Doing it and Meaning it

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Title: Doing it and Meaning it (And the Relationship Between the Two)

Authors:

Mr. Marek McGann (1,2), Prof. Steve Torrance (1,3)

1:
Centre for Research in Cognitive Science (COGS),
University of Sussex,
Falmer, Brighton, BN1 9QH,
United Kingdom.

2:
Dept. of Psychology,
DBS School of Arts,
Balfe St., Dublin 2,
Ireland.

3:
School of Health & Social Sciences,
Middlesex University,
Enfield, EN3 4SF,
United Kingdom.

Biographical sketches:
Marek McGann is studying for his D.Phil. in the Philosophy of Cognitive Science at the Centre for Research in Cognitive Science (COGS) at the University of Sussex. He is examining the concept of purposes and goals in Cognitive Science, and particularly the implications of enactive approaches to mind and consciousness for our conceptions of same. He teaches in Psychology at DBS School of Arts in Dublin.

Prof. Steve Torrance is professor of Cognitive Science at Middlesex University and visiting research fellow at the Centre for Research in Cognitive Science (COGS) at the University of Sussex. He has published extensively in the area of philosophy of mind, consciousness and machine consciousness. He is particularly interested in the ethical aspects of theories of consciousness and enactive approaches to mind and consciousness. He has chaired several recent UK meetings on enactive theories of consciousness.

Abstract:
A number of related approaches to cognition and consciousness have been gaining momentum in the literature in recent years, emphasizing the active, embodied nature of the mind and grounding mental states and processes in the interaction between mind, body and world. These approaches are here gathered under the title "enactive". Given a working hypothesis, that there is a meaningfulness to our conscious states that seems fundamental to those conscious states, implications of this enactive approach to mind are outlined. It is argued that taking such an enactive approach implies a fundamental role for motivational states and goals, which currently lack an explicit explanation in consciousness studies or Cognitive Science more generally. An enactive framework for considering goals is sketched, and two of the more dramatic implications for our understandings and investigations of consciousness are outlined.

Keywords: Enaction, enactive theories of mind and consciousness, embodiment, intentionality, conceptions and theories of goals.

Introduction: A Working Hypothesis

Consciousness is many things to many people. Definitions are usually futile, and sweeping statements invitation to dismissal as much to argument. Progress must be made, however, and to this end let us begin with a claim, a sweeping statement, a launching point for an argument about the nature and structure of consciousness. The hypothesis is this: There is a meaningfulness to our conscious states that seems to be fundamental to those conscious states. Whatever else it may be, consciousness, being aware of ourselves or the world, seems meaningful. Being conscious of something seems at least in part for that thing to have some meaning for us. Our relationship with the world seems mediated by this relationship. It is not one of simple occurrence, but one of interaction. We are not rocks in a stream of experience, but agents actively involved with our environment, our world.

This claim, if sensible, has some important implications for theories of consciousness. It is not necessary to be insolubly wedded to it, but it would seem fair to say that it is sufficiently prevalent in the literature on consciousness to warrant investigating its implications in some depth. In particular, this claim, coupled with a view on mind and consciousness fast gaining momentum in the literature, has some important and fundamental ramifications for theory and research. The view on mind and consciousness is the enactive approach, a perspective on cognition that makes central our nature as agents in the world. There are a number of facets to this approach, many of which arose independently within subdisciplines of Cognitive Science. Though there is no united front to this perspective put forward in the literature, the present paper will try to draw out the common themes which bear implications for our investigation and understanding of consciousness.

In what follows, we will first very briefly deal with two possible counterexamples to the claim that consciousness is bound up with meaningfulness, then outline the form of enactive approach that will be dealt with here, finding commonalities in the work of Varela, Thompson & Rosch (1991), Hurley (1998), O'Regan & Noë (2001) and others. This will include drawing out implications concerning the kinds of concepts that must be clearly described if an enactive approach is to hold together. In particular the concept of perspective, which is defining of an agent and subject in the world will be examined and given a basic evolutionary account. In doing so, the work of John Collier will be used to explicate a difficulty faced by some such evolutionary accounts, and a solution to that problem. An appreciation of the power of enaction in our understandings of the mind will throw into relief the question of motivations and goals. A brief foray into the cognitive scientific literature provides no extant theory of goals which might be used successfully to describe the agentic nature of our existence, so a sketch of an enactive framework is drawn before some of the more potent implications of the enactive approach for consciousness studies are outlined. But first things first.

