

In search of the enactive: Introduction to special issue on Enactive Experience

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Abstract. In the decade and a half since the appearance of Varela, Thompson and Rosch's work *The Embodied Mind*, enactivism has helped to put experience and consciousness, conceived of in a distinctive way, at the forefront of cognitive science. There are at least two major strands within the enactive perspective: a broad view of what it is to be an agent with a mind; and a more focused account of the nature of perception and perceptual experience. The relation between these two strands is discussed, with an overview of the papers presented in this volume.

1. The centrality of experience.

In their introduction to *The Embodied Mind* (Varela *et al.*, 1991; hereafter EM), Francisco Varela, Evan Thompson and Eleonor Rosch observe that cognitive science, at the time of writing, had “virtually nothing to say about what it means to be human in everyday, lived situations” (Varela *et al.*, 1991: xv). At the time when EM was written, the primary focus of the interdisciplinary investigations associated with cognitive science was the nature of cognition, considered often in a rather narrow sense, as what humans do when they solve problems or seek to represent the world – the kinds of things that were relatively straightforward to model in (classical or connectionist) computer simulations. Since then the attention of the cognitive science community has broadened to include consciousness, emotion, dynamic embodied interaction with the world, and so on. In so doing it has come to be more closely in touch with everyday, lived human experience.

EM has played no small part in this broadening out of the interdisciplinary matrix. The ‘enactive’ approach, first given wide currency under that title in the book, has been supported by many over the intervening period. There have been a number of celebrated discussions of experience, consciousness and related topics, which have expressed specific allegiance to ‘enactive’ notions. Studies by Evan Thompson and colleagues on colour vision (e.g. Thompson, Palacios and Varela, 1992; Thompson 1995), and work by Francisco Varela and others on autopoiesis (Varela 1979; Maturana & Varela 1980), neurophenomenology (Varela 1996; Lutz & Thompson 2003; Thompson, Lutz & Cosmelli forthcoming), etc., provide examples of work aligned to the enactive approach. Recently some major collections of papers flying the enactive banner have been published, for example on empathy and intersubjectivity (Thompson 2001), and on visual consciousness (Noë, 2002;

see also the anthology of readings on philosophy of perception: Noë & Thompson 2002). A number of authors defend views closely aligned to the enactive approach, without necessarily calling themselves enactivists – for instance Andy Clark (1997), Susan Hurley (1998), and Kevin O'Regan (O'Regan and Noë, 2001a). 'Enactive' concepts have been appealed to in order to criticize established views on the neural correlates of consciousness (Noë and Thompson 2004); and to offer new approaches on neural plasticity (Hurley and Noë 2003), art (Myin 2000; Noë 2000), emotion (Ellis & Newton 2005; Colombetti and Thompson forthcoming), biology and ecology (Palacios and Bozinovic 2003), autism (Klin *et al.* 2003; Gallagher 2004), and other subjects. There have also been recent enactively-based studies of semiotics in organisms (Weber 2002; Weber and Varela 2002) and in robots (Ziemke and Sharkey 2001), linking the enactive approach with writers such as Susanne K. Langer, Hans Jonas and Jakob von Uexküll

Is there a consistent concept of the enactive which underlies these different studies? There is no simply-stated definition of 'enactivism' that trips off the tongue: rather it is a composite notion, which always did involve the collocation of several linked strands. One can, I believe, discern two major collections of ideas in the enactive approach. The first, which offers a broad approach to the nature of the mind, is most strongly associated with the work of Francisco Varela and Evan Thompson. The second is a more focused set of views concerning the nature of perception, as found in writings by Thompson, Alva Noë and Kevin O'Regan.

2. Enactivism as a broad account of mind.

Thompson (this volume) characterizes the broader enactive approach to mind in terms of five themes, which, taken together, may be seen as a multi-threaded answer to the following question: *What are minds, and how do they relate – epistemically and experientially – to the world?* The following response to the above question, couched in terms of these themes, may serve as a characterization of enactivism, broadly conceived. (a) Minds are the possessions of embodied biological organisms viewed as autonomous – self-generating and self-maintaining – agents. (b) In sufficiently complex organisms, these agents possess nervous systems working as organizationally closed networks, generating meaning, rather than processing information as inner representations of the external world. (c) Cognition, conceived fundamentally as meaning-generation, arises from the sensorimotor coupling between organism and environment. (d) The organism's world is 'enacted' or 'brought forth' by that organism's sensorimotor activity; with world and organism mutually co-determining one another, in ways that have been analysed by investigators in the continental phenomenology tradition. (e) The organism's experiential awareness of its self and its world is a central feature of its lived embodiment in the world, and therefore of any science of the mind. (For a parallel, and complementary, characterization of the 'enactive' approach, see Noë, 2001, footnote 9.)

