patterns of mind that are difficult to break. His ‘solution’ to the problem of ‘uncreative’ patterns was to ‘provoke’ them, for example by interjecting a random word, with the result that a new pattern would then emerge out of the disrupted equilibrium. (This was hardly as original as De Bono likes to claim - an extremely basic neural net machine had actually been built at Cornell University in 1960. Called the Perceptron, and representing the light-sensitive neurons in the retina, it had the capacity to mimic and adapt such neural networks.) What this actually represents is a very simple version of associationism, which is a long-established approach to creativity that presumes that all that is involved in creativity is a little stretching of the boundaries, or a re-arrangement of whatever is already there. It has much in common with the later post-structuralist approach to creativity, which is that essentially no such thing as genuine creativity exists, and that we are merely re-cycling past ideas, putting them in different orders, relationships or associations, thereby resulting in something ‘new’ or ‘different’ emerging.

De Bono tacked this associationist idea on to a gestaltist structural approach by invoking the patterns of neural networks, and then labelled the outcome ‘lateral thinking’. Since then he has built a hugely successful career out of re-cycling and re-presenting this single simple idea in literally dozens of books. To a large extent he was until very recently playing on an empty field, with no serious criticism or competition, and that lack of review pressure seems to have led to his invincible sense of being self-evidently ‘right’. What it rather indicates, however, is the extraordinary and shameful lack of interest shown by the academic research community towards matters of creativity. De Bono himself, however, is in no doubt about the significance of creativity, but although due credit must certainly and deservedly be paid to his solo efforts over the years to successfully raise the profile of creative thinking across the world, his estimation of his own work is, I would suggest, somewhat over-inflated. (For example, in the Introduction to De Bono [1988] he bemoans the fact that his insights and contributions are not more

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widely recognised by the research community. He then makes the extraordinary claim that his ideas on the provocation of neural networks anticipated Prigogine's 'later' dissipative structures, which were in fact first described in Prigogine [1967], and that his work also anticipated neural connectionism, even though neural networks have been actively researched since the 1940s. While modestly disclaiming any direct linear causality, he comments that both John Hopfield, one of the world's leading connectionists, and Murray Gell-Mann, one of the founding-fathers of the science of complexity, are 'well aware' of his work.)

Actually reading his original exposition of his ideas in De Bono [1969] merely serves to emphasise the inappropriateness of his claims. Nevertheless, the point is rather that his idea of easy-option heuristic creativity, and his distorted perception of the real-world nature and process of genuine creativity, is widely shared, not least by many in the research community. And what that tends to highlight is the gulf that exists between the associationist-relativists who regard creativity as a matter of accidental or random trial-and-error lucky-dip chance, and the realists who approach creativity with rather more respect, as something that is highly complex and sophisticated, and that is very much to do with tapping into or unlocking some key aspect or process of the real world, thereby accessing some element of the intrinsic emergently creative nature within that reality. The associationist-relativists seem to believe that we can all, with a little effort and a nudge or two, be 'equally' creative, whereas the realists acknowledge and honour the enormous struggles and great achievements of the relatively rare genuinely creative thinkers. Not surprisingly the former tend to be overly-satisfied with low-level and superficial novelty, whereas the latter exact very much more demanding standards and criteria.

Interestingly Prigogine and Stengers [1985] argue that it is processes associated with random chance that lead to higher-order dissipative structures, in other words that creative self-organisation happens spontaneously, *by chance* emerging from certain indeterminate conditions of chaos and disorder. (This view is contradicted by the science of complexity in so far as complexity focuses on identifying those *precise* conditions of chaos that lead to emergence. The successes of complexity scientists indicate that indeed there is a specifiable stability and order at that point of self-organising emergence.)