Rejecting Two Potential Counterexamples to Meaningful Consciousness

There are two possible counterexamples to the importance of meaningfulness in consciousness, which need to be addressed before we can get to the issue at hand. Firstly, is to point out that there are times or situations when we might be fully aware of something, but fail to grasp any meaning in it. One might read an article, for instance, but fail utterly to comprehend it. You might suffer some experience, but see no point to it, become thoroughly confused by it and be left unable to understand it, even at a very basic level.

A simple response to this argument is that such situations do not really involve a complete absence of meaning. Rather, while there is meaning in it, it is not the kind of meaning that we want. One may read a sentence and fail to understand it, but could say many things about it - what it sounds like when read aloud, whether it is a long or short sentence, if it is in a language we would normally understand. What is not available to us is its meaning in the context of the text in which the sentence is embedded. There might be a whole set of similar aspects of a confusing event that could be described and understood, but could not be fixed in any importantly relevant context. What is so frustrating about such situations is that we are aware of them, aware of some meaning in them, but are somehow prevented from grasping the meaning we feel is actually important, that is relevant to

us and our goals.

Another way of arguing with the claim that meaning is fundamental to consciousness is to say that basic perceptual experiences might have no real meaning in and of themselves. What, after all, is particularly meaningful about a simple perception of redness? Or of pain? Is it not true, however, that a perception of red entails "there is something red", or, at the very least, " there is some redness"? This would be a very minimal kind of meaning, to be sure, but even this minimal form requires explanation if consciousness is to be grasped in its entirety.

Meaning What You Do and Doing What You Mean: The Enactive Approach

The enactive approach has yet to put forward a united front in the literature on consciousness and Cognitive Science. The term is used here in a somewhat sweeping fashion to refer to a related set of views and beliefs on the mind that have been gathering momentum in Cognitive Science over the past ten to fifteen years. Though there are differences in the details, and some strong disagreements amongst some of the proponents, certain themes and beliefs are common. Chief amongst these, and fundamental to the perspective, is the relationship between mind, body and world.

Varela, Thompson & Rosch (1991), argue that mind and world are enacted through the interaction between subject and object, observer and world. They reject the possibility of a completely pregiven observer or a completely pregiven world. There can be no conception of one without the other. The structures of the world allow the structures of the observer to exist, while the structures of the observer allow the structures of the world to be conceived and perceived. It is this complex interplay between the world and the subject which gives rise to meaning, the understanding of the world.

The enactive approach to Cognitive Science makes use of a quite different conception of the mind than more traditional information processing models. The mind, rather than receiving information, building representations and producing new knowledge, or outputting commands to the body, is intricately interwoven with its embodiment and its world. The enactive mind is not a passive recipient of information from the world, but actively engages with its environment, unbuffered by separable functions of perception and action (Hurley, 1998). This approach would draw upon and endorse a number of different research agendas becoming prevalent across the discipline. Perception, for instance, is not conceived as the transmission of information but more as an exploration of the world by various means (such as the active vision described by O'Regan & Noë (2001)). Cognition is not tied into the workings of an "inner mind", some cognitive core, but occurs in directed interaction between the body and the world it inhabits. The enactive mind is thus also an embodied mind, the enactive approach ties in with the growing literature on the role and value of embodiment. That the cognitive system owes more to its physical instantiation than previously thought is a conception given clear exposition by Clark (1997). He argues that the operation of the cognitive system is not general, and potentially arbitrary, information processing but is grounded in the details of the agent's embodiment. The enactive view means that thinking and action are radically goal-directed and constrained. This is not a medium-neutral mind. The specifics of embodiment matter for the specifics of cognition. The enactive approach would thus agree with the thinking of Glenberg (1997), when he argues that the human memory system is not for rote learning, but for guiding our actions in a complex three-dimensional and subtly social world. Similarly a change in thinking about working memory is called for, and might be found in the work of Ballard, Hayhoe, Pook & Rajesh (1997). Under their account, working memory is not necessarily about holding representations active in mind but about selecting and targeting embodied operations in the service of present goals. Finally, learning a skill is not about learning the relevant facts about the environment, but is about learning to control the dynamics of our relationship with that environment, here again other work in Cognitive Science finds just that (see Clark's (1997) analysis of Thelen & Smith's (1994) work on children learning to get around different kinds of obstacles while crawling, and then later when learning to walk).

