

# Phenomenology and Embodied Action

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**> Context** • The enactivist tradition, out of which neurophenomenology arose, rejects various internalisms – including the representationalist and information-processing metaphors – but remains wedded to one further internalism: the claim that the structure of perceptual experience is directly, constitutively linked only to internal, brain-based dynamics. **> Problem** • I aim to reject this internalism and defend an alternative analysis. **> Method** • The paper presents a direct-realist, externalist, sensorimotor account of perceptual experience. It uses the concept of counterfactual meaningful action to defend this view against various objections. **> Results** • This account of experience matches certain first-person features of experience better than an internalist account could. It is fully tractable as “normal science.” **> Implications** • The neuroscientific conception of brain function should change from that of internal representation or modelling to that of enabling meaningful, embodied action in ways that constitutively involve the world. Neurophenomenology should aim to match the structure of first-person experience with the structure of meaningful agent-world interactions, not with that of brain dynamics. **> Constructivist content** • The sensorimotor approach shows us what external objects are, such that we may enact them, and what experience is, such that it may present us with those enacted objects. **> Key words** • Neurophenomenology, perception, experience, sensorimotor contingency theory, direct realism, externalism, qualia, counterfactuals.

## Introduction

Neurophenomenology, as named and as practised, seeks to discover structural similarities between neural dynamics, as disclosed via physical and mathematical investigation, and experiential dynamics, as disclosed via the phenomenological method. It is the first half of this equation that this paper will question: the emphasis (in name and in fact) on *neural* dynamics. This emphasis on the neural (or certainly the internal) as the correlate of first-person experience remains a largely undiscussed bias in most enactive cognitive science, despite enactivism’s rejection of other internalist metaphors such as information processing and internal representation.

It certainly seems hard to imagine that my conscious experience now could depend constitutively on something other than what is happening inside me right now; even more so when we consider forms of experience such as imagination (in which no physical object of perception could even be argued to be currently acting so as to influence the ongoing experiential dynamics). Despite this difficulty, I will argue that the specifically *neuro-* aspect of the neurophenomenological approach is a further legacy of the internalist framework, one that can and should be rejected.

There is one research programme in particular within the broadly enactivist camp that already points in the right direction, towards understanding not merely that the world is constitutively involved in our experience, but also how. That programme is the sensorimotor approach, as introduced by Kevin O’Regan and Alva Noë (2001). I hope that the broad outlines, and even most of the details, of the sensorimotor view as presented here will be standard. But when it comes to the most externalist aspects of what I say, I am not clear whether Noë and O’Regan would fully endorse them. I certainly intend at least some of what I say in this respect to be novel (at best rather hidden and implicit in existing presentations of the sensorimotor theory).

Since this paper is aimed at a general audience, including some who may well be suspicious of the very notion of phenomenology (especially as to its claimed distinctness from the failed introspectionist paradigm of the late 19th and early 20th centuries), I will firstly say something brief to address these worries. Then I will outline neurophenomenology itself, defending the claim that (as actually practised, and despite its own claims to the contrary) it is essentially brain-focussed as regards the correlates of first-person experience. Thereafter, I will be in a position to explore and defend a non-

brain-based and sensorimotor view of experience, and to argue that such a view has advantages when applied on both the mind and the world sides of the “neuro”-phenomenology equation.

## Phenomenology and introspection

A key tactical problem for phenomenology in the cognitive sciences is that many who are outside the phenomenological tradition tend to dismiss phenomenology as a variant of introspectionism. In their excellent book reviewing phenomenology and its relation to the cognitive sciences, Gallagher & Zahavi (2008: 20) observe that Metzinger (2003) describes phenomenology as “impossible” (Metzinger 2003: 83) and as not able to “provide a method of generating any further growth in knowledge” (Metzinger 2003: 591). As Gallagher & Zahavi rightly note, Metzinger dismisses phenomenology as if it were a form of the failed introspectionist programme for psychology initiated, in the late 19th century, by James, Wundt and others.

The agreed (if perhaps slightly oversimplified) problem with introspectionism was that every laboratory came up with different results when they “looked inward.” As such,

it eventually came to seem empirically obvious to many of those working within the psychological sciences in the United States that there were no reliable, intersubjectively verifiable data to be found using the introspective method. Indeed, the behaviourism of the early and mid-20th century – the denial of any scientific reality whatsoever to internal mental life – arose precisely as a reaction to this perceived failure (Watson 1913).

