The OST view of people: ecological learning

Merrelyn Emery,

February 2025

Another powerful concept explaining an important human ability is called ecological learning or direct, unmediated, perception. It is our ability to learn directly from the world around us including the human or social realm as well as the physical environment. The foundation paper for this concept, *Educational Paradigms: An Epistemological Revolution*, 1980, by Fred Emery can be found under Communication, perception and the media.

The following discussion is an update of that paper with evidence from a variety of fields. In the second part, we examine just how this concept is used to enhance the utility and value of all our methods and practices. Putting it to work not only increases the validity of the conclusions reached by participants but also increases their confidence in them and their ability to do such work. This is a boon in a world where so many have been damaged by their experiences in the educational system, which generally devalues ecological learning, and by being put down by some experts and other overbearing elites.

Ecological Learning: The Epistemology Of Direct Perception And Knowing.

The Theory

There are many references in the literature to concepts such as 'double loop learning' while (Argyris & Shon 1978 & 1996) and Flood & Romm (1996) have now proposed 'triple loop learning'. The questions are "are we doing things right, and are we doing the right things, and is rightness buttressed by mightness and/or mightness buttressed by rightness? (pxii). These three questions cover respectively "structuralism", "intersubjective decision making" and "might-right management". Triple loop learning is the "new style of practice" (p52), an emancipatory practice, accompanying the metatheory of diversity management. This more comprehensive schema is a better approximation to 'learning to learn' or the emerging learning paradigm. But as we have seen above, this holism is a closed system approach which has no theoretical answer to the question of how we learn from the environment as the theory doesn't contain one.

This is the other dimension of 'learning to learn'. How we learn from the environment obviously involves the perceptual system. Without knowledge of this dimension, we have less than a complete answer to the question of 'are we doing things right?' In open systems theory, this dimension is called 'ecological learning'. It underlies our practices.

Antecedents to Ecological Learning

There have been many approximations to the core of ecological learning. Dewey, building on the work of Charles Peirce and William James, endeavoured to evolve an epistemology which could guide educational reform for a participative democratic society (Rorty 1991: 6). In his 'Postulate of Immediate Empiricism' (1905) "things are what they are experienced to be" (McDermott 1981: 242). He rejected the sterile 'intellectualism' of the 'idealists' and also the 'spectator' or representationalist theories of knowledge. Dewey 'naturalized' epistemology (Margolis 1977: 123) by invoking a "biological-anthropological method" and separating truth from validity. He replaced 'knowledge' with "warranted assertibility" as he emphasized that "what we come to believe is contextually warranted by the process of

inquiry itself, that it cannot be specified as knowledge independently of that relation" (Margolis 1977: 132). He took a very positive view of science (Olafson 1977:173) and his own theory of inquiry did not renounce scientific method. Indeed he insisted that "there is no sharp dividing line between common sense and science" (Dewey 1938: 71) and he struggled to overcome the major difficulties inherent in reconciling a knowledge abstracted from its concrete base with his bent towards integrating knowing and doing. He contrasted primary or direct experience with secondary or reflective experience whereby "the subject-matter of primary experience sets the problems and furnishes the first data of the reflection which constructs the secondary objects...The objects obtained in reflection **explain** the primary objects, they enable us to grasp them with **understanding**, instead of just having sense-contact with them" (Dewey 1958: 4). This sequence shows that he accepted the atomization of the senses and their delivery of fragmented knowledge, in other words, the mechanistic theory of perception. While being an advocate of experience, he did not, therefore, encompass a form of perceptually based knowing which delivers immediate understanding without its secondary, removed reflective phase. In addition, he never doubted that there was "a valuable legacy of knowledge and culture to be transmitted" (Olafson 1977: 184) and he was left with the necessity of instruction. His position on a direct perceptual realism remained, therefore, essentially ambiguous and ambivalent. However, the formative work of the early pragmatists and their successors, has contributed to "a sea change" in recent philosophical thought (Rorty 1990: 5), preparing the ground for theories based on a unitary perceptual system. For example, De Bono (1976, 1979) has long contended that practical creative knowing or thinking is a function of perception.

Polanyi evolved an epistemology of 'tacit' knowledge which rendered bare the claims of objective science and the paradigm of learning on which such claims were premised. "Knowledge is an activity which would be better described as a process of knowing" (Polanyi 1969: 132) and that "the structure of scientific intuition is the same as that of perception....Intuition is a skill, rooted in our natural sensibility to hidden patterns and developed to effectiveness by a process of learning" (Polanyi as above: 118 and see also 1958). Research then becomes simply a more intensely dynamic form. But tacit knowledge as personal knowing is an indwelling and a participation, a logic of perceptual integration. Learning essentially then for Polanyi is the personal experience and training of perception. Thus we may have tacit knowledge, the content of which we are unaware but which may be discovered by an act of perceptual integration. Following this line of reasoning (by tacit knowing) Polanyi arrives at the opposition of tacit knowledge and explicit knowledge, that of objective science. But "while tacit knowledge can be possessed by itself, explicit knowledge must rely on being tacitly understood and applied. Hence all knowledge is either tacit or rooted in tacit knowledge. A **wholly** explicit knowledge is unthinkable" (Polanyi as above: 144).

These brief summaries do no justice to the richness of these positions but highlight the concern that concepts of learning and knowing must be rooted in the individual perceptual activity which is itself embedded in the flow of the field. None have, however, achieved the clarity of Heider's formulation or unfolded as profusely as the work of the Gibson School. Drawing originally on the Gestalt School and Heider, this group has developed a coherent conceptual framework and programme.

Brief summary of Educational Paradigms with additional evidence.

Inexorably over the last twenty years, the debate about the future of education and learning has heated up. In attempting to understand this debate, Fred Emery (1980) came to see that