Many of the cognitive functions, so often seen as requiring detailed "inner" representations need not rely on such representations, but can be successfully guided by the constraints imposed by the

world itself (Hutchins, 1995; O'Regan, 1992; Clark, 1997; O'Regan & Noë, 2001). The moral of the tale is that the mind is not removed from the world, tucked away inside the body, thinking its thoughts in some private office, receiving reports and sending out instructions. Rather, the mind exists in the interaction between embodiment and world. Its operations may cross the boundaries of the organism, become extended into its environment, and loop back in tighter or looser feedback relationships (Hurley, 1998; Clark, 1997; Clark & Chalmers, 1998).

Enaction and the Importance of Perspective

The enactive approach binds meaning into the mutual constraint of subject and world, a complex feedback dynamic. Such feedback dynamics, however, cannot be sufficient for descriptions of mental content and thinking. Our intuitions regarding the mind require that the set of systems with complex feedback dynamics be much larger than the set of cognitive systems. The weather cannot think, surely, nor do the dynamics of population densities in predators and their prey deliberate. Hurley (1998) suggests that fundamental to the concept of cognition and consciousness is the concept of a perspective. While meaning may be a function of the complex causal relations in a dynamical system, what fixes that function (what effectively disambiguates the set of relations in some way) is a perspective. Hurley's purpose in her discussions of perspective (see Hurley 1998, particularly Essays 2, 4, 5 and 9) is an analysis of the interdependence of perception and action in the mind, and she does not commit herself to any particular explanation of the phenomenon of perspective, though she suggests (Hurley, 1998, p.7) that an evolutionary approach may be employed to get a grip on things. Her purposes simply require that something be capable of fixing the inter-relationship between causal processes at a subpersonal level, and mental content at the personal level at particular times.

A complete dynamic theory of meaning, built on the likes of Susan Hurley's approach, accepts an active nature for the cognitive system. It argues for an interdependence between perception, action and cognition and requires some explanation for the existence of perspective to value the complex of feedback that is the embodied organism.

An Appeal to Evolution, a Problem and a Solution

A simple way of addressing the question of perspective might be to appeal to evolution, claiming that natural selection made it that way. This will in fact be the approach taken in the present paper. However, following a line of argument put forward by John Collier (2000), it can be suggested that to focus on natural selection alone will leave us with an incomplete or at least a less intuitively correct explanation of perspective.

Collier (2000) argues that the typical stance taken in dealing with evolution (to trot out the unassailable logic of differential reproduction) misses something important. Under this typical view, function is defined in terms of its ultimate value to differential reproduction. Collier (2000), however, argues that this view focuses broadly on the general case of the lineage and plays down the importance of the individual case, the function in terms of a specific animal. It is at this specific individual level that the many functions must operate in order to be selected. Collier thus suggests that some evolutionary accounts confuse consequences with causes. The cause is the usefulness to the individual animal, the consequence, selection.

Collier claims that etiological accounts of function (those which emphasize pure selection) mostly ignore the organizational requirements of biological entities, even when this organization may play an important role in the function in question. Such purely selectionist accounts can lead us into an erroneous modular account which fails to appreciate the importance of the configuration and flexibility of capacities. Selection acts as a limiting but not determining factor on functionality. In order to be selected, a trait must already be functional - that is why it is selected in the first place. The functionality of a trait can often be determined without any knowledge of the origins of that trait. Thus, the perspective of the individual animal is important in the identification and analysis of characteristics (including, presumably, cognitive characteristics).

However, this is not to deny the validity of the evolutionary approach, but simply to shift the focus of its analytical spotlight. Collier's (2000) point is that functions should be understood within

the framework of a set of organizational requirements which themselves may be best understood in terms of natural selection. To elide this individual level of value of a trait, and jump straight to the value for the lineage, will be to miss something non-trivial. Collier is thus arguing that an understanding of the emergence of an individual perspective is essential to an understanding of the kinds of functions, cognitive functions, that we are interested in.