Metzinger and others (e.g., Dennett 1991: 44) are expressing a reaction that is all too common within mainstream Anglo-Saxon cognitive science. These authors cannot see how phenomenology can possibly be anything distinct from introspectionism: the avowed aim of phenomenology is to access first-person data methodically, but do we not already know, from bitter experience, that such a research programme is doomed to failure?

This, from a certain, and not unreasonable, point of view, is a genuinely hard question. Introspectionism did fail to reach consensus on many key issues (Schwitzgebel 2012: section 3). Arguably, one reason for this was that introspectionists were misled, by their preferred theories, into finding what they expected to find in their own minds (cf. Dennett 1991: 67–68). But, by the same token, it seems very hard, perhaps impossible, to avoid having one's own (implicit or explicit) theories colour (or even fully structure) all of one's experience, be it introspective (Beaton 2009a) or exteroceptive.

How, then, should we proceed? As we will see in the next section, Varela urges us to take a “disciplined” (Varela 1996) approach to first-person science. By this, he particularly means to reference the extended, and carefully developed, body of work in the phenomenological tradition (see Gallagher & Zahavi 2008 for an overview). I would suggest that Varela also particularly means to contrast such work with the failed (and “undisciplined”) introspectionism. But can phenomenology really do anything differently? Or is it doomed to lead itself astray in the same way as introspectionism, only more slowly and carefully?

Even those of us without a very strong background in phenomenology will be aware that phenomenologists talk about procedures such as the phenomenological

*reduction* and *epoché* (Gallagher & Zahavi 2008: chapter 2). But what are these procedures? It might seem that these must be processes whereby the phenomenologist seeks to set aside the world and to focus only on experience itself (again, cf. Dennett 1991: 44). This, I believe, is a crucial misunderstanding of phenomenology (though it perhaps does describe what the introspectionists were trying, and failing, to do).

What alternative is there? As Gallagher & Zahavi describe it, the Husserlian *epoché* is not a process of setting aside the world, but rather of abandoning our habitual attitude to the world. As such, and as they clarify:

“The only thing that is excluded as a result of the *epoché* is a certain naïvety, the naïvety of simply taking the world for granted.” (Gallagher & Zahavi 2008: 23)

In a similar vein, Merleau-Ponty writes:

“The best formulation of the reduction is probably that given by Eugen Fink, Husserl's assistant, when he spoke of ‘wonder’ in the face of the world.” (Merleau-Ponty 1962: xv)

And also, strikingly:

“The most important lesson which the reduction teaches us is the impossibility of a complete reduction.” (Merleau-Ponty 1962: xv)

I take this to mean that you cannot completely stop taking the world for granted. You cannot turn away from the world completely, towards your experience of it. Stated baldly, this is because your experience of the world is a part of the world. More theoretically, we may well argue that this is because experience, in its very structure, entails the existence of the world that it is about (Putnam 1981: chapter 1; Martin 2006). Thus, phenomenology, correctly understood, and in contrast to introspectionism, does not suppose that we can or should turn our attention to some private, internal state or process. Instead, it requires us to attend more carefully to how the world is given to us. We will see below how such an approach can work, as we look at various phenomenological analyses, including Noë's detailed analysis of the case of perspectival vision.

## Neurophenomenology and experience

Neurophenomenology, as an explicit research programme going under that name, was introduced by Varela (1996). As Varela describes it:

“my proposal is that *disciplined first-person* accounts should be an integral element of the validation of [any] neurobiological proposal.” (Varela 1996: 344, original emphasis)

The first-person methods in question here are particularly those developed by the European phenomenological school (e.g., Husserl 1973; Heidegger 1962; Merleau-Ponty 1962). Of course, there are many more recent developments. For a typical and very relevant example, see Vermersch (1994) and Petitmengin (2006).

Varela explicitly makes clear, when defining the term “neurophenomenology,” that:

“‘neuro’ refers here to the entire array of scientific correlates which are relevant in cognitive science. But to speak of a neuro-psycho-evolutionary-phenomenology would be unduly cumbersome.” (Varela 1996: 330)

Of course, I cannot just ignore what Varela says here. But I do wish to argue that in practice, in most of neurophenomenology, including in Varela's own work, the strong implicit assumption is that only internal neurological happenings will be found to correlate directly with first-person experience itself.