In management science, Stacey [1997] describes processes of self-organisation within the context of strategic planning. He outlines at length the circumstances of chaos, instability and breakdown that are the necessary preconditions for self-organisation, but then disappointingly leaves it at that, presuming à la Prigogine that creativity will then naturally, spontaneously and effortlessly follow. I agree that it is certainly necessary to inhabit such a space of disorder, as well as to face with a consciously open mind the imminent collapse and chaos of one's immediate circumstances. All creative activity starts with recognition of a breakdown at some level or another, indeed the absence of such disintegration would probably imply that there is no problem to be solved in the first place. But although obviously happenstance *can* lead to creativity, that is surely only very rarely and fortuitously so, and I would argue that suggesting that creativity spontaneously emerges by chance and of its own accord is naive verging on irresponsible. Fritz [1991] also describes creativity in a management context, lucidly and accessibly, but again stops short of identifying emergent realities, taking the view that creativity is 'easy'. But we must insist that all of the evidence of genuine creativity emphasises the focussed search for and unravelling of the 'solution', dragging it kicking and screaming out of the mist of confusion. Few genuinely creative thinkers are on record as having experienced spontaneous chance creativity - on the contrary, all seem to associate creative thinking with grindingly hard, long and lonely labour. (Some creative thinkers make it look easy, but scratching the surface always reveals punishing and painful work schedules. Almost the only exception to this amongst world-leading creatives seems to be Mozart.)

The point of this is surely that new ideas have to fit the real world. This means that they must not only adapt to the real current surface circumstances of the local environment, they must also tap into or reflect those deep-level emergent dynamics that are likewise real, albeit often only nascent. With hindsight not only do such dynamics seem to characterise all genuinely creative ideas, but the genesis of those ideas seems to indicate that early on the creative thinker has a very clear intuition of roughly where those deep-level dynamics lie, roughly what their particular and uniquely creative nature is, and roughly how they relate to the subject in hand. Creativity clearly depends intimately on identifying where real natural emergence lies within the chaos and disorder, and it is only through close association with the real dynamics immanent within the respective situation that there will be any realistic chance of generating genuine growth. Morgan [1997] (chapt 8) describes a very similar process from the perspective of complexity, outlining the need to shift 'attractor' patterns so that new ones might emerge.

Therefore work such as De Bono's *does* of course have a value, but in terms of genuinely creative thinking it addresses only a very early stage of opening the mind to other possibilities. That early stage is clearly essential as a prerequisite for creative thinking, as a step along the way, and as presented by De Bono it self-evidently excites and inspires many people. It is misleading, however, to pretend that it is

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creativity other than at a very simple level. Real creativity lives way beyond this, and relies on cognitively shifting into those rarefied and precious areas that can be described as dynamically emergent. In that context I would say that De Bono's and others' associationist approaches of course help broaden out the scope of thinking, and are therefore valid aids to a kind of intelligent thinking that might be described as simple elementary-level creativity. But high-level creativity is something else.

To paraphrase Einstein, with apologies, God does not play dice with emergence. Our task surely is precisely not to just cast the dice and hope to strike lucky, it is rather to go out and explore bravely at the farthest and deepest reaches, thereby hoping to discover where real emergence lies. Only then can we all drink from it, and all benefit from it.

<sup>38</sup> The psychological technique of brainwashing is the most brutal demonstration of how to break a mindset. Modern 'personal growth' movements such as EST (Erhard Seminars Training), and many of the proliferating cult sects, practice very similar techniques, with crude and often damaging results. Techniques such as NLP (Neuro-Linguistic-Programming) operate on similar but far safer principles. The current management vogue for adventure-pursuit courses reflects the same kind of interest in changing mindsets, usually by shock tactics. Many of the more quick-fix techniques are extremely risky, and casualties seem to be common. Psychotherapy of course deals precisely with these problems of 'stuck' mindsets, but it also acknowledges the considerable dangers of meddling with or breaking them, and good professional practice is specifically and rigorously geared to doing that gently and compassionately, helping the client to find new and safe mindsets that are above all properly appropriate to the individual. One potentially powerful technique that is aimed at resolving the difficulties of communication created by conflicting underlying mindset assumptions is Dialogue, wherein group participants attempt to find their way through discussion to a new common ground or shared meaning - see Bohm [1985, 1992].

<sup>39</sup> Hadamard [1945], Köhler [1969] and Wertheimer [1959] all refer emphatically to the need to search out new links, relationships and structured patterns of organisation. Poincaré [1952] describes looking for facts that lend themselves to generalisation, and to finding connections between precisely separate areas or domains, and to *selecting* a systemic pattern of those connections that are relevant.

Boden [1990] acknowledges that radical originality cannot be produced by the same set of generative rules and principles as underlie familiar existing ideas. Distinguishing between novelty and radical originality, she indicates the need to identify *new* generative principles.