In these themes can be discerned several well-known theoretical currents strongly associated with the enactivist approach, discussed at length in EM and in subsequent literature. The idea of enactivism, as thus proposed, can be

clarified by explaining what minds, on the enactive view, are not. For enactivists minds are *not*: information-processing engines, receiving external stimuli from a pre-existing world, which are transduced into internal neural representations, from which internal cognitive transformation processes recover, through complex computational operations, objective features of the world so as to generate appropriate motor actions on the world. The story of mind is thus not the story of an ‘input-output model’ in Susan Hurley’s (1998) phrase, where world and cognizing being exist as separate systems linked through the intermediary of internally manipulated representations.

A key underlying notion in the enactive approach, conceived broadly, is that living is itself a cognitive process – a process whereby a living being creates and maintains its own domain of meaningfulness, in generating and maintaining its own self-identity as an embodied organism. This idea powerfully counteracts what the authors of EM call (following Bernstein, 1983) the ‘Cartesian anxiety’ (Varela *et al.*, 1991, ch. 7). Since Descartes, western philosophers have been impaled on the problem of which, if any, of our internally generated representations of the world outside can be taken as reliable guides to the objective properties of that world. This anxiety generates the requirement that science, as a collection of systematic methods of knowledge-management should enable us to duplicate the world as faithfully as possible *in foro interno*, so as to enable us most effectively to fulfil our goals. This anxiety generates a dream and a nightmare – the absolutist dream of achieving a guarantee of objective truth in our internal representations, and the nihilist nightmare that such a guarantee is forever beyond us.

The authors of EM propose to steer a ‘middle way’ between the twin poles of the Cartesian anxiety, based on rejecting the idea of mind-as-representation. The middle way offered takes its inspiration from a number of sources: the work of Varela with Maturana on the notion of autopoiesis and cognitive closure, which offers a rich (yet, in EM, strangely muted) backdrop to the discussion in the book; the ‘entre-deux’ of Merleau-Ponty, according to which “(t)he world is inseparable from the subject, but from a subject which is nothing but a project of the world, and the subject is inseparable from the world, but from a world which the subject itself projects” (Merleau-Ponty, 1962, cited in Varela, *et al.* 1991, p 4); and finally the ‘middle way’ of the Madhyamika tradition of Buddhism, which asserts the ‘groundlessness’ of both the outer world and the inner world of the ego.

What is distinctive of the enactive approach, as set forth in EM, and in later works in that mould, is that these ideas are seen as capable of being taken into the heart of debates within cognitive science itself, so as to produce a series of contestations and reframings of that science. In producing a new approach to cognitive science, enactivism has provided a perspective on consciousness which offers solutions to puzzles that have grown up in the years since the first publication of EM, concerning the possibility and scope of a science, not just of cognition, but of consciousness.

For supporters of the informational/representational view of mind which is contested by enactivism, experiential consciousness is an embarrassment. Conscious feelings seem to play no part in the functioning of mind as the recovery of objective properties of the world, being either accidental accompaniments to the brain’s representations of the world, or simply a subset of those representations. Hence one reason for the prevalence of the ‘hard problem’ of consciousness as seen by supporters of the representationalist

view. The publication of EM predates most of the well-known articulations of the ‘hard problem’ (in particular Chalmers 1995, 1996). Yet subsequent work by enactive writers has offered important ways of responding to the challenges of the problem, and indeed in reconstructing the terms of the debate. Some of the relevant papers have been published in this journal (see, for example, Lutz 2004; Thompson 2004). The major contribution of enactivism in response to the hard problem is to say that the problem is itself misconceived – that it is self-generated, and insulated from a solution precisely because it presupposes a wrong-headed Cartesian framework – a unbridgeable dichotomy between mind and world, between ‘inner’ and ‘outer’.