the conflict was between two quite distinct sets of epistemological assumptions. The first is a central strand in the development of Western and scientific culture and is the basis of our education system. The second is evident in the theories of De Bono and Polanyi, takes its core understandings from Heider & Gibson and in its practical application represents the alternative that has long characterized adult/continuing education. The choices are spelt out below. This section also serves as a summary of the above discussion of direct knowing, ecological learning. Figure 1 presents the choice.
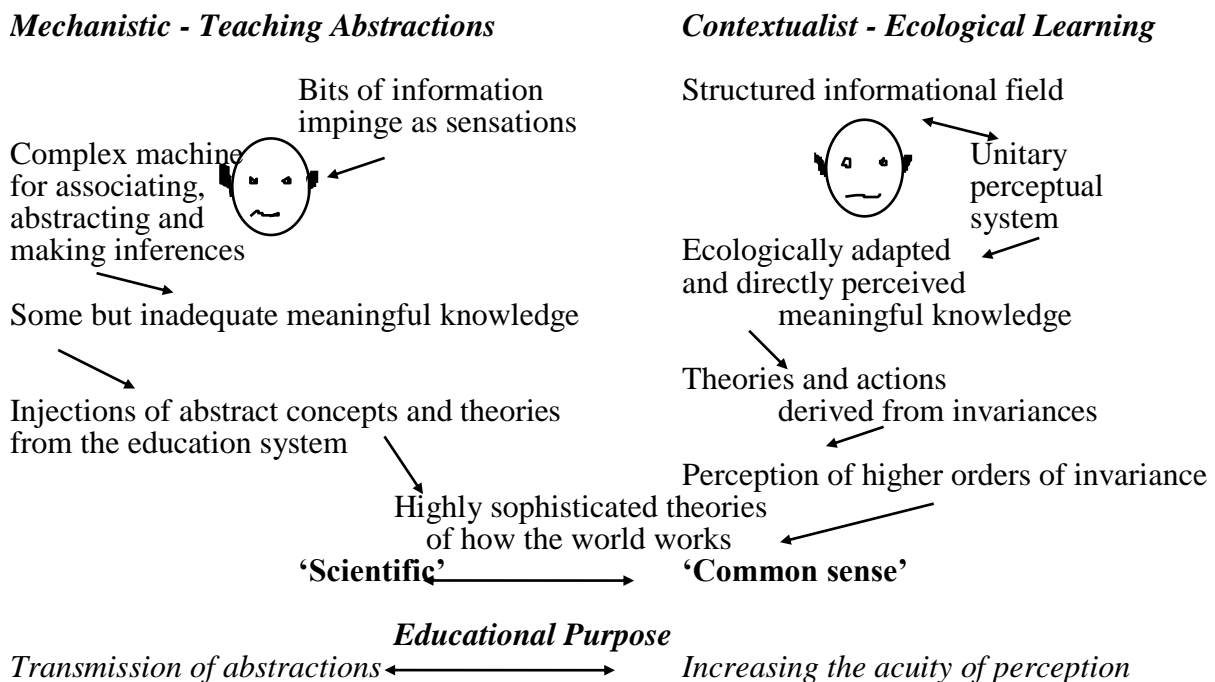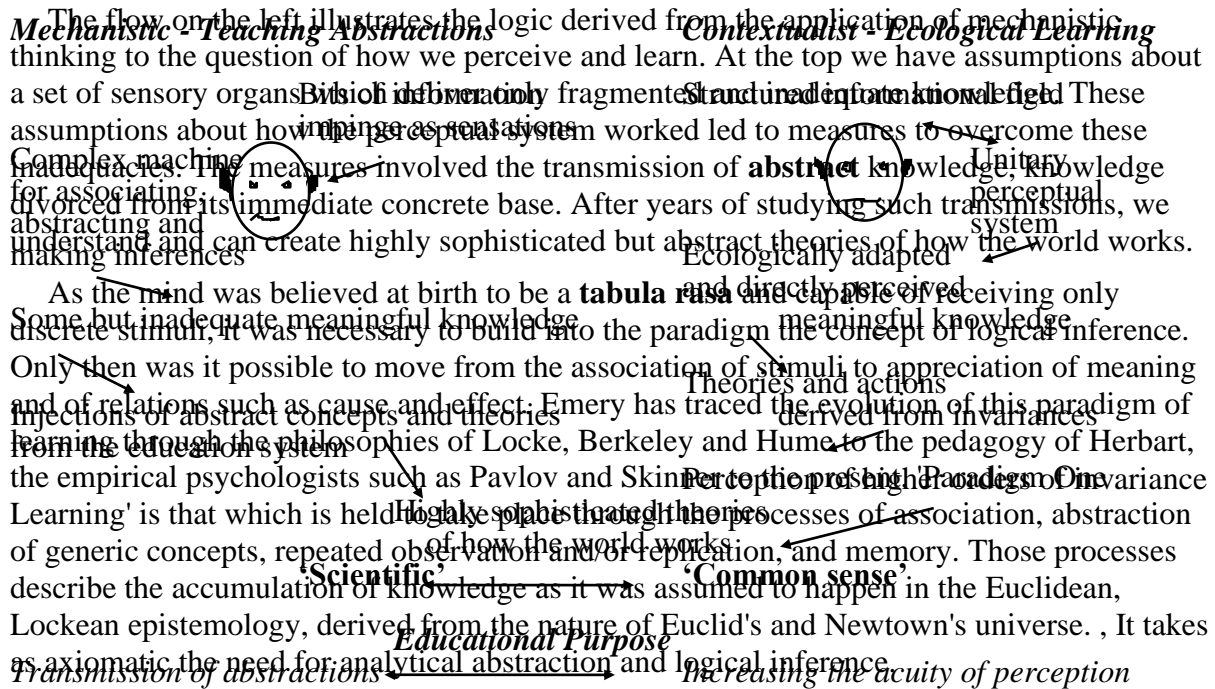
The flow on the left illustrates the logic derived from the application of mechanistic thinking to the question of how we perceive and learn. At the top we have assumptions about a set of sensory organs. Bits of information fragmented and inadequate knowledge. These assumptions about how the perceptual system worked led to measures to overcome these inadequacies. The measures involved the transmission of **abstract knowledge**, knowledge divorced from its immediate concrete base. After years of studying such transmissions, we understand and can create highly sophisticated but abstract theories of how the world works.

As the mind was believed at birth to be a **tabula rasa** and capable of receiving only discrete stimuli, it was necessary to build into the paradigm the concept of logical inference. Only then was it possible to move from the association of stimuli to appreciation of meaning and of relations such as cause and effect. Emery has traced the evolution of this paradigm of learning through the philosophies of Locke, Berkeley and Hume to the pedagogy of Herbart, the empirical psychologists such as Pavlov and Skinner to the present high Paradigm of 'One Learning' is that which is held to take place through the processes of association, abstraction of generic concepts, repeated observation and/or repetition, and memory. Those processes describe the accumulation of knowledge as it was assumed to happen in the Euclidean, Lockean epistemology, derived from the nature of Euclid's and Newtown's universe. , It takes as axiomatic the need for analytical abstraction and logical inference.

Mechanistic - Teaching Abstractions   Contextualist - Ecological Learning

Bits of information impinge as sensations

Complex machine for associating, abstracting and making inferences

Some but inadequate meaningful knowledge

Injections of abstract concepts and theories from the education system

Highly sophisticated theories of how the world works

'Scientific' ——————→ 'Common sense'

Structured informational field

Unitary perceptual system

Ecologically adapted and directly perceived meaningful knowledge

Theories and actions derived from invariances

Perception of higher orders of invariance

Educational Purpose
Transmission of abstractions ←————→ *Increasing the acuity of perception*

Figure 1. The Two Epistemologies.

3

Euclid included a fifth postulate which contradicted perceived reality (that parallel lines cannot meet) and in so doing proposed a form of knowledge which could not be known or learnt except by an intellectual process divorced from naive realism. Because the postulate could not be derived or extracted from direct observation, it provided the foundation for an elite, the literate who were to specialize in such abstract knowledge. Simplistically, these are the 'knows' and the 'don't knows'. As abstract knowledge and theories are accorded value and power in our world, so it is in the interests of the few 'knows' to continue to mystify abstract knowledge and increase its value. Education is used as a device to sort people into hierarchical social strata.