For instance, later in the same paper, Varela says:

“Attention can be understood as one of the basic mechanisms for consciousness ... In recent years studies of electrical recordings and ... functional brain imaging have led to the identification of [three distinct] attentional networks [in the brain] ... involving orienting to sensory stimulation, activating patterns from memory, and maintaining an alert state. ... [E]xperiential distinctions between these forms of attention [will] require detailed structural investigation of the varieties of ways in which attention is manifest in experience. ... [H]ow is one to investigate the neural mechanisms relevant to consciousness unless

such experiential counterparts can be sufficiently discriminated, recognized and trained?” (Varela 1996: 341f)

I provide this relatively full quote to emphasize that when Varela says neural mechanisms, he means it: he supposes that it is the goings on in the brain that will directly correspond to the details of attention disclosed via phenomenology.

Equally, Varela's (1999) analysis of time consciousness (endorsed by Gallagher & Zahavi) proposes that...

“[a neural] integration-relaxation process at the 1 scale level [i.e., at a 0.5 to 3 second timescale] corresponds to the living present, and is describable in terms of the [Husserlian] protentional-retentional structure.” (Gallagher & Zahavi 2008: 81)

Once again, the assumption is that the temporal structure of experience, as uncovered by Husserlian phenomenology, corresponds to some aspect of neural dynamics. See also Lloyd (2002) for another equally phenomenologically informed author making similar background assumptions on the same topic.

Of course (and perhaps this goes some way to explaining the second quote from Varela, above), all of these authors recognise, and would be happy to emphasize if asked, that these neural dynamics are richly intertwined with the dynamics of the whole agent's embodied action over time. Still, there seems to be no hint, in practice, that the dynamical structure that corresponds to experience itself might lie anywhere other than in the brain. In contrast, I will argue below that the true third-person correlates of experience are to be found in the dynamics of an agent's embodied action.

As a final example in this vein, consider Evan Thompson's discussion of mental imagery (Thompson 2007: chapter 10). Thompson's main aim in that chapter is to argue that image-like experience (for instance visual memory, imagination) is not (not even phenomenologically) like viewing pictures. This seems laudable and correct. In fleshing out the alternative, Thompson states that:

“we do not experience mental pictures. Instead we visualize an object or scene by mentally enact-

ing or entertaining a possible perceptual experience of that object or scene.” (Thompson 2007: 269)

This, too, seems hard to disagree with, on at least some possible readings. Thompson elaborates this position by talking first about visual perception (of actual, present objects), and discussing, in informative and subtle detail, the many ways in which visual perception is phenomenologically unlike viewing a picture. Next, Thompson moves to the case of visual memory (introducing the technical notion of re-presentation: of having something before one's mind but as not present). Next, I suggest, Thompson makes a mis-step. He says:

“A tempting way to link these ideas to mind science would be to say that memory does not involve 'online' sensory experience – sensory experience appropriately constrained by current sensorimotor interaction with the environment – but rather 'offline,' simulated or emulated sensory experience ... an internal process that models but does not loop through peripheral sensory and motor systems (Grush 2004).” (Thompson 2007: 290–291)

Exactly how tempting does Thompson find this proposal? Next he discusses visualization (i.e., imagination), once again with much genuinely deep phenomenological insight. But then he sums up:

“We are now in a position to summarize the main point of this phenomenological analysis of imagery experience: this analysis makes no mention of phenomenal mental images, in the sense of phenomenal pictures inspected by the mind's eye. In visual imaging or visualizing, we do not inspect a phenomenal mental picture; instead we mentally re-present an object by subjectively simulating or emulating a perceptual experience of that object.” (Thompson 2007: 297)

And furthermore:

“If the proposal [which someone offers] is that a phenomenal mental image is simply a simulated or emulated perceptual experience, then the foregoing analysis can be taken to support this proposal. ... [A] phenomenal mental image is not a phenomenal picture in the mind's eye, ... it is, rather, the mental activity of re-presenting an

object by mentally evoking and subjectively simulating a perceptual experience of that object.” (Thompson 2007: 297)