Let us recall our earlier question: “What are minds, and how do they relate, epistemically and experientially, to the world?” We have seen how the Cartesian anxiety calls into question the validation of the epistemic relation of mind to the world, as it pictures that relation. The standard post-Cartesian view nevertheless has a pretty straightforward account of what that relation is: mind relates epistemically to the world by seeking to create internal tokens that adequately replicate relevant features of the outer world. But the standard view has nothing very clear to say about how mind relates *experientially* to the world – that is, about how the experiential or conscious features of mind function in relation to the world – other than offering a cognitivised account of consciousness that makes experiential features play an epistemic or quasi-epistemic role (for example by saying that perceptual conscious states are the bearers of information about sensorily-accessible parts of the external world). So puzzles about consciousness are almost inevitable on this picture, since the role of the latter is marginalized because of the dominant role played by cognition in that construction of mind.

On the enactive view, by contrast, cognition and experiential consciousness seem to be best seen as two parts of the same process, that of the lived, embodied action of the organism within its world. Neither cognition nor consciousness are processes that go on purely on the inside of the agent, but are rather fully-embodied activities of the agent that arise from its adaptive sensorimotor coupling with the world. Cognition and consciousness are both aspects of this adaptive sensorimotor coupling, and neither can be considered apart from the other. This, then, is one enactively-inspired response to the difficulties over consciousness that have been raised by philosophers over the years since the publication of EM. (There have been other complementary suggestions – for instance the proposal, by Varela, that neurophenomenology can be offered as a methodological remedy to the hard problem of consciousness (Varela 1996; Thompson, Lutz, Cosmelli forthcoming; see also Lutz 2004).)

3. Sensorimotor skill and perceptual consciousness

Alongside enactivism as a broad approach to mind, there is a more focused sense of enactivism, which deals specifically with perception. The most well-known source for enactivism in this more focused sense is a flagship paper on vision by O’Regan and Noë (2001a, b; see also, *inter alia*, O’Regan and Noë 2001c; Myin and O’Regan 2002; O’Regan, Myin and Noë 2004). These authors understand perception in terms of the exercise of a knowledge of sensorimotor contingencies. Noë has characterized this approach to perception as ‘enactive’,

emphasizing “the centrality of our possession of sensorimotor skills” (Noë 2002, p. 11; see also Noë 2004). The ‘enactive’ or ‘sensorimotor’ view of perception is developed against the backdrop of a series of puzzles about perceptual – in particular visual – awareness. For instance, we seem to have a rich, detailed perceptual grasp of a given visual scene – say a large buffet table overflowing with plates of various brightly coloured dishes – even though empirical findings about blind spots, saccadic smears, impoverished peripheral colour vision, susceptibility to change-blindness, etc. show that our visual apparatus provides a surprisingly impoverished tool for visually accessing the world. Why, then do we seem to have a feeling of a richly detailed visual scene wherever we look? Two proposed answers are, first (the ‘orthodox internalist’ view), that the rich detail is internally represented in the brain (through successive saccadic ‘raids’ on the scene), and our consciousness of the rich detail is based on that internal neurally-based inner ‘picture’; and second (the ‘grand illusion’ view), that we *don’t* have the richly detailed visual experience of the world that we think we have – that we’re wrong about how, visually, things seem to us. The enactive view of perception of O’Regan, Noë and others denies the ‘grand illusion’ claim, and therefore agrees that there is a problem of apparent visual richness that needs to be explained. However they reject the orthodox explanation, based on internal brain-based detail. Rather, their view appeals to the range of skills that perceiving agents have in picking up details as needed (for example through appropriate eye or head movements). So the rich, detailed perceptual presence of the array of dishes on the buffet-table is indeed a phenomenological reality for us (as the ‘orthodox internalist’ view asserts but the ‘grand illusion’ view denies), but the perceptual presence of that richness consists, not in an internally-constructed neural ‘snapshot’ of the scene, but rather in the access that we have to those various details via the exercise of our sensorimotor skills.

In O’Regan and Noë’s (2001a, b) extended presentation of their sensorimotor account of perception, the authors emphasize that this is as much an account of visual *consciousness* as of visual *cognition*. Other related work has emphasized the relation between the sensorimotor skills which are given extended treatment in their account and the perceptual phenomenology (for example Myin and O’Regan 2002). In their paper in the present volume, O’Regan, Myin and Noë develop this account of perceptual phenomenology further, suggesting that the phenomenal ‘feel’ of perception can be explained in more detail in terms of two key features of the perceptual situation. ‘Corporality’ refers to the way that changes in our bodily movements (even tiny ones) radically affect our sensory inputs – for instance, when looking at a cloud, by moving my head left, the cloud ‘moves’ from the centre to the righthand periphery of my visual field. ‘Alerting capacity’ refers to a (complementary?) property, whereby a change in the sensory input will elicit a motor response so as to orient attention towards the change – so that a large bird flying across the cloud will make me shift my gaze rightward, bringing the cloud back into the centre of the field. These properties are, according to the authors, experimentally measurable and, they claim, together capture the specially vivid feel of sensory phenomenality – the ‘what it’s like’ of seeing a bird flying across the sky – as compared with other phenomenal states, such as imagining a bird flying across the sky, or believing that birds eat worms.