Some of the more interesting recent writing on creativity harks back to the earlier work in gestalt psychology. This approach defines problem-solving as 'a search to relate one aspect of a problem situation to another, and it results in *structural understanding* - the ability to comprehend how all the parts of the problem fit together to satisfy the requirements of the goal. This involves *re-organizing* the elements of the problem situation in a new way so that they solve the problem...(the) emphasis (is) on *organization* - on how elements fit together to form a *structure*....' Mayer [1983](p35). Distinguishing between productive and reproductive thinking, he argues (p42) that 'the road to productive thinking is paved with discovery of the structure of the problem'. And see Dominowski [1995], Mayer [1995] and Finke et al [1992]; also Holyoak and Thagard [1995] on the role of analogy in creative problem-solving.

<sup>40</sup> See Capra [1996], Coveney and Highfield [1995] and Kauffman [1995].

<sup>41</sup> The systemic and synthetic existence of a world-view property does not of itself mean that it is also emergent. Most historical cultural world-views are no doubt still 'valid' - for example the (Renaissance) view of a self-determining humanity and the (Victorian) view of natural energy. It is simply that, for whatever reason, they are no longer actively emergent in the way that they once were.

It is probably also worth pointing out that world-views might well be synthetic, but that does not therefore mean that they also operate exclusively of all others. Although at some esoterically and inaccessibly deep level our world-views very probably are describable as genuinely and exclusively synthetic, vastly many 'smaller' or more 'partial' world-views function alongside and within that overall macro-gestalt. These are surely the minor or lower-order gestalts that relate to local patterns of dynamics in the world, such as for example chaos, cohesion or fragility, that are valid, real and co-existent, but that do not constitute the whole and exclusive picture. And this of course makes sense in that despite a general cultural conformity we also all have our own experiences and views of the world, and recognise many different 'sub' dynamics that are peculiar to us. There are infinite such dynamics in our worlds, all around us, some of which might be classifiable as emergent, most probably not. The point is that in the maelstrom of dynamics that *is* the world around us, our perception works in such a way as to identify

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patterns of dynamics, and then to ‘translate’ them into world-views, local and global. And we then selectively employ those world-views as gestalts to shape and structure our thinking and reasoning, attuning and aligning it as far as possible with those dynamics that we judge to be most salient, significant and emergent within different respective situations and contexts.

<sup>42</sup> These features, properties or dynamics that underlie world-views are frustratingly elusive and impalpable, and especially so in respect of those that are emergent. What these dynamics actually ‘are’, ‘where’ they lie, whether ‘in’ the external world, the internal human world, or in the general interaction and ecological medium of the natural world, whether they are ‘shared’, ‘local’ or ‘global’, and ‘how’ they operate, one can only speculate. And indeed a philosophical commentary on emergent dynamics would be a veritable nightmare, drifting way beyond the outer barriers of ontology and bumping into all kinds of strange ideas like ‘progress’, and into other far more frightening chimeras of teleology and cosmology. But there is also a sense in which any such answers would be incidental - the fact is that emergent dynamics are historically self-evidently ‘real’ in some sense or another, they are ‘out there’ (or maybe ‘in here’), and they do seem to carry within them the seeds (or maybe the fruits) of a sort of natural living creativity. And despite our inability to pin down their true natures and characteristics, we humans are nevertheless in practice remarkably adept at identifying them reliably (or at least viably), and at adapting our behaviour to them, naturally, appropriately and creatively. Selecting the ‘right’ world-view premises, the ‘right’ emergent dynamics, occupies a major part of our decision-making and rationalising lives, and it has to be said that we are quite good at it. Decisions in every area and every discipline and at every level succeed not by chance, but by fitting in reasonably accurately with the locally emergent dynamic realities.