Valuing knowledge unable to be derived from perceptual experience had two effects: it devalued the experience of the ordinary person in so far as this led to a belief contrary to geometry and it had to be taught. In this way another element of stratification was introduced and institutionalized. Elites developed within elites.

Because the first epistemology begins with erroneous assumptions about the nature and process of perception which lead to erroneous notions of its inadequacy, it was necessary to overcome these supposed defects. When the goal became a population with a working knowledge and acceptance of the products of traditional education, it was deemed necessary to give everyone repeated injections of accumulated abstracted knowledge, truth, the ideal of the universities. 'Good' students were then equipped to continue through the system until they obtained the tickets (MA, PhD) to begin devising variants on our ideas of how the world works. These ideas are called 'scientific'. The process is well be described as one of discipline rather than learning as it aims for the static rather than the dynamic, 'being rather than becoming'. Creativity becomes heresy and cooperation is cheating. It is divide and conquer in the best spirit of DP1 and the Type III environment.

To achieve this goal effectively, it was of course necessary to disabuse individuals of any faith in the validity of their own idiosyncratic perceptions. Using the analogy of consulting maps in Russia, Schumacher describes the effects of this process on his personal intellectual growth:

"It then occurred to me that this was not the first time I had been given a map that failed to show many of the things I could see right in front of my eyes. All through school and university I had been given maps of life and knowledge on which there was hardly a trace of many of the things that I most cared about and that seemed to me to be of the greatest possible importance for the conduct of my life. I remembered that for many years my perplexity was complete; and no interpreter came along to help me. It remained complete until I ceased to suspect the sanity of my perceptions and began, instead, to suspect the soundness of the maps" (Schumacher 1977: 11).

It also required stressing the importance of memorizing established associations and knowledge of the rules of classification and taxonomic hierarchies. Other requirements followed logically; externally imposed discipline and literacy. From these epistemological assumptions and the derivative requirements of a critical, disciplined and literate mind, it is possible to deduce the evolution of most of the characteristics and highly stable features of the Western system of formal education, the teacher-student relation, timetables, standardized curricula, the nature of the reward and punishment systems, etc.

For young children, the first epistemology means a long hard road of putting away the childish pursuits of devising their own theories of how things work. Wrong answers built on personal observations and creative thinking are punishable. Every child spends its early years extracting invariances and creating systems of meaningful knowledge. As education reduces

the value of this process and its products so the child loses confidence in its perceptions and experience. This paradigm is practised at every level of education and across every division of our culture.

The loss of confidence however, is a gradual process. As our methods show, the abilities to directly extract invariants are not lost, they remain tacit. More unfortunately, the bad experiences so many have during their schooling make them reluctant to reenter the education system. They have to be convinced that Adult Learning uses different methods which involve them in creative learning with its feet on the ground. They need proof that they produce positive affect based on the dignity and tolerance of individual learning and their cooperative use towards shared purposes. Our methods provide that proof.

Bolyai and Lobachevski irrefutably established that a proof of Euclid's fifth postulate was impossible (Pirsig 1974: 260). Now Emery has shown once again that the scientific basis for our cultural beliefs and educational practices is less than 'scientific'. The conclusions from Heider and Gibson are that:

- the environment is recognised as having an informational structure.
- this informational structure of the environment is embodied in the invariances that exist in the relations between energy flows despite fluctuations in the individual flows and regardless of whether they impinge on the sensors of an organism.
- the perceptual systems of living species have evolved so as to detect and **extract** this information from their environments despite a great deal of 'noise' at the sensory level.
- our conscious feeling of sensations is all but irrelevant to the role of the senses as discriminating perceptual systems (Emery F 1980: 52).

The second epistemology starts, therefore, from a unitary perceptual system adapted to its world. It functions to directly extract meaningful knowledge from its ecosystems by perceiving invariances in time and place. What this means is essentially very simple. We were never 'tabula rasas', blank tablets, onto which the accumulated knowledge of the ages must be poured and left to soak. Rather than weld abstract knowledge into more and more abstract theories, we employ higher and higher levels of invariance to arrive at sophisticated theories of how the world works. These are often derogatively referred to as 'common sense' or 'primitive'. These judgements reflect the devaluing of knowledge extracted from the direct knowing of everyday reality.

As the environment contains limitless information then any person with an intact perceptual system can access what they need. Access is restricted by habit, lack of confidence and physical or psychological isolation from the informational field. The implications of this paradigm are immense, not only for our educational systems but for our culture generally. Humanity, by its very structure and functional nature, is intimately adapted to its world. The Lockean paradigm of learning and 'education' as the necessary and dominant cultural mode was indeed aberrant and misconceived.

Our direct learning about our meaningful world is not confined to our perception of the strictly physical environment as we saw above in the data about the abilities of young children. Music can be as readily known as can the meaning of social and conversational fields and this leads to the homonomous dimension of learning to learn. But before we turn to the music of conversation and human groups we should note that other confirmation is derived from the discipline of neurophysiology which has shown that meaning and behaviour are not correlated with the mechanical transfer and association of data from one part of the brain to another.

Luria (1968 & 1972) illustrates the proposition by contrasting studies of a man who couldn't forget and one who couldn't remember. The earlier study of the mnemonist showed that his recall was not a function of a series of images such as would be expected by transfer in and out of 'memory' but was more easily explained "in terms of factors governing **perception and attention**" (p62), a unitary perceptual system. The man who couldn't remember has as Luria puts it, lost that part of the system which controls the organization of a coherent 'framework', the system principle. He was left with nothing but "undeciphered images and unrelated ideas" (p103). This man had lost the capacity to instantaneously grasp "intricate patterns" (p108). "Knowledge is not stored in the memory like goods in a warehouse or books in a library, but is preserved through a succinct system of identification that creates a framework of ideas" (p116).

"The kinds of concepts that represent this (paradigm two) perceptual achievement are **structural concepts**...not the **generic** concepts yielded by a process of abstraction and naming; e.g, of naming species and genus" (Emery as above). This distinction becomes more important as we consider isomorphism between the structure of our neurological and perceptual systems and that possible in the social or cultural world. As Emery points out "The general and undeniable consequence of the new paradigm is that no firm barriers can be drawn between common sense and bodies of scientific or scholarly knowledge. The so called special skill of identifying the universal (the invariances) through logical abstraction and logical inference is a myth. It was of course a convenient myth for preserving social hierarchies".