These two properties highlight a more general point: for O’Regan *et al.* sensory consciousness is constituted by the skills involved in our perceptual

activity. This contrasts sharply with the view, widely held by neuroscientists and many philosophers keen to tie conscious states in with states of the brain, that conscious feels must be properties of specific internal neural activation patterns (see Noë and Thompson 2004 for an enactive critique of that view).

4. Contesting the sensorimotor account of perception.

This account of sensory consciousness offers an enormously rich and well-developed exploration of the idea that consciousness should be treated as inextricably bound up with the sensorimotor coupling of an organism with its world, rather than as an ineffable, mystery-engendering, inner process. Nevertheless it has excited considerable controversy. One possible ground for disquiet may be this: the central properties of corporality and alerting capacity are presented as keyed in to specific *changes*: bodily modifications and modifications to the scene. Yet much of the phenomenal character of the felt quality of vision and audition is based on the overall and ongoing nature of the visual or auditory manifold, rather than particular points of variation within that manifold. The authors appeal to the idea of *access*, via appropriate motor responses, to specific details, in order to account for this sense of an overall manifold. However it is not clear that our sense of the fullness of presence of this manifold as a totality can be adequately understood in terms of potentiality for motor activity to pick up such and such details. If I am listening to, say, the climax of Tchaikovsky's *1812 Overture*, the variations in my focal attention at each moment takes place against the background of an overarching grasp of that moment as a part within the musical unfolding. This overarching background is not merely material for possible sallies of attentive selection: rather it is the field within which such selective acts take place. (Also these attentive selections, in the case of audition at least, seem as much a matter of cerebral action as external bodily actions such as head movements.)

This, then, is one way in which the enactive or sensorimotor view of perception may need to be refined or supplemented. Many other criticisms have been offered, some more radical than others. Dan Hutto (this volume) sees an inbuilt ambivalence in the sensorimotor account. The latter puts great emphasis on the subject's *knowledge* of 'laws of sensorimotor contingency'. What kind of knowledge is this – declarative, practical or what? And does talking in terms of knowledge (of whatever kind) involve an inescapable reference to some kind of inner representations (which are entities that enactive accounts seek to remove from the discussion)? Hutto answers both questions in the affirmative, but suggests that a rather more radical, representation-free, account of enactivism, may be offered.

5. Embodiment, autonomy and adaptivity.

Earlier we distinguished between enactivism as a broad account of mind, and as a more focused account of perception. The enactive view of perception discussed above might be challenged, in certain details at least, by some people who prefer to pursue the theoretical development of enactivism from a broader viewpoint. Evan Thompson (this volume) offers certain critical comments on the views of O'Regan *et al.* as part of a discussion of a wider set of issues.

One of Thompson's concerns, in recent writings, has been to elaborate a broad view of what it is to be an embodied, autonomous agent. One issue that has been discussed by Thompson in various papers, is the apparent divergence between two possible ways in which our embodiment can be viewed. On the one hand we can take our embodiment as a *subjectively lived state* – we experience our lives as embodied selves; on the other hand our body exists as a *living, biological organism*. (See Hanna and Thompson 2003; Thompson 2004; this volume). A key question here is how one *experiences* one's own lived embodiment; and how one's experience of being embodied relates to one's experience of one's body as an object. Crucially, these two perspectives are complementary: one experiences one's body both as object (for instance as seen in a mirror) and, pre-reflectively, as subject. Any *scientific* account of the human organism must embrace both these complementary perspectives.