Collier's (2000) aim is to provide some means of allowing traits to be valued (and thus considered functional or not functional) in the individual case. To this end, he employs the concept of autonomy. In a 2002 paper, he defines autonomy as follows:

> A system is autonomous if and only if the organization of internal aspects of system processes is the dominant factor in the system's self-preservation making itself and the processes that contribute to autonomy functional.
>
> (Collier, 2002)

This view is informed by Maturana & Varela's (1980, 1987) concept of autopoiesis, but is less absolute, admitting of gradations where autopoiesis is all or nothing. Nevertheless, Collier's approach can be put to use, allowing us to drive an individual system into a gauntlet where it must sacrifice its autonomy and become indistinguishable as an entity independent of its environment or risk disintegration in being insensitive and unadaptable to its environment. Life is dynamic, but those dynamics are not open-ended. A system which does not in some way maintain some kind of boundary between itself and the dynamics of the world surrounding it is essentially indistinguishable from that world. The weather is not alive, because its open dynamics do not distinguish it in any real way from the broader physical system in which it is embedded. On the other extreme, however, a rock may have a much more constrained dynamics, but these are constrained almost to the point of non-existence. A rock has no dynamics at a global level of description which might allow us to distinguish it as a entity as anything more then the sum of its physical parts. In such a gauntlet of distinction and unity do life and cognition develop.

The Centrality of Goals

The enactive approach encourages a more holistic view of the mind and cognition than more traditional perspectives, placing cognitive functions in a context of embodiment, evolutionary history, or personal and physical constraint. The cognitive system is conceived as active rather than reactive.[1] Meaning is bound up in the dynamics of the system and those dynamics, under the enactive approach, describe an agent. These are by implication dynamics of goal-directedness. This is a concept which the different aspects of the literature have orbited, but which has not yet been given the central place in our thinking about thinking that it deserves. The mind is engaged in satisfying the needs, desires and goals of the organism. This simple fact appears to run behind all of the aspects of the enactive approach. In satisfying these needs universal computation and representation are not generally necessary. In order to understand an agent's behavior you must deal with the specific context of the limits and demands of its embodiment. The fact that these demands and constraints are not arbitrary but directed at some end is skirted continually in enactive writings, but no one, as yet, seems to have driven this point home: To explain what it is the mind does we must offer an explicit account of motivation and goals. More so, as these operate at all levels of cognitive function, this account cannot assume conceptual capacities or representational functions of the kind in which cognitive theories typically traffic. The enactive approach plays down the omnipresence of such capacities in cognition.

Conceptions of Goals Extant in Psychology

As we have seen, other aspects of the enactive approach were presaged or independently proposed within different domains of Cognitive Science. Might this be the same for a theory of goals? Psychology, as representative of cognitive scientific work includes many theories which make reference to motivational states or goals. However, those theories extant within Psychology tend to

hold definitions of goals as either explicitly representational or implicit and assumed. Social and personality theories such as Bandura's (1992, 1997), or Mischel & Shoda's (1995) have increasingly emphasized the manner in which actions are driven and directed by an agent's goals, but the level of description of these goals tends to be at the level of personhood, self-esteem and self-efficacy. A range of such evaluative concepts are described by these and similar theories, and while they may count as a challenging particular case to a general theory of motivation, they resist easy integration into a perspective on the mind which denies the prevalence of conceptually driven thought. Social and personality theories are description at too high a level, then, for what we need. We might turn to more analytic, cognitive approaches.

The torrent of research over the past decade on executive function is much more usefully pitched at a subpersonal level of explanation. However, it appears to take the concept of goals as a given, a starting point for theory and experiment. This research has seemed to focus on the processes involved in adopting, following and switching between goals, but the concept of goals themselves is implicit. Selective attention, choosing to focus consciousness on certain stimuli rather than others is typically evidence of goal-directed cognition (Duncan, 2001). However, research on selective attention tends to stipulate or assume the goal to be followed. We have significant control over what we pay attention to, and attention focuses cognitive effort, but precisely what the goal in question is or how it is instantiated in the system is far from clear. Research into selective attention's counterpart, inhibition (Wegner, 1997; Wegner & Wenzlaff, 1996), suffers from a similar problem, as do monitoring (Norman & Shallice, 1986) and task-switching (Monsell, 2003; 1996). These different streams of research highlight the control that we human beings are capable of exerting over our cognitive functions, but either seek a mechanistic account where goals are unnecessary constructs or assume the existence of goals and work at higher levels of description, attempting to explain how they are followed.