"We are now confronted with the fact that people are equipped to directly achieve information for themselves and they achieve that in conceptual form, the same form of serial concept that stands as the highest achievement of modern science. The central problem for education is no longer which minds can achieve conceptual knowledge and undertake conceptual operations. In the new paradigm the central question is what kinds of environments best enable all minds to exercise their ability to perceive deeper orders of invariance". Emery proceeds from this point to examine the implications for traditional educational practice and concepts such as IQ. For our purpose here it is necessary to draw two points.

Firstly, as each and every human is equipped with this ability to directly perceive meaning, the emergence of a practical paradigm which acknowledges and enhances this ability will have the effect of engendering confidence in it. Secondly, as this confidence grows not only will individuals grow and become more perceptive, able to think, but the field itself will change as a result. The theories ultimately derived from the epistemologies do not differ in sophistication but they do differ in their relation to their ecological and adaptive base. Common sense or 'primitive' can often mean no more than practical or still attached to a perceptual base. It can also mean that the majority of the population can understand it by relating it to their experience. Australian Aboriginal cosmologies are directly related to the health of the land and the species which belong to it. These cosmologies help them understand their lives in a way that the physics of quarks or neutrinos cannot. Such understanding leads to action which changes the whole.

The implication of learning which proceeds to intensify meaning through naive realism, is identical to the implication inherent in the concept of innate wisdom. "As we move to a deeper, more comprehensive, understanding of a human being, we tend to pass from more tangible particulars to increasingly intangible entities: to entities which are (partly for this reason) more real: more real, that is, in terms of my definition of reality, as likely to show up in a wider range of indefinite future manifestations" (Polanyi 1969: 168). There will be a

speeding up of the dual processes of differentiation and decentring or reconstruction (Lewin 1936) of the individual and cultural cognitive field. When a particular field is seen in sufficient detail it flips and what has been known or understood undergoes rapid reformation. "Things will never look the same again". Once we begin to trust, and learn from, our immediate experience and observations there is a new wealth of data and detail to any circumstance or puzzle. While we are dependent on abstract knowledge which could only be gained by access to discrete and often restricted sources, differentiation was a slow process. The process of cognitive restructuring or the rapid formation of new understandings can be expected to spiral upwards until a new cultural level of understanding or conventional 'wisdoms' is stabilized. A new system principle will have come into being. This is the process currently in train and paradigm two learning is both a symptom and a multiplier effect. Transformation to a new culture wide appreciation of wisdom and ideal seeking can be expected to accelerate although the transition will certainly not be without its bumps.

Our capacity to learn and know as perceiving is, of course, in the most real sense learning by doing. Perception is an act and although it may not always be conscious it cannot connote a passive perceiver. As is shown by Haith's babies below, **active is adaptive.**

Ecological Learning Elaborated Today

Gibson's work is an ecological and systems appreciation of how we learn and know. As adaptation involves the fit between the dynamics of L_{11} and L_{22}, so our perceptual theories are crucial for making judgements about its development and determination. On the basis of confirmed nexuses of theory and data we can begin to sketch some fundamental human adaptations and the ways in which they may be practically employed. People do not live, work and learn in laboratories but in normal everyday settings, **econiches** which have inherent ecological significance, particularly in terms of the learning they afford.

Gibson argued on the basis of a lifetime of empirical practical studies that the associationist doctrine of knowing and learning could not be supported. Simply put, "perception is ...not reducible to sensations". (Gibson 1966: 237) "The neural inputs of a perceptual system are **already** organized and therefore do not have to have an organization imposed upon them" (as above: 267). The environment has an informational structure which is knowable and known to a perceiver without benefit of mediators of any variety. Direct perception or the knowing of invariants for the visual system for example, takes place at the level of surfaces, objects and events; in other words at the level of adaptive meaning rather than at the level of physics. Meaning is given by the invariants extracted during exploration and locomotion. (Gibson 1977 in Reed & Jones 1982: 289) As Johnston (1981) argued, Lynch's (1961) classic study of human orientation in cities demonstrated that the ecological structure of the city appears to be more important than its geometric structure in determining how people find their way around. The Gibsonian school argues for a fundamental realism for survival, in opposition to representationalism which denies direct knowledge. Clearly a word is a representation at one level, but its meaning can also be directly known. Seeing is knowing rather than believing. The crucial distinction is not whether one believes knowledge of the world through perceptual means is possible or not, but whether the constituents of knowledge are facts or beliefs, interpretations (Shaw, Turvey & Mace 1982: 177).

Believing invites the assumption of intentional objects with immanent existence or inexistence. Knowing does not. While knowing and perceiving are indeed intentional, the objects they specify are quite real in an ordinary sense, and therefore, commensurate with the physical objects required to define a human environment. (Adapted from Shaw, Turvey &

Mace 1982: 180). The practice of Searching validates over and again that perceptions of value trends and shifts for example are very real and objective and based on **events** which have been perceived and remembered. Turvey and Shaw (1979: 214) have formally derived the 'Postulate of Direct Perception' the logic of which is as follows:

"First, what justifies the claim that perception is a valid and reliable source of information for an animal or human about its environment is that perception is necessarily incontrovertible by any other form of knowing the environment (e.g. inference). Secondly, perception is incontrovertible, because it is necessarily a direct apprehension of that which is true **by force of existence.** rather than by force of argument. And third, perception may not be contradicted because only propositions may be true or false and perception is not a proposition-making activity. **Propositions** are assertions regarding states of affairs that either always obtain or never obtain. **Perception**, by contrast, is not an assertion about states of affairs but is a state of affairs and therefore necessarily obtains."

The postulate states: "If some state of affairs, S, is (directly) perceived to be some state of affairs, T, then it is necessarily what it is perceived to be, namely T" (p215). That is, perception is valid. That is the first and primary ground rule for the data collection phases of the Search. As Turvey & Shaw point out, the postulate for indirect or mediated perception renders knowledge about the dangers of the environment so weak and tenuous "that it is difficult to imagine the successful survival of even one generation of animals, much less the continued evolution of their species over countless generations without a break in the chain" (p214). The Postulate of Direct Perception gives us then, not a 'naive' realism but an essential one.

By 'seeing', Gibson meant understanding with the essence of perception being "selective attention to something important". "To see a thing...means to be in touch with it." Each perceiver must select that part of the potential information he or she needs. Perceptual learning is the life long process of increasing our attention to the meaningful features of our world. (Gibson 1960; Reed & Jones 1982: 258-268). When a learning planning community pools its perceptual learning around matters which demand shared attention, the result is a picture not only of great richness but of sharp definition.

The theory was derived from vision but has been generalized (Gibson 1963). Invariants of the energy flux in every form have pattern or structure which convey "information about" the environment (Gibson 1967; Reed & Jones 1982: 376). Extracting invariants over time is the essence of the perceptual process and can be assumed to occur at higher levels, including those called intellectual (as above: 378). This view of perception includes the concepts of memory and expectation (Reed & Jones 1982: 395) and is comparable to Sommerhoff's derivation of 'transformation expectations' (1950: 171)

Invariants are extracted by processes of **scanning** or **searching**. Perceptual systems are exploratory. In the absence of adequate information "the perceptual system **hunts**. It tries to find meaning, to make sense from what little information it can get." (Gibson 1966: 303) Gibson here alerts us to the fact that vigilance is also an adaptive behaviour. Attentiveness alone is insufficient. As Searching or active adaptive behaviour becomes a way of life, vigilance in the sense of conscious environmental monitoring replaces regulated attention. Attention is mobilized automatically when an event trips the vigilance system.