The question of embodiment relates to the sensorimotor account of perception discussed earlier. While sympathetic to this account, Thompson suggests that it needs to be supplemented by reference to various aspects of what it is to be an embodied, autonomous individual. For Thompson, as for many others, to be autonomous, or self-determining, organism is to be an *autopoietic* system (see Varela 1979; Maturana and Varela 1980; etc.). Autopoiesis has been defined in various ways: Thompson (this volume) characterizes an autopoietic system as one whose component processes must “recursively depend on each other for their generation and their realization as a system”, so that they “constitute the system as a unity in whatever domain they exist”. Any such system, in defining itself as a unity, also defines (enacts) its environment as a domain of meaning, and defines things in its environment as meaningful within that domain (in the way that, for instance, sugar is meaningful for bacteria). Could it be, then, that what is missing in the rather focused enactive account of perception proposed by O'Regan, *et al.* is a more widely enactive concept of the perceiver as an autonomous, or autopoietic, self-maintaining individual? This certainly seems to be Thompson's view, and it would be one way to unify the two strands of enactivism mentioned earlier.

The notion of autopoiesis, absent from early presentations of enactivism such as EM, has become prominent in recent writings in the enactive mould. Towards the end of his life Varela, with Andreas Weber, produced a revised account of autopoiesis (Weber and Varela 2002), tying it in with Kant's treatment of self-organization, and with the philosophy of biology of Hans Jonas (1966). Both Thompson (2004) and Ezequiel Di Paolo (this volume) have considered the impact of Jonas's philosophy and of Weber and Varela's 2002 discussion. Weber and Varela seek to show that autopoietic theory, and, independently, the work of Jonas, helped to provide an important new direction in biology, particularly in relation to teleology. Conventional biological science has difficulty in grounding teleology in a natural-scientific view of the structure and function of biological organisms. The common solution to this problem has been to assume that teleological notions do not refer to any processes intrinsic to biological systems, but rather enshrine a certain pragmatic or ascriptive attitude of the biologist. The question of teleology in organisms relates to two other important questions: how to delineate organisms from merely mechanical systems; and how an organism constructs its own identity.

However, is the notion of autopoiesis on its own sufficient to provide a grounding for inherent teleology, or for what Weber and Varela called ‘sense-

making' in organisms? Di Paolo argues, below, that it is not. Autopoiesis, strictly interpreted, is an all or nothing state: either you maintain a self-identity or you are nothing (other than dead, an ex-parrot). Teleology, on the other hand, implies a gradation from worse to better; a landscape of viability. The key to achieving the necessary variability across this landscape, and thus a perspective of meaningfulness, is, Di Paolo suggests, 'adaptivity' – the latter represents a separate property which requires its own analysis. Moreover, he claims, from these two key properties, a number of further properties can be derived, which help build up a full picture of an active, experiencing agent. This is certainly a promising view, but it remains to be seen whether the two notions of autopoiesis and adaptivity really are sufficient on their own to perform that kind of explanatory and constructive work that Di Paolo claims they can. Nevertheless this kind of discussion clearly helps to move forward the debate on enactivism in its broadest sense.

6. Enacting experience

The enactive approach has, as we have seen, sought to bring experience and consciousness to the forefront in cognitive science. The term 'enactivism' has come to be associated with (at least) two distinguishable, but linked, strands of reflection about cognition and consciousness. Yet both have been concerned to carry forward the insight, as expressed in EM, that "cognition is not the representation of a pre-given world by a pre-given mind but is rather the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs" (Varela *et al.*, 1991: 9) We have seen that one strand of enactivism has concerned itself specifically with perception, stressing the relation between perceptual cognition and the exercise of sensorimotor skills in interactions of beings with the world; the other, broader, strand of enactivism, draws more deeply from earlier work in volumes such as EM, and from work on autopoiesis and related notions. What both these strands have in common is a radical rejection of the idea that the mind is a 'mirror' of a pre-given world. Both stress the importance of seeing the relation between organism and world as an active relationship of dynamic coupling; and both stress the centrality of the phenomenology of an organism's experience of the world and of selfhood, but also of doing so in ways which are consistent with insights in phenomenology and with maintaining scientific rigour. While this has often meant critically targeting *idées reçues* within scientific research communities – such as the viability of the 'neural correlates of consciousness' programme – enactivist research has never divorced itself from science but has, on the contrary, continually developed its views "from within the heartland of science" (Varela *et al.*, 1991: 9). As such, enactivism should continue to provide crucial contributions to both philosophical and scientific investigations of mind and experience.

Background to this special issue.

The papers in this issue derive from a series of meetings held in the UK which discussed how recent work within the enactive framework furthered our understanding of consciousness, particularly perceptual awareness and intersubjectivity. These meetings were organized in Oxford in the summer of

2003 and in Brighton in the spring of 2004. All the contributors to the present issue, and to the planned later one, spoke at these meetings, which were designed to enable enactivism and related views to be discussed among a wider audience.

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