More venerable research traditions in Cognitive Science have more to say on goals, but for the main part fail as an adequate explanation in one of these two ways. Newell & Simon's (1972) problem-space theory of problem solving effectively uses goals as representational reference values. These do not drive the system, but act as data for some comparator function to determine whether or not the goal state is present or absent. The rather rigid contexts required to assess this theory (which appears to remain without significant challenge as a framework for problem solving theory: Hunt, 1994, Eysenck & Keane, 2000) predetermine the goals of participants. A problem is often presented as a puzzle to solve, where the problem dimensions and valid operations are few. More naturalistic problem solving, in more fluid environments, slides into the arena of naturalistic decision making. A new process-tracing research paradigm (see Crozier & Ranyard, 1997) has moved substantially away from normative accounts (such as Tversky & Kahneman's prospect theory, 1979). This new approach has given rise to a change in description of the entire process. No longer is described an early information gathering stage at the end of which some evaluative function divides the best (or least worst) response from the also-rans. Decisions are dynamic negotiations between the agent and world in which some early choice is made and then used as the launch point for a series of interdependent evaluations, option-differentiation and decision-consolidation processes, wrapped in an action-feedback cycle that the new approaches consider central to the way decisions are made. Here too, however, goals remain described at a fairly personal and intuitive level, with no real means available of analyzing the concept in terms amenable to an enactive perspective.

An Enactive Framework for Understanding Goals

The enactive approach, under the view presented here, demands a means to understand ends. Contemporary Cognitive Science can offer some suggestions but few real answers. What follows will roughly sketch the outline of a framework that might be useful in structuring our thinking on this issue, a framework that might successfully bridge the space between a minimal case of enactive potential and the complex self-governed dynamics that we humans seem to enjoy.

The minimal case must occur at the origin of perspective. A result of evolution, we might expect this minimal case to be impossible to define precisely, but to be the low end of a gradient of entities for whom the world holds some implication. At this simple level we might expect there to be some

system which operates to maintain itself, has autonomy, and therefore impacts on the system from its environment will affect it in positive and negative ways (no simply neutral occurrences here, the world implies something for this system). The system will have basic interests which must be maintained, and if it is not structured in such a way as to serve those interests, it will not survive for long. The minimal case of enaction, then, is governed by interests which are basic concerns of an autonomous living system. Life regulatory processes such as homeostasis might be considered the basic instantiation of interests. Being basic, these values are also immediate and inflexible. A creature which operates only according to interests will have no possibility of either prediction or memory, slaved to the immediate state of its basic motivations. Some simple single cell organisms and some plants can be considered in this category, where the current impact of the environment on the organism controls its movements, but does so in the interests of that organism. Think, for instance, of the manner in which a glucose gradient drives the flagella of a bacterium so that it will move into richer fields of nutrients.

Given some flexibility, interests and the actions they produce might become sensitive to context, so that the relationship between stimulus and response is less rigid. Flexibility will be constrained by the fundamental organization of the creature around its interests, but even a limited flexibility may allow contexts and actions to be loosely configurable. Following Susan Hurley (2003) such flexibility may provide for a coarse combinatorial structure between means and ends and the possibility of action in error (hence normativity). Hurley argues that these two criteria are sufficient for describing the agent in question as acting according to reasons (and that these reasons are not simply attributed, but exist at the appropriate level of description of the agent).

The development of symbol use and voluntary memory allows human beings to control their cognitive context in an ad-hoc and arbitrary manner. The world becomes suffused with meaning layered ever-thicker by every new commitment we make. You may look at your watch and say that it is eight o'clock. This has a number of possible meanings, but if you are intending to catch a plane at half past nine it becomes even more loaded with meaning for you. We weave rich tapestries of habitual goals over our life-span, but it is in the light of having such self-generated goals, purposes, that our world is so rich with implication.

This gradient of interests, with limited body-specific implications, to reasons, with context-dependent but flexible action-specific implications, to purposes with context-configurable but commitment-specific implications is offered as a first-step to scaffolding a general understanding of the goal-directed structure of enaction. Goal-directedness, under the enactive approach, is fundamental to and constitutive of the mind. This has dramatic ramifications for consciousness.

What it Means for Consciousness

Theories of consciousness often take awareness to be prior to motivation. Motivation and goals may be accepted as having some organizing and structuring role in consciousness, but play no constitutive part. The radically goal-directed nature of mind, an implication, it is argued here, of the enactive view, turns this view on its head. The meaningfulness that is so central to consciousness depends on a bedrock of motivation.