But events of whatever nature, have a special importance in contextualism. "An **event** can be defined as a minimal change of some specified type...wrought over an object or object complex within some determinate region of the space-time continuum" (Shaw & Pittenger 1978: 189) where 'minimal change' means "the least transformation of a property of an

object...needed to specify unambiguously the exact nature of that change". To further explain event perception Shaw & McIntyre (1974: 353) derived the **principle of perceptual transitions** which states that global physical invariants are more attended to than local ones. The perceptual organization of an event proceeds from globally invariant properties to locally invariant properties. There is a 'modulatory program' by which the perceptual system becomes attuned to invariant information through experience. The Search follows this process, beginning with the L22 or global plus level.

Building on this work, Shaw & Pittenger (1978) isolated two fundamental types of event change, structural (what changed) and transformational (what type of change was it). By making this distinction they placed the theory firmly in the 'process' camp as there is an obvious hierarchical order implied between the two. While it is important to know what changed, which implies that one already knows what the what is, it is of greater significance for adaptation and survival to know the ways in which things change. Only this knowledge can form the basis of prediction and conscious control. Again in a Search, we elicit this data. It is insufficient to know that weather patterns are changing. It is vital that we know if rainfall is increasing or decreasing in a certain area and why.

While event perception emphasized the primacy of process, other central Gibsonian concepts accentuated the ecological stance. "Perceptual knowledge is first and foremost an adaptive relation between perceived and perceiver" (Mace 1974: 141). Direct perception of globally invariant physical information is due to the evolutionary attunement of the biological systems supporting cognitive processes. By contrast, direct perception of local invariants is due to attunement of the modulatory states of those biological systems by the experience of the organism with its world. According to the principle of cognitive symmetry this attunement arises from the symmetrical **rearrangement** of states of the biological system with respect to the invariant structure of the events perceived" (Shaw & McIntyre 1974: .347-8). The attunement is accomplished by the 'education of attention', or in other words, by **learning** (Gibson 1966). There is one other concept which serves to unite Gibson's work with the broad framework discussed above.

"People are not only parts of the environment but also **perceivers** of the environment. Hence a given observer perceives other perceivers. And he also perceives *what* others perceive. In this way each observer is aware of a shared environment, one that is common to all observers, not just his environment... The awareness of a common world...is not entirely due to our verbal agreements with one another...(but) also to the independence of our perception from a fixed point of observation, the ability to pick up invariants over time" (Reed & Jones 1982: 411-2).

Gibson has thus elucidated the third of Asch's (1952) conditions for effective communication -the emergence of a mutually shared field. A mutually shared field of objective environmental features can now be defined as a field whose features afford a common set of behaviours and learning to those perceiving it. In practice this means that we can be confident that the values assigned to the environment, as determined by mutually agreed perceptions are objective. People are learning the same things about the environment, its affordances, at the same time. And the greater the collective recognition that they share this directly perceived environment, the greater will be their consciousness of their learning and their confidence in it.

Babies Are Ecological Learners

Gibson's conclusions are receiving support from research into newborns. Identification of events as central affordances is important from birth. "Newborns start by looking at the edges of things, exploring" (Friedrich 1983: 54). They prefer the complex to the simple and will choose a patterned surface to a plain one. Preferences are found with other senses as well as vision. Invariances are already in the process of extraction at this stage. Experiments by Meltzoff & Moore have demonstrated the "infant's very early capacity for...'intermodal perception' -to combine the brain's perception of two activities" (Friedrich as above: 55). In addition, using infants six to eight months old, Starkey et al (1983: 181) showed they could extract information about number across two very different kinds of display, or perceptual modes. They in fact had to disregard the modality, visual or auditory, in order to detect invariance In other words, meaning is extracted by a **single, organized, perceptual system.** People are perceptual systems.

Continuing experimentation uncovers more and more of our sensitivities or finely tuned perceptions of our human environment, that environment considered from the standpoint of what it affords people as a particular kind of animal (Loveland 1991: 100). Infants detect temporal synchrony, tempo of action, rhythm, changing distance and affective information uniting visual and acoustic presentations. By age four months, babies can match faces and voices based on gender information (Walker-Andrews et al 1991). Children find it easier to accurately perceive gender when the faces they see are interacting with others as in conversation (Berry 1991) but before language begins, babies are using the ability to recognize and organize affordances, the environment's wealth of meaningful resources. As a species they are obviously equipped to start learning about the world and its intrinsically meaningful informational structure.

There is evidence that children can directly perceive affordances, or lack of them, for social meaning, that are specified by structural adjustments in one or more aspects of facial gesture, body gesture, posture or gait. These adjustments are the informational bases for perception of social affordances. They are made in response to the mutually recognized coaffordances of a particular target individual with whom the child either intends or does not intend to prolong social interaction. Children can be quick to communicate their intention to interact, or not interact, through gesture and posture, and other children are just as quick in detecting these intentions (van Acker & Valenti 1989, 397-400). Motion is critical to detection of invariants of social intentions and children as young as three years can detect these (Berry & Springer 1993).

We are so finely attuned to our own species and our human environment that not only can we detect purposeful activity through minimal dynamic clues but we can also detect intentions and intentions to deceive (Runeson & Frykholm 1983 in Valenti & Good 1991). "Persons have available to them to them immediate information about both what others are doing, and more importantly, what others intend to do; they can directly perceive relatively hidden psychological properties of others (Valenti & Good 1991: 85-9). Emotional and personality qualities are also directly extracted from facial expressions. Babies of four months can also express stable or invariant intentions (p89). Affordances for social knowing and social interaction involve the principle of kinematic specification of dynamics. Generally, kinematic or movement patterns of behaviour specify the dynamics or forces underlying behaviour (p84). This provides a firm informational base for the direct perception of persons in action and persons in interaction: (a) person to person specific kinematic patterns are visually detectable through the extraction of invariant structures in ambient light, and (b) these invariants structures are lawfully related to mechanical and biomechanical factors that constitute specific goal directed acts. When individuals are permitted greater opportunities for

visual exploration as they are when they are working in close proximity to others over extended periods, the accuracy of perceiving affordances is enhanced (p90).

This confirms what some working with large groups and their dynamics have long observed -that although there may be no conscious appreciation of intentionality, people certainly behave concertedly as if they were aware of intentions and the assumptions underlying those intentions. People hear events as well as sounds and the information they pick up about events is not arbitrary. The sounds we hear convey much more information than is specified by physics or expected by cognitive psychologists. The specification of many features and dimensions of events is sufficient (Gaver 1993: 287). Social and communicative affordances embrace not only the significance of events for perceivers themselves, but also the significance of the human environment for other persons or animals. With sufficient skill, any perceiver can know what a human environment affords for others (Loveland 1991: 101). This is part of the set of skills that Search designers and managers must develop.