<sup>43</sup> Almost all serious writers on creativity refer to the central role of intuition, and almost all creators acknowledge their debt to it, but without much elaboration beyond the fact of its deep and intangible mystery. Wilber [1996] and Wilber et al [1986] are alone brave enough to explore this potent area in any real depth, and without embarrassment, in particular discussing conscious access to the intuition via some of the more esoteric meditational disciplines

<sup>44</sup> As I have already said, this is not to say that such work is not interesting or rewarding. Often it does indeed have much to say about symbols and subjective meanings, and post-structural theory is adept, and ideally suited, to analysing and interpreting that. It is just that ‘objective’ art has a different kind and level of content, with different applications, and that creates a problem when the very possibility of such a content is categorically denied by post-structuralism. Much of the criticism aimed at post-structural theory might be defused if this distinction could be recognised and accepted by relativists, namely that there is indeed a thin layer of objective knowledge that underlies subjective knowledge (remembering that the vast bulk of our daily perceptions and cognitions is of course precisely subjective). It is in that context that I regard post-structuralism as a *primary* basis for describing and analysing the subjective culturality of life in general, but as only a *secondary* basis for describing and analysing art.

<sup>45</sup> This is always, of course, dependent on us becoming perceptually discriminating viewers, developing our skills at filtering out the ‘subjective’ from the ‘objective’. This essay is arguing that those skills are not at all as rare or esoteric as one might be tempted to believe. Above all, what is required is the same degree of attention and respect that one would offer to any other person who is attempting to communicate with one. Courtesy (and efficiency) usually requires that we attend to what is actually being said rather than what we might like to think is being said or meant, and regardless of what we might personally and subjectively think *about* what is being said.

As an aside to this, art often carries a curious potency within peoples’ lives. It seems to be the case that, for many, art represents an acceptable and safe means of experiencing emotion, sensitivity, imagination, spirituality and mystery. It seems that many people invest much of their sense of inner feeling self in their appreciation of art, maybe uniquely in their lives. Consequently any perceived challenge to their very subjectively meaningful experiences in art is often regarded as deeply threatening. Certainly, explaining to such people how art works and what it articulates frequently seems to be regarded as an outrageous affront to their sensibility, and can arouse intense fear and hostility. It is as if their sense of emotional identity and autonomy is being undermined in some fundamental way. Without wishing to disparage or devalue this in any way, it is also to be hoped that such people can come to accept that artists are in fact articulating very precise and complex meanings in their work, and that they are there to be experienced *as such*. Art is not just a pretty screen or mirror on which we can project our personal feelings, even though many might choose to treat it as such. I would ask them to consider the

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possibility that a work of art might in fact hold even greater joys and riches if they could only trust, and look objectively and dispassionately rather than respond purely subjectively and emotionally.

<sup>46</sup> Again, it is perfectly legitimate and appropriate that post-structural theory be applied to a discussion about what content in art is potentially emergent and what content is not, why, and where it might or might not lead. The point is that post-structural theory is wholly and specifically designed to approach the indeterminacy of the *subjective* (which is a vast part of our lives), and it is inappropriate *only* for that (far smaller) part of our lives that is concerned with cognising the universally accessible. Many ‘soft’ relativists indeed acknowledge the formal visual content of art as having some kind of objectivity (see Note 24 above), but they often either marginalise that as being of little interest compared with the subjective cultural content, or take the position that objective and subjective is all inextricably mixed up together. This essay is attempting to argue that the ‘objective’ content of art in fact has far more power and significance than has previously been credited to it, and furthermore that it is also readily and easily accessible.

<sup>47</sup> This is of course the thinking, and the purpose, behind the on-line *Artworlds* catalogue of art-based profiles of cultural change in different countries. It is specifically designed as a tool to enable managers to understand and engage with the emergent deep-level dynamics of cultural change, and to facilitate the adaptation of their management techniques and processes to that change.

However unsatisfactorily, it does seem that our access to emergent mindsets is probably ultimately through our intuition, and any enhancement of our intuitive faculties will no doubt be beneficial to us both personally and societally. It is interesting to speculate that, whereas art hitherto has articulated very wide-scale, almost idealistic, macro world-views, as concepts of how the broader emergent world is, in future art might usefully articulate narrower more situation-specific intuitions of emergence. Such an art might, for example, articulate an appropriate emergent world-view for a specific international conflict, for a national or regional economic crisis, for a domestic agricultural problem, or whatever. If there is indeed such a state of affairs as objective emergence, then presumably any situation could be so defined, in terms of where within that situation genuinely emergent dynamics might be identified (or at least where more emergence than not might be identified). Intuition might well become the means by which we consciously identify detailed patterns of emergence in our lives and our societies, and art might well become the means by which those members of our societies who are artists consciously communicate such insights and understandings to the rest of us.