This transition from talk of “enacting or entertaining” a possible experience (Thompson 2007: 269 & 279) to talk of “simulating or emulating” (ibid: 292ff) one occurs without explicit comment. Indeed, after introducing these terms (firstly with the caveat “tempting”) on the neurodynamical side of the equation (ibid: 290f), Thompson then uses them (without any caveat or explicit justification) on the phenomenological side of the equation in the rest of his discussion of imagery experience (e.g., Thompson 2007: 292, 295, 297 multiple times, 298–300). Surely this cannot be right? Nothing in Thompson's own phenomenological analysis seems to support the claim that imagery experience is like “simulating” or “emulating” anything, any more than it is like “viewing a picture.” Thompson talks about re-presenting; he talks about the fact that imagery experience is like visual experience in that we are related to the intentional (i.e., apparent) object of the experience as if from some particular visual point of view; he clarifies that in mental imagery we nevertheless have a different intentional attitude as regards the existence of the intentional object; and, moreover, that we do not suppose that our imagery experience is constrained, as perceptual experience would be by a real object. But none of this amounts to saying that imagery experience is phenomenologically like emulating or simulating “online” visual experience.

It seems that Thompson really does give in to temptation (albeit that his use of the word “tempting” indicates that he senses something wrong around here). But why would one be so much as tempted to use these words as part of the phenomenological description of experience, especially after saying so much that is right? It seems that the only possible answer can be that one wishes to connect the phenomenology to the brain science (in this case to the internal emulation ideas of Grush and others). And indeed this is precisely how Thompson puts it:

“A neurophenomenological approach to imagery experience would ... try to relate the ex-

periential structure of the visualizing act to the dynamical structure of brain activity. It would ... pursue a phenomenological analysis of the experiential structure of visualizing, and use this analysis to guide investigation of the neurodynamics” (Thompson 2007: 302)

This really is unambiguous. However, I will suggest, Thompson’s own phenomenological analysis supports a much richer conclusion, which is that visual memory and visual imagination are themselves types of relationship to the world. The phenomenological structure of such experience, then, would be a guide to the structure of our (objectively observable) relationship to the world. Can this work? Can imagery experience of non-present (possibly non-existent) objects be some kind of relationship to the world? I will return to the issue of merely intentional objects after first offering an externalist (i.e., world-involving), sensorimotor account of the perceptual experience of actual, present, veridically experienced objects.

## Perspectival experience

### From the first person

Let us take as our case study the example of perspectival experience, initially from the first-person point of view. By perspectival experience, I mean here to refer specifically to the sensory experience of inhabiting a three-dimensional (or 3D) world as such (i.e., *qua* three-dimensional world, with a practical, engaged sensitivity to the options for movement that the three-dimensionality of the world brings).<sup>1</sup> If we abandon the habitual attitude in such a case – if we do not just take the world for granted – what do we find? Following Noë (2004: chapter 3), we can note at least the following features. Firstly, we find that the world is always viewed “from here,” from a vantage point. What I can see depends, in certain regular ways, on where I look from. We also find that we can never see all of an object at once (except,

1 | This fits fairly well with another standard usage, according to which having “perspectival experience” refers to having experience from a particular point of view, in some perhaps more metaphysical sense than that intended here.

arguably, for some translucent objects). Which parts of an object I can see depend on where I am, and where it is. Furthermore, we find that objects look smaller when they are further away<sup>2</sup> and also that nearer objects occlude further objects (in ways that are changeable and reversible, depending on my, and their, movements).

One of Noë’s favourite examples in this respect is the case of the plate, or penny (or any given round object), which can and often does look elliptical “from here” (i.e., from any view except face on). The proper treatment of looks is not a simple thing (Noë 2003), but in this case we can certainly say that the directions in space that I would have to trace out, in order to trace out the outline of the tilted plate, are (objectively) the same directions in space that I would have to trace out in order to follow the outline of an elliptically shaped object viewed face on.

According to the sensorimotor analysis of experience (O’Regan & Noë 2001; Noë 2004), my ability to know what shapes I am looking at consists in my practical, engaged mastery of these kinds of regularities. Moreover, and more strongly, my practical, engaged “knowledge”<sup>3</sup> that such movements would trace the shapes of the objects with which I am interacting (combined with practical, engaged “knowledge” that I am picking up on these regularities in ways that depend on my eyes), is a fundamental, constitutive part of my visual experience of their shape, according to the sensorimotor account. (Further discussion of elements that are relevant to a more complete ac-

2 | This corresponds to the objective fact that objects subtend a smaller visual angle as they become more distant. Of course in one sense, if we properly understand that an object is further away, then it does not look smaller at all: it does not seem to be smaller. But it does look smaller in the sense that it looks like a nearer, smaller object, in just the same way in which an obliquely viewed penny looks elliptical (see main text).