Adopting the systems approach, Haith, through a series of ingenious experiments showed that "Newborns are congenitally equipped to engage in visual activity that maximizes the likelihood that they will find visual information. This 'seek' operation is endogenously controlled, that is not dependent on external stimulation for its activation or maintenance" (Haith 1980: 89). This biological preparation is adaptive in that neural activity is essential and the baby is rarely awake. When awake, they move their eyes virtually every half second. Babies keep their eyes on the most informative parts of their visual field (p124). They actively search their environment for meaning. Haiths's evidence supports the concept of a system with two scanning routines and shows why much looking which is usually called 'meaningless' is not such at all. People (not just babies, p119) must simply attempt to maintain a high rate of cortical firing. By this method of sampling the energy provided by the currently available visual array, we remain alert to and intelligent of significant events and changes in the visual field.

From this sample of accumulating data, two points are clear. The first is that virtually from birth, our abilities to immediately understand what is happening in our human environment are acute and extensive. The second is that an imperfect grasp of what human language, gesture, posture and other social and communicative affordances mean, would constitute a pretty severe handicap (Loveland 1991: 105). Perhaps one of our problems is that we have become so lacking in confidence about our social perceptions and skills that as a culture we have become socially handicapped. Our rituals are impoverished. As Knudtson & Suzuki (1992: xvii) note - "native customs are evidence of an astute understanding of the psychology of human interactions".

In an over eventful environment such as a Type IV where there is too much information, perception must become selective. There are dangers in such environments of committing major errors. There are limits within which the amount of information is adaptive. When there is active purposeful behaviour within an ecosystem, much information is irrelevant. This makes nonsense of claims that all we need is access to more and more information, the belief behind the rush into 'information technologies'. Inevitably in collecting data about the current L_{22}, there will be automatic selection for system relevance. This is the corollary of the central feature of the Type IV environment - **relevant uncertainty**. Haith's work stressed the adaptive role of activity, both at the level of gross movement and at that of cortical firing. Given the centrality of activity to such adaptation, we must assume that the generalization will hold for all levels and areas of activity. The greater the uncertainty, the greater the need for an active approach.

The Practice

We have described in *The open system: learning about and using the L22*, above, the exact process for scanning the environment (L22) as an essential feature of the Search Conference and most OST methods where an up to date appreciation of the extended social field is required.

From this description you can see that right from the start, the data collection process, what is elicited from participants are their perceptions, not their academic or other knowledge, not their opinions or beliefs but what they have seen happen. The process is aided by the rule that all perceptions are valid so participants are in no doubt that they are not being asked to contribute any book learning. Some opinions or beliefs may slip in during the process but the later stages are designed precisely to edit them out leaving an accurate appraisal of the field.

The process does not end there. Throughout the Search as we see below, participants use their perceptions and memories as the fodder for their deliberations and conclusions.

Learning about the L$_{11}$ (System)

In the basic classic model, there are usually three distinct steps. The first consists of a **history session**, '**Where have we come from**?' '**What has made us look the way we do today?** (community) In anything other than a greenfields site, there needs to be a history session. The answer to the questions above is as important a part of the shared context of the community as is the future they will inhabit. Assumptions that people know what has made them look the way they do are invariably wrong. More than this, there can be different histories or conflicting histories. These are usually conflicting interpretations rather than facts or events. It is important that all versions are aired and that people understand how deeply others were affected by various events and changes. The history session often significantly enriches the growing cohesion within the community and frequently marks a turning point.

With the history session, the community begins to explore its 'probability of choice' that dimension of their choices which expresses the unique character of their system. The history session starts at the beginning of the system regardless of whether that was 50,000 years ago or last year. In spelling out the significant events and changes that have brought the system to its current shape, the community is implicitly, and sometimes explicitly, learning about its essential **continuities** in which are embedded its probability of choice. Strategic plans which are non participative or externally devised and imposed, miss this dimension. They have a standardised character to them and feel alien to those who have to live with them. If some of these continuities are not extended from past into future, implementation will flounder as the plan does not encapsulate the living 'personality' of the system.

The process of the history session is very simple. It is a large group (community) conversation through which the community compiles a time line of formative events and changes through the life of the system. There is no small group work in a history session. The manager simply records the conversation as it happens. The conversation leaps backwards and forwards in time as people re-create their past in the future and make meaning of it. We usually ask the oldest and most experienced members of the community to open it up. Their experience of living through so much of the system's development and their telling of it first hand to others who care deeply about its further development makes for compelling and deeply significant learning. The historic event is "the event alive in its present...in its actuality, is when it is going on **now**, the dynamic dramatic active event" (Pepper 1942: 232).

Oral 'telling' using "heightened language" exposes the hidden laws embodied in human environment and expresses feeling and judgement (Caudwell 1937). These powers of spoken language relating the past, produce celebration and pleasure in the pursuit of knowledge and as in the old oral cultures, the difference is to feel or **know** reality rather than to merely **see** the truth. Telling the event conveys both its total meaning (quality) and the details and relations (texture) which make up that character or quality, its intuited wholeness (Pepper: 238). The 'teller' was then as now, the educator and this form of cultural learning represents a mobilisation of the conscious memory. The processes in train here are not, however, those of a one to one relation between the teller and individual member of the audience but are a product of and "intensified by participation in group activity" (Havelock 1963: 40). Younger or newer members of the community ask questions of the elders as they absorb the meanings from the past and make them part of themselves. The means by which the communication is made effective are the positive affects and the learning "is an act of personal commitment, of total engagement and of emotional identification" (160).

As the time wanders towards the present, more members become involved in sharing their perceptions and putting the story together and a complex web of interdependencies is woven through different experiences. Search communities vary in the extent to which they make explicit their learning from their history. It is in the culture of some communities to be very articulate about drawing patterns from the history. For others, their learning remains unspoken but a manager can see the nods around the room as a pattern is recognized and implicitly noted. The history session becomes a fully participative community event amplifying the common ground established in phase 1.

The second step involves **analysing the present**. (community) With both future and past contexts in place, the community enters another analytical stage. Here it builds upon the learning from the history session and should by now have sufficient trust in itself, including its perceptions, to openly acknowledge problems and weaknesses as well as strengths of the current state of the system.

The first SC in 1959 used a distinctive competence analysis and this can still be useful. A more comprehensive analysis is provided by strengths/weaknesses. But both of these approaches are still narrow and by selecting these dimensions, miss others. It is more useful to broaden the analysis to capitalise on all of the dimensions of the system touched upon by the history session. Many of these are subtle cultural or other dimensions which lie outside the normal parameters captured by an essentially business or rationalist oriented analysis. An analysis based only on 'probable efficiency' or 'relative value of outcome' will again lose essential character or 'probability of choice', the unique, intrinsic factors contributing to homonomy or belongingness.