As something of an afterthought it is probably apposite to point out that, this essay notwithstanding, the role of art is of course not confined to management situations in the material world out there. Indeed probably the majority of contemporary art is far more focused on the world of the inner individual. There is enormous potential for using such ‘personal’ art in the exploration of self-development. The *Artworlds* format could be readily adapted to enable users to experience and engage with emotions such as joy, compassion, love and trust, even with such realms as destiny, spirituality and the soul. In many ways one could argue that it is more urgent for individuals to explore personally emergent mental models and world-views than it is for organisations to explore societally emergent ones. After all it is individuals who constitute those organisations, and the ‘healthier’, wiser and more grounded they are, the better it will be for society at large. An excellent and inspiring description of the discovery of the self within a corporate context is Whyte [1994].

<sup>48</sup> This ultimately unavoidable question of what constitutes ‘great’ art is, to a post-structuralist, the ultimate stake-burning heresy. Recklessly grasping that nettle (or maybe just too tired to continue dodging the issue) I would say that the answer to that must start with (tentatively) defining the difference between the artist and the non-artist.

We all by definition have world-views of some sort or another. The artist’s business, however, is to articulate his or her world-views as world-views *tout court*. The non-artist’s world-view, on the other hand, is usually deeply embedded and embodied within his or her work, the point of which is to achieve other ends rather than the *communication* of that world-view understanding. The artist’s role and purpose is, I would suggest, exclusively that of world-view communication.

If the artist’s defining purpose is to communicate his or her understanding of the dynamics of reality, and accepting for the sake of argument that the defining basic skill of the artist is to articulate that understanding as a universally accessible content within the work, I would go on to suggest that the defining qualities of the ‘great’ artist are threefold. Firstly, the great artist will be artistically technically skilful, and will articulate a content loudly and clearly. Possessing the most powerful and precious insights into life is of little value if one’s voice fails to articulate and carry. Secondly, that content will be

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non-trivial and non-superficial but will have complexity and depth, and will hold within it some seriousness of philosophical meaning. This might sound pompous and boring, but remember that we are talking here not of entertainment but of 'great' art. And thirdly, and most contentiously, that content will also be emergent. Unfortunately, however, the fact or not of emergence can only really be confirmed with hindsight, and even then only very cautiously so. Probably all that can be said with any confidence is that when we do look back at the 'great' artists of a particular period, we can recognise that the world-views articulated in their work were indeed also reflected and manifested in the most creatively emergent developments within their contemporary society.

In terms, however, of identifying a 'great' contemporary artist, life is far more hazardous. At the risk of answering this negatively, what can be said with some certainty is that many currently highly reputed artists fail to fulfil all three criteria. Powerful and accomplished high-volume technical skill allied with a seductively attractive, fanciful, melodramatic or even comfortingly familiar or sentimental content often passes for depth of meaning and emergence. Such loud but essentially lightweight (or out-dated, or just inappropriate) art is intrinsically disappointing, as one is left feeling that despite such a high level of skill with the capacity to communicate something significant, the artist is actually selling the work and us short. As has historically so often been the case, it may well require the passage of many years before those truly great artists of our time rise up clearly above their peers in terms of their public recognition. And of course conversely, and again negatively, we will also then see more clearly how very many artists of our time were not at all emergently creative. This is hardly a satisfactory answer, but lacking anything better we shall in the meantime just have to exercise our best and most critical judgement.

What will also be certain, however, is that those artists who are eventually acclaimed of greatness will also be seen not to have been alone in their identification of deep and meaningfully emergent understandings of reality. Artists are pioneers only in so far that they *communicate* their particular understandings, in a medium that uniquely allows experiential (and universal) access. Many philosophers, scientists, educationists, financiers, industrialists and commentators are all likewise identifying and manifesting similarly emergent ideas, but they are bringing them into the reality of our everyday contemporary world in other ways. Artists have no monopoly of technical skill and expertise, or of depth or sensitivity of experience and expression, or of emergent and creative insight. Emergence is emerging literally all around us, and artists comprise just one group among many, albeit an important and a unique one, who are all focussed on the excitement and adventure of that emergence.

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