3 | I use “knowledge” in scare quotes, because the abilities in question certainly are not full-blown propositional knowledge. On the other hand, they are not merely mechanical; they must be exercised in accord with the agent’s personal-level norms (see the section “Against some possible misreadings”).

count of experience occurs below in the sections “Against some possible misreadings” and “Qualia.”)

We normally take all of this first-person perspectival structure for granted. We just see an apple. We do not think about what it is to see it from here, to be able to move round it, and so on. But these further facts about my subjective experience of objects “from here” are there to be found if I look for them. Note that when and if I attend in this way to how the world is given to me, I do so not by looking inwards but by looking again at the world.

### From the third person

Now, these features of experience (which are easily taken for granted, but which are there to be found via careful phenomenological exploration) are not only subjective features of the way things are for me. They also correspond directly to objective, third-person features of what it is for me (or any such agent) to successfully occupy a three-dimensional world.

An example that helps to clarify this point comes from case studies that show that some congenitally blind artists paint using perspective (Kennedy & Juricevic 2002, 2006). At first, it seems that such artists must be doing no more than using a convention, presumably one that they have learnt to copy, through touch, from the work of sighted artists. That is, it seems natural to assume that perspective cannot be something with which they have direct acquaintance from their own experience. But this assumption is simply false, for perspective does exist when we reach out into the world by touch alone. Take the standard example of a receding railway track. The visual angle subtended by the nearby parts of such a track is large. The visual angle subtended by further and further parts gets smaller and smaller, tending to zero. But equally, if a blind person encounters parallel linear objects, then the angle between the two reaching movements needed to encounter the near parts of the two objects is large, and the angle between the two reaching movements needed to encounter further parts is smaller. It is true that a blind person is not going to encounter a vanishing point by means of touch alone (that is, you presumably cannot physically reach far



enough to get a good sense of that effect<sup>4</sup>). But perspective also exists in the structure of auditory experience. Imagine two people near you, talking. It is easy to localise where each of them is. But if they move further and further away, still talking, then the angle subtended at your location by their two voices gets smaller and smaller; it gets harder and harder to distinguish their two locations. This is not merely like a vanishing point. At a certain level of abstraction, dealing with angles and directions and abstracting away from specific ways of being sensitive to them, this is the same phenomenon, and it applies in all these sensory modalities (vision, reaching and touching, hearing).

It should be noted that this rich structure is not just something that can be described approximately, in words. Perspective has a rich mathematical structure, described by projective geometry (Stillwell 2005). Many of the basic mathematical structures involved (such as homogeneous coordinates and transformation matrices) are familiar to those designing the graphics engines used in computer games and movie CGI (Blinn 1996; Foley et al. 1996). At a yet more abstract level, this same topic can be studied algebraically in terms of the properties of the projective linear group (Semple & Kneebone 1952; Stillwell 2005). Several other aspects of group theory are also directly relevant to the structure of our action in 3D space, for instance the SO(3) group abstractly captures the rotational movements of 3D solid objects (Stillwell 2008).

But what exactly is the relevance of all this mathematical structure to experience? Am I (are Noë and O'Regan) saying that we have implicitly mastered all this highly complex mathematics, simply in inhabiting a 3D world as we do? Yes! The world we inhabit – the world for us – is a massively complex affair that we take for granted, and rightly so: being the kind of creatures that we are necessarily entails fluently inhabiting such a complex world, much as being a small bird necessarily (and additionally) entails navigating at speed through a complex maze of tree branches without a second thought.

4| Though cf. Froese et al. (2012).

## Against some possible misreadings

At this point, I should head off some possible misreadings of what has just been said. Perhaps the most central point I would wish to make is that in saying that an agent implicitly knows or understands the formal mathematics involved in interacting with 3D objects, I mean much the same as I might mean by saying that someone knows how to ride a bike. There is a lot that can be said explicitly, indeed mathematically (e.g., Meijaard et al. 2007), about how riding a bike works. An agent who knows how to ride a bike can do what is thereby described (and, no doubt, more) fluently and without explicit effort or thought. Nevertheless, and as I emphasized above, there is an incredibly rich structure present in what the agent therein implicitly knows how to do (whether it is riding a bike or perceiving). Certain rich, relevant truths about the structure of what the agent knows are revealed by the appropriate mathematics.