Antonio Damasio (1999) has made emotions the core of his theory of consciousness. His account is integrable within an enactive framework, acknowledging as he does the importance of embodiment (Damasio, 1994) and the grounding of consciousness in life regulatory processes (Damasio 1999, 1994). His *Descartes' Error* puts forward a theory emphasizing the organizational role of emotions over basic and higher cognitive processes. He developed from this his view of emotions and feelings as underpinning the very basis of consciousness. From an enactive perspective this would seem to be a promising road to follow. Though Damasio has laid the foundation for thinking in these terms his own principal aim has been to identify the neural circuitry responsible for maintaining these functions. A complete enactive theory of content and consciousness will be broader than this, encompassing all possible forms of instantiating awareness. Damasio also relies on concepts of "maps" and representations which, while not a major difficulty for integration, require some explication in more dynamic terms. Also, the relationship between emotions and goals (which may be one of identity) will need further analysis to follow this line of investigation. There are numerous

accounts to choose as a starting point, Damasio's own, those of Panksepp (1998), Lazarus (1991), Frijda (Frijda & Moffat, 1993; Frijda & Swagerman, 1987), or Power & Dagleish (1999) to name but a few. Each provides challenges for integration into the enactive framework, but each maintains a prominent role for emotion and motivation in cognitive function and consciousness. This foundation of evaluative and motivational issues underlying consciousness potentially has a more wide-sweeping implication for our investigations, however.

Many theories of consciousness in contemporary consciousness studies seem to stress the "how" question of consciousness. It is this determined focus: "how could any physical system be conscious?", "how can it feel like something to ....?" that stands behind the so-called hard problem of consciousness (Chalmers, 1995). The goal-focused enactive approach presented here sidesteps this issue somewhat, suggesting that the more sensible question is not "how?" but "why?". The points put forward in this paper suggest that the kinds of meaning that are constitutive of our conscious experiences are formed on the basis of sensitivity to relevant relationships between subjects and world. Perspective is formed of dynamic relationships which define a teleological gradient which in turn defines a gradient of implications. Given a system defined by an agent and the implications of the world for that agent, it may seem more appropriate to ask how could it *not* feel like something. To claim that consciousness can somehow be conceived of independently of this relationship of meaning, steeped in the facts of embodiment and dynamics, challenges the claim that consciousness is meaningful. Such views, attempting to explain how there can be such things as "qualia" or "subjective feels" are forced to make the further step of explaining the relationship between subjective feels and the meaningfulness that consciousness seems to enjoy. If the contents of consciousness are indeed meaningful, an assumption of the arguments of the present paper, then this might be to take a divide-and-conquer strategy to explaining consciousness a step too far. Perhaps there's been a little too much dividing, and not enough conquering.

The enactive perspective, then, will find it more productive to focus on why something is experienced in *this* way rather than *that*. This will be to move the emphasis, as Hurley & Noë (2003) do, from an *absolute* explanatory gap ("how can physical systems be conscious at all?") to a comparative one ("how do different forms of consciousness differ from one another?"). Addressing such questions will involve not just a first-person approach to conscious states, but a richly context sensitive approach in which the interests, reasons and purposes of the subject are given account. The *functions* of consciousness and its structure are the target of such a context-sensitive approach. Merlin Donald (2001) has argued vehemently for a move to such a "why"-focused view. Donald arrived at this conclusion not from a theoretical standpoint, not via an enactive perspective, but through survey of a wealth of data concerning cognition and neural function. The enactive approach may provide a fresh perspective on old data, and more productive approaches to future research; fresh questions from a new set of assumptions.

How we view consciousness, as passive froth on cognitive function, or active and goal-directed "all the way down"; as abstract information processor or grounded in real world embodied constraints: these things are once more in review. The dynamic and deliberate nature of consciousness has be thrown into stark new relief by the enactive approach.

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Notes
1. Reactive conceptions of mind are prevalent in both behaviorist and many cognitivist accounts. The cognitive system seems often given the job of keeping track of the world in a dispassionate fashion, developing representational perceptions and drawing inferences in algorithmic determinism, driven by data.

References

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control.* Cambridge: Cambridge University Press.

Bandura, A. (1992). Self-efficacy mechanisms in psychobiological functioning. In R. Schwarzer (ed.) *Self-Efficacy: Thought Control of Action.*. Washington, D.C.: Hemisphere.