A basic three way classification of 'keep', 'discard or chuck out' and 'create' cuts across all these dimensions and neutralises forces towards inadequate, 'rational' or merely economic models. Its process uses the same rules as the original brainstorming of perceptions of L_{22} change, reinforcing confidence in their direct perceptions and values, their naive perceptual realism and in their openness and DP2 function. Items may appear on one, two or each of the three lists. This process, building on the history session, is just another preparatory step in the mutually supporting processes of building a community as it builds its active adaptive future.

The 'keep, chuck, create' lists can also serve as the basis for a most probable future of the system when this is considered necessary. The most probable is simply a linear extrapolation from the keep and discard data.

The third step is agreeing on the **Most Desirable System**. Dividing the community into small mixed groups which will work in parallel on the future of the system again sets the scene for mutual validation, confidence and trust building.

The membership of small groups after the first experience with desirable and probable futures is virtually unlimited. There are some provisos though. However the composition of small groups is chosen, no one small group should be allowed to function throughout with constant membership. Two or three such groups will take on figurative properties and a competitive atmosphere will develop. It is important to avoid the formation of in-and-out groups. One of the functions of group work is to provide maximum possible opportunities for people to get to know each other through working together. Group membership should constantly change except in the case where groups by the pre-arranged reporting back time, have either not completed the task or have been judged to have inadequately treated it. In some organizational contexts where the board, for example, is a legal entity based on proportional representation, it is useful to preselect groups so as to maximise geographical diversity, and facilitate new clusters of working relationships. If there are conflicts between states for example, you may organise selection to avoid bunching of those state members. There need be nothing deceptive about this - the reasons for the selection and rationale over time can be put just as openly as any other aspect of the overall plan. Most organizations are well aware of their inherent disabilities and hopeful of learning to overcome them - it's usually one reason they came.

Barring these sorts of considerations the managers can just select by a neutral device such as alphabet or numbers as for Most Desirable and Probable Worlds. Again, task instructions must be precise.

Group reports on the Desirable System are again hung together and the process discussed above for rationalisation of conflict and integration is repeated. When it is complete, the community has itself a most desirable future. The items which compose this desirable future are the community's desirable **strategic goals**.

In cases where there are more strategic goals than can be comfortably managed by the community, say more than about 10, there is a choice between attempting to integrate some which have strong interrelations and some process of assigning priorities.

Integrating Environment and System

By this time, the community has done all the learning required to establish the directive correlation for active adaptation and has become genuinely open, trustful, and creative. There are two major ways of proceeding, one is longer and more rigorous, the other a short cut. The first is for the community to identify major constraints, break into groups to deal with them and report. The community then reviews its strategic goals in the light of this work and makes a judgement as to whether these goals need to be modified. It is very rare for a community to revise its goals but it has happened. The result in both cases becomes the **Most Desirable and Achievable System.** The community then self selects around the goals and makes action plans to achieve their goals.

The second way is for task forces to immediately self select and look at the major constraints applying to their strategic goal and deal with them before going into fully fledged action plans. Its advantage is speed. Its disadvantages are that less consideration is put into dealing with constraints which may apply to all goals and there is no opportunity for the whole community to revise those goals.

In both options, data and work from all previous sessions are put to the service of integration and action and the community becomes **self managing.** The self selected groups or task forces now act on behalf of the total community and are left to their own devices to work over the last night. It is usual to allow for and give notice of an interim plenary. This is for reports of work in progress so that the community can check directions and ensure that there will be coordination between action plans at the end.

At the beginning of the integration phase, I now give a short briefing on the **Strategy of the Indirect Approach.** By this stage, I also am trusted by the community and such an intervention is not interpreted as an imposition. If it was, my reversion to the Mixed Mode would cause an outbreak of the group assumptions, most probably fight/flight. My introduction mentions our cultural predilection for the Direct Approach which does not enjoy a great track record in a Type IV environment and has led to failures of implementation.

This briefing also has the advantage of amplifying the task instructions which are to identify the major constraints and work out what can be done to remove, go around them etc. Putting the emphasis on positive action neutralises any remaining forces towards negative affect, e.g. there are too many problems, it's too hard, etc. This is one reason why constraints are left as close to the end as possible. Concentrating on them before the community has experienced itself as confident and creative would itself be a major constraint to its development.

To identify constraints, the community must survey all its previous work, particularly their Most Probable World in year X (environmental constraints) and the 'Discard' or 'Chuck out' lists (systems constraints). For the action planning, they similarly survey their Most Desirable World and the 'Keep' and 'Create' lists to identify vectors with which they can be symbiotic, adding power and momentum to their strategies and action plans. I give a few handy hints for action planning such as the first issue to be addressed is 'who needs to be gotten on side?' Good action plans generate rather than consume support and resources.

All plans must be totally concrete. The most successful sets of action plans are also those which are nested in time. If the strategic time frame is 2004, it is desirable that for example, subgoals for 1997, 1999 and 2002 can be specified. These provide an automatic scheme for monitoring progress over time. Monitoring the field and its changes is an essential part of the Strategy of the Indirect Approach and active adaptation itself.

Because constraints have been put in the positive, task forces often find that their work here has provided major leads, if not strategies, for many of the positively oriented aspects of their chosen strategic goal. It is rare to strike problems here, particularly after putting constraints under the creative gaze. So much formative work has been done up to the point of agreeing this future that very few surprises can remain. Action plans, therefore, flow naturally from the work done on beating the constraints.

This third phase of the Search is just as critical a part of it as the first or the second. An event in which this phase is missing cannot be called a SC. About one third of the total working time of the SC should be budgeted for it. One of the most serious mistakes a manager can make is to run out of time for phase 3. One way to avoid this is to mark a non negotiable starting time for phase 3 on the plan and draw the attention of participants to it. This will usually be round late afternoon of the first full day in a 2 day 2 night SC.

Final task force reports finish the SC when it is to be followed by a Participative Design Workshop for designing an organization for implementation. When this PDW is not required, there will be a session where the community plans its continued life. This is the 'next steps' session and it is here that the community decides what to do with its immediate product,

usually some form of report, who should do it by when. Usually some small task force is chosen to do this. The conference has to decide amongst other things what is to be done with the butcher's paper. This will be part of its discussion of diffusion or strategy. On a couple of occasions there has been a ritual burning. This has happened when there has been an awareness of the new culture and oral, associative rituals established, and that nobody would forget them or the outcomes they produced.

The community will usually decide that a report in some form should be prepared. The questions then raised are by whom, how and by when? Often the job is offered to the managers, and in the past has often been accepted by them. Although there may be convincing reasons for some why managers should accept this role, it has been found to be more satisfactory if the community compiles the report. This resolves any remaining doubts about the status or ownership of the report, removing any lingering dependency. It also results in a product which is strictly about the community's purposes. Managers may wish to write their own report to fulfil their own research interests about process, and in this case should indicate this intention to the community, with all the necessary conditions for preserving a genuinely collaborative relationship.