I realise that it will nevertheless strike some as phenomenologically inapt to describe such a fluently acting agent as in any sense understanding or knowing the relevant mathematics. Here, I offer an extremely brief defence of this way of speaking. Several thinkers (e.g., Shoemaker 1996; Hurley 1998) have argued that we have an implicit knowledge of self, simply in having mental states at all (and that we have this implicit knowledge in a sense that is equally applicable to less advanced agents, say animals, which have a mental life, but which do not and cannot engage in explicit reasoning about themselves). I would argue that the sensorimotor theory, in both my and Noë and O'Regan's presentations of it, talks about implicit knowledge of sensorimotor laws in very much an analogous way. Though I do not have space to develop the details here, this line of thought may lead to good reasons for describing such implicit fluency as knowledge. To develop the point further, I would draw a very close analogy with Shoemaker's insightful discussion (e.g., Shoemaker 1996) of the intimate logical relation between implicit and explicit self-knowledge. I would suggest that this same kind of link exists between implicit and explicit knowledge more generally. If

so, then the states that Noë, O'Regan and I have chosen to describe as implicit knowledge would be, at least, intimately logically related to other different states: states of explicit knowledge that (I have agreed) such agents certainly need not be in (and need not even be able to be in, given their mental limits).

To ward off a different type of misunderstanding, I am not claiming that everything that there is to say about experience can be captured using complex mathematics. Experience fundamentally involves norms on the sensorimotor account (e.g., knowing what to do, doing it correctly). Thus any claim that the nature of experience can be fully captured mathematically would amount to an example of the naturalistic fallacy, at least according to a widespread and compelling (if certainly not universal) conception of norms (Glüer & Wikforss 2010: esp. section 4).

This conception of norms, with its rejection of bald naturalism (e.g., McDowell 1996: xx and Lecture IV), is a position that I would suggest that the sensorimotor theory ought to adopt. I would also suggest that, broadly, the sensorimotor theory (at least as presented by Noë) already does endorse this view. However, I should also acknowledge that the sensorimotor account requires additional work (which I do not present here) at exactly this point, for the status of norms and of the personal level within the theory is not yet fully clarified. For instance, O'Regan seems happy to treat low-level sensorimotor abilities (e.g., keeping track of the changing outlines of 3D objects) as essentially sub-personal (O'Regan 2011). But this risks failing to explain the personal level correctly, for (according to the non-reductive view of norms that I have just endorsed) it is questionable whether it is possible to build meaning from "semantically innocent" materials, a way of stating the problem that Noë (2004: 29) credits to Searle (1992). Noë is sensitive to this issue, and no longer endorses exactly what he originally said with O'Regan about it (Noë 2004: 228f.). As I see it, the problem is that for lower-level sensorimotor abilities to play the role required of them, it would seem that they have to be not fully personal and yet not fully mechanical. If they were already fully personal, they would not be correctly suited

to play their explanatory role in the theory, the role of partially constituting personal-level, meaningful action. If they were fully mechanical, on the other hand, they would not be meaningful in the way that seems to be required if we are to preserve a non-reductive account of the personal level. Noë suggests that the problem can be finessed by downplaying the personal/sub-personal distinction (Noë 2004: 29–31), but I think we must probably accept that this remains a deep issue about which more needs to be said in order to fully clarify the sensorimotor view. For now, I think the most useful clarification that I can offer is the following. It would be a misunderstanding of the sensorimotor view to suppose that one can characterise the relevant, low-level abilities (i.e., sensitivity to directions in space, and so on), in the way required by the theory, without essential reference to the norms of the whole agent considered as a full-blown subject. What counts as succeeding or failing with respect to the low-level abilities is fundamentally related to the norms and purposes of the whole agent.

Moving on, I hope it is reasonably clear that I am not claiming that we need anything equivalent to a computer in our heads in order to compute the mathematics that describes the structure of our sensorimotor abilities. It is now well-established that there can be structure in a creature's action<sup>5</sup> that depends fundamentally on the structure of the world as much as on the structure of the nervous system (cf. Beer 2003; Izquierdo & Di Paolo 2005). Equally, the perspectival (and other) mathematics mentioned here does not describe what is going on in the creature's head; it describes what

5] "Behaviour" and "action" are also weasel words in this context, each having, in actual use, variable implications of full-blown normativity. Here I mean the norm-governed "action" of the agent (with the caveats given in the preceding text), and not merely its rule-governed "behaviour." However, that means I have cheated in citing the evolutionary robotics references, since these only unequivocally demonstrate that behaviour (i.e., in the completely rule-governed sense) depends on the world as much as the body. Nevertheless, I think these references strongly indicate that the norm-governed action of a physical creature may be equally world-involving.

the creature does. As to how it does it, that well may fundamentally involve the world as much as the head.