Chalmers, D. (1995). *The Conscious Mind.* Oxford: Oxford University Press.

Clark, A. (1997). *Being There: Reuniting Brain, Body and World.* Cambridge, Mass: MIT Press.

Clark, A. & Chalmers, D. (1998). The extended mind. *Analysis*, *58*, 7-19.

Collier, J. (2002). What is autonomy? *International Jn. of Anticipatory Systems*, *12*, .

Collier, J. (2000). Autonomy and process closure as the basis for functionality. *Annals of the New York Academy of Science*, *901*, 280-291.

Crozier, R. & Ranyard, R. (1997). Cognitive process models and explanations of decision making. In R. Ranyard, W.R. Crozier & O. Svenson (ed.) *Decision Making: Cognitive Models and Explanations*. London: Routledge.

Damasio, A.R. (1999). *The Feeling of What Happens.* London: Willian Heineman.

Damasio, A.R. (1994). *Descartes' Error.* New York: Papermac.

Duncan, J. (2001). Frontal lobe function and the control of visual attention. In J. Braun, C. Koch & J. Davis (ed.) *Visual Attention and Cortical Circuits*. Cambridge, Mass: MIT Press.

Eysenck, M.J. & Keane, M.T. (2000). *Cognitive Psychology: A Student's Handbook.* Hove: Psychology Press.

Frijda, N. & Moffat, D. (1994). Modeling emotion in cognitive studies. *Bulletin of the Japanese Cognitive Science Society*, *1*, .

Frijda, N. & Swagerman, J. (1987). Can Computers Feel? *Cognition and Emotion*, *1*, 235-258.

Glenberg, A. (1997). What memory is for. *Behavioral and Brain Sciences*, *8*, 1-55.

Hunt, E. (1994). Problem Solving. In R. Sternberg (ed.) *Thinking and Problem Solving.*. Hove: Academic Press.

Hurley, S.L. (2003). Animal Action in the Space of Reasons. *Mind and Language*, *18*, 231-256.

Hurley, S.L. (1997). *Consciousness in Action.* Cambridge, Mass: Harvard University Press.

Hurley, S.L. & Noë, A. (2003). Neural plasticity and consciousness. *Biology and Philosophy*, *18*, 131-168.

Hutchins, E. (1995). *Cognition in the Wild.* Cambridge, Mass: MIT Press.

Kahneman, D. & Tversky, A. (1979). Prospect theory: An analysis of decision making under risk. *Ecomometrica*, *47*, 263-291.

Lazarus, R.S. (1991). *Emotion and Adaptation.* Oxford: Oxford University Press.

Maturana, H.R. & Varela, F.J. (1987). *The Tree of Knowledge: The Biological Roots of Human Understanding.* Boston: New Science Library.

Maturana, H.R. & Varela, F.J. (1980). *Autopoiesis and Cognition.* Boston: D.Reidel.

Monsell, S. (2003). Task Switching. *Trends in Cognitive Sciences*, *7*, 134-140.

Monsell, S. (1996). Control of Mental Processes. In V. Bruce (ed.) *Unsolved Mysteries of the Mind: Tutorial Essays in*. Oxford: Erlbaum.

Newll, A. & Simon, H. (1972). *Human Problem Solving.* Englewood Cliffs, NJ: Prentice Hall.

Norman, D. & Shallice, T. (1986). Attention to action: Willed and automatic control of behaviour. In R.J. Davidson, G. Schwartz & D. Shapiro (ed.) *Consciousness and Self-Regulation*. New York: Plenum.

Panksepp, J. (1998). *Affective Neuroscience.* Oxford: Oxford University Press.

Power, M. & Dalgleish, T. (1999). Two routes to emotion: Some implications of multi-level theories of emotion *Behavioral and Cognitive Psychotherapy*, *27*, 129-141.

Thelen, E. & Smith, J. (1994). *A Dynamic Systems Approach to the Development of Cognition and Action.* Cambridge, Mass: MIT Press.

Varela, F.J., Thompson, E., & Rosch, E. (1991). *The Embodied Mind.* Cambridge, Mass: MIT Press.

Wegner, D.M. (1997). When the antidote is the poison *Psychological Science*, *8*, 148-150.

Wegner, D.M. & Wenzlaff, R.M. (1996). Mental Control In E.T. Higgins & A. Kruglanski (ed.)

Social Psychology: Handbook of Basic Principles. New York: Guildford Press.