While the hieroglyphics on the butcher's paper are full of meaning to the community, they are often incomprehensible to others not present. If it is intended to produce a fairly detailed report for the consumption of others it is necessary to translate the butcher's sheets into clear English. Managers may be requested to act as resource to this drafting group, and can certainly help in this way if necessary. Reports have varied from very brief to full, detailed reports of both process and content, depending on the purpose to be served and the audience.

Based on their action plans, the community will also decide details of future meetings. As the above discussion shows, perception is the bedrock of the total participative process. A functioning perceptual system is an equalizer which cuts through all the various visible and invisible barriers created by such as education, wealth and occupation. But the Search Conference is only one forum in which perceptions take the stage, front and centre. Most OST methods including Unique Designs and the Participative Design Workshop rely on perceptions at various stages of the process. It is one of the glues that holds groups and communities together as they work towards a more desirable future.

References

Argyris, Chris & Shon, Donald A. (1978) *Organisational Learning: A Theory of Action Perspective*. Addison - Wesley.

Argyris, Chris and Shon, Donald A. 1996. *Organisational learning II. Theory, Method and Practice.* Reading, MA. Addison - Wesley.

Berry, D. S. (1991). Child and adult sensitivity to gender information in patterns of facial motion. *Ecological Psychology*, *3*(4), 349–366.

Berry, Diane S and Springer, Ken. 1993. "Structure, motion and preschoolers' perceptions of social causality. *Ecological Psychology*. 5(4), 273-283.

Caudwell, Christopher. 1937. *Illusion & reality. A study of the sources of poetry*. Lawrence & Wishart. 1947.

Dewey, John. 1938. *Logic: The theory of inquiry*. NY. Henry Holt.

Dewey, John. 1958. *Experience and Nature*. NY. Dover Publications Inc.

Flood, Robert L and Romm Norma 1996. *Diversity management: Triple loop learning*. John Wiley & Sons.

Friedrich, O. 1983. "What do babies know? More than many realize and much earlier, according to new research." *Time.* August 15. 52-59

Gaver, William W. 1993. "How do we hear in the world? Explorations in ecological accoustics. *Ecological Psychology*, 5(4). 285-313.

Haith, M. M. (1980). *Rules that babies look by: The organization of newborn visual activity.* Hillsdale, NJ: Erlbaum.

Havelock, Eric A. 1963. *Preface to Plato*. Belknap Press of Harvard University Press, Mass.

Gibson, J J. 1960. "Pictures, perspective and perception." *Daedalus.* 89. 216-227.

Gibson, J J. 1966. *The senses considered as perceptual systems*. Houghton Mifflin Co.

Gibson, J J., 1967, New Reasons for Realism, *Synthese,* 17, 162-172.

Knudtson, Peter and Suzuki David. 1992. *The Wisdom of the elders.* Toronto. Stoddart Publishing Co. Ltd.

Loveland, K. A. (1991). Social affordances and interaction II: Autism and the affordances of the human environment. *Ecological Psychology, 3*(2), 99–119.

Luria, A.R. (1968) *The Mind of a Mnemonist*, translation Lynn Solotaroff. Jonathon Cape Ltd., London.

Luria, A.R. (1972) *The Man with a Shattered World*. Penguin, translation Lynn Solotaroff. (1975)

Mace, W M. 1974. "Ecologically stimulating cognitive psychology: Gibsonian perspectives." In Weimer W B & Palermo D S (Eds), *Cognition and the symbolic processes.* Lawrence Erlbaum Associates. 137-164

Margolis, Joseph. 1977. "The relevance of Dewey's epistemology." In Steve M Cahn (Ed), *New studies in the philosophy of John Dewey.* Hanover. University Press of New England.

McDermott, John J. (Ed). 1981. *The philosophy of John Dewey.* Two Volumes in One. University of Chicago Press.

Olafson, Frederick A. 1977. "The school and society: Reflections on John Dewey's philosophy of education." In Steven M Cahn (Ed), *New studies in the philosophy of John Dewey*. Hanover. University Press of New England.

Pepper, S. C. (1942). *World Hypotheses.* University of California Press. Reprinted in 1970.

Pirsig, Robert M. (1974) *Zen and the Art of Motorcycle Maintenance*. The Bodley Head.

Polanyi, M. (1958). *Personal knowledge*. London: Routledge and Kegan Paul

Polanyi, Michael (1969) *Knowing and Being*. Essays edited by Marjorie Grene. Routledge and Kegal Paul, London.

Reed, E., & Jones, R. (1982). *Reasons for realism: Selected essays of James J Gibson.* Hillsdale, NJ: Erlbaum.

Rorty, Richard. 1990. "Pragmatism as anti-representationalism." Introduction to John P Murphy, *Pragmatism: From Peirce to Davidson*. Westview Press.

Rorty, Richard. 1991. "Just one more species doing its best." *London Review of Books*. 25 July. 3-6.

Schmacher, E. F. (1977). *A guide for the perplexed*. London: Jonathan Cape Ltd.

Shaw R and McIntyre M. 1974. "Algoristic foundations to cognitive psychology." In Weimer W B & Palermo D S (Eds), *Cognition and the Symbolic Processes.* Lawrence Erlbaum Associates. 305-362.

Shaw, R and Pittenger J. 1978. "Perceiving Change." In Pick, H L & Saltzam E (Eds) 1982. *Modes of perceiving and processing information.* NJ. Lawence Erlbaum Associates. 187-204.

Shaw, R; Turvey M T and Mace W. 1982. "Ecological Psychology: The Consequence of a Commitment to Realism." In Weimer W B & Palermo D S (Eds), *Cognition and the symbolic processes.* Vol. 2. NJ. Lawence Erlbaum Associates. 159-226.

Starkey, P., Spelke, E. S., & Gelman, R. (1983). Detection of intermodal numerical correspondence by human infants. *Science, 222*(4620), 179–181.

Turvey, M T & Shaw R (1979) **The Primacy of Perceiving: An Ecological Reformulation of Perception for Understanding Memory.** 167-222 of Nilsson, Lars-Goran (Ed) Lawrence Erlbaum Associates.

Van Acker, Rick and Valenti, S Stravos. 1989. "Perception of social affordances by children with mild handicapping conditions: Implications for social skills research and training." *Ecological Psycholog.*, 1(4). 383-405.

Valenti, S. S., & Good, J. M. M. (1991). Social affordances and interaction I: Introduction. *Ecological Psychology, 3*(2), 77–98.

Walker-Andrews, A. S., Bahrick, L. E., & Raglioni, S. S. (1991). Infants' bimodal perception of gender. *Ecological Psychology, 3*(2), 55–75.