On this same point, to say that a creature knows how to enact such complex behaviour is not to say that the creature requires any representation of what it should do, held in its head or anywhere else.<sup>6</sup> It is simply to say that it can do what it needs to do, as and when it needs to do it. This knowledge – this ability to act appropriately – may well also be fundamentally world-involving. Certainly, recent work on the care of the elderly (see, e.g., Gitlin & Earland 2010) appears to indicate that aspects of human knowledge (of how to perform important daily tasks) are fundamentally world-involving in this way. Looked at this way, knowledge may be no more in the head than action is. Instead, knowledge can be seen as one key aspect of the exhibited, and counterfactual (for more on this, see the section "The role of counterfactuals" below), structure of a creature's embedded, embodied, normative action. Alternatively, one could perhaps say, knowledge can be seen as a property of the creature's "action-space," meaning by this to evoke a structured, abstract "space" of at least potential actions.

Against a final possible misunderstanding, and perhaps contrary to appearances, this account does not claim that our perceptual systems must follow precisely these mathematical rules for this theory of perception to be correct. On the contrary, it is to be expected that our perceptual systems, and our perceptually guided action, will only approximate to these rules. Nevertheless, the account predicts that to the extent that our perceptual systems do not follow these rules, this will count as misperception (misperception of the solidity and shape of objects, for instance). Indeed, well-known psychophysical results establish that faces (Valentine 1988) and other quotidian objects (Palmer, Rosch & Chase 1981) are much more easily recognised when seen in their canonical orientations. This failure to perceive (or, in this case, failure to perceive easily) is certainly a failure of a sort, as measured against the kind of abstract stand-

6] At least, not in any sense that tries to make "having the representation" separate from, and explanatory of, having the ability.

ards laid out here (albeit failure that is perhaps evolutionarily or psychologically understandable, Kahneman, Slovic & Tversky 1982). Such failure is not predicted by the present theory, but nor is it contrary to it. This is because the account presented here is intended as analytic philosophy rather than as a (more typical) scientific hypothesis. It is an analysis of what terms such as "perception," and "(solid, three-dimensional) object" actually mean. That is, it is an account of the way something has to (at least approximately) be, to count as a perceiver at all. Such points are familiar in the case of belief-desire analysis. Perfect rationality is implausible (perhaps impossible). For all that, we can only make sense of irrationality once we have an agent that is (broadly) rational. In the same way, if the present account is right, we can only make sense of misperception once we have an agent that (broadly) perceives in the way described here. Equally, like typical analytic philosophy, the account claims that aspects of the ways we use terms such as "perception" and "experience" can be more parsimoniously and consistently explained (for instance, in the ways emphasized in the section "Cases where brain dynamics cannot match experience" below) using this approach than under some standard, opposing approach (in this case, the internalist conception of experience).

Moreover, like any good philosophy of science (analytic or otherwise), the sensorimotor approach aims to say something of relevance to the working scientist. In this case, it aims to overthrow the conventional wisdom of the internalist approach to (conscious) experience, which supposes that phenomenal, first-person features of experience must somehow correspond to internal features of brain states themselves, considered apart from any relation to action. In contradistinction, the sensorimotor theory proposes that the study of perceptually guided behaviour, including the study of the ways in which such behaviour non-trivially involves the body and world, is fundamental to understanding the nature of perceptual experience itself, even in those cases of experience that do not involve occurrent interaction with the world. More strongly, but also clarifying the final part of the previous claim, the sensorimotor approach proposes

that states of agents are only ever states of experience in virtue of their (at least potential, see the section “The role of counterfactuals” below) relation to action, and not at all in virtue of any other, purely internal features.

## Other aspects of sensorimotor experience

The structure of perspectival sensory experience is a significant strand of the sensorimotor theory of experience. It helps to clarify what it is to occupy a world of 3D objects. But, of course, it is not the only sensorimotor regularity present in our experience. As we have seen, the 3D perspectival aspects of the world can be present to different sensory modalities. On the other hand, there are certainly aspects of the world that are specific to the sensory modalities. For instance: brightness and colour; timbre and pitch; smell; taste; felt surface texture. In all of these cases, phenomenologically, we just have the world before us in the first instance. As Heidegger so aptly puts it:

“We never ... originally and really perceive a throng of sensations, e.g., tones and noises, in the appearance of things ... ; rather, we hear the storm whistling in the chimney, we hear the three-engine aeroplane, we hear the Mercedes in immediate distinction from the Volkswagen. Much closer to us than any sensations are the things themselves. We hear the door slam in the house, and never hear acoustic sensations or mere sounds.” (Heidegger 1977: 136; quoted in Crane 2006)

By showing us how to (at least partially) stop taking the world for granted, phenomenology can help us to elucidate the structure of sensory experience from the first-person perspective. Equally, from the third-person perspective, it is possible to elucidate the sensorimotor structure of various experiences by elucidating what it is that we know how to do in having such experiences. Kevin O’Regan has done more than perhaps anyone else to make progress on this latter project (e.g., Philipona, O’Regan & Nadal 2003; Bompas & O’Regan 2006; O’Regan 2011). Colour, for instance, is taken to be a hard test case for the sensorimotor view. Surely the structure of my

colour experience cannot be exhausted by what colour perception enables me to do? However, O’Regan and co-workers have shown that there is an incredibly rich structure to how coloured surfaces interact with different colours of lighting and with the human visual system. The sensorimotor approach would take it that our perception of colour constitutively involves our implicit mastery of such regularities. An example of the potential explanatory power of this approach is provided by Philipona and O’Regan’s joint work on colour (Philipona & O’Regan 2006, 2008). In this work they claim, with some plausibility, to have provided a rigorous mathematical and psychophysical framework, based on the assumptions of the sensorimotor theory, that offers an (at least arguably) more parsimonious and (testably) more numerically accurate analysis of the unique, phenomenally non-mixed hues than has appeared in the extensive previous work on the topic.

## Cases where brain dynamics cannot match experience

In the above, I have tried to shift the emphasis from the normal neurophenomenological view, in which experience itself is still understood as going on in the head (even whilst it is accepted that bodily and worldly dynamics play a crucial role in brain dynamics), to a more radical sensorimotor view, in which experience itself is found to involve constitutively the (actual and available) embodied, norm-governed actions that a creature makes.

Once we start to see that such a view is possible, we find that it has other attractive features. In particular, there are at least two key aspects of experience, which are perfectly accessible given careful first-person attention, that logically cannot be as they phenomenologically seem to us to be, if experience depends solely on brain dynamics. An advantage of such a truly externalist view of experience, then, is that there need be no systematic error in such cases, no grand illusion (Noë 2002): when for us it is as if our experience has these world-involving features, it may be (and typically is) because it really does.

## Directness

Firstly, and most obviously, experience seems to be an encounter with the world itself. As Merleau-Ponty puts it (and cf. the Heidegger quote given earlier):

“When we come back to phenomena we find, as a basic layer of experience, ... not sensations ... , but the features, the layout of a landscape or a word” (Merleau-Ponty 1962: 25)

But nothing in brain dynamics can be an encounter with (things in) the world itself. So if experience corresponds to the brain dynamics, then experience cannot be the encounter with the world that it seems to be. Of course, the standard view only claims that internal states represent the encounter, not that they are the encounter. But the aim of the present paper is to argue that there is available an alternative, scientifically tractable view of experience, according to which veridical perceptual experience does not just represent the encounter with objects but instead is the encounter with objects, just as it naïvely seems to be.

The standard, internalist view presents a further problem. If experience corresponds directly only to brain dynamics, then it seems that all we can ever be sure about are those brain dynamics themselves (under their experiential guise). We would be pushed back to a standard, Cartesian-internalist view; for it is surely true that when we examine our experience, by whatever method, we can at best find signs of whatever might lie outside it, rather than any such (putative) things themselves. Thus, if experience itself does not involve the world, then we have to take it on trust (perhaps as some kind of inference to the best explanation, e.g., Jackson 1977) that the world really is the cause of our experience. All this, of course, is a standard Western view on the nature of experience. But it is not the only possible view. Not just within phenomenology but even within modern Western analytic philosophy, forms of the alternative view, which I am defending here, have been put forward by very well-known authors (for example, McDowell 1996; Martin 2006).

If this alternative view is right, if the world really is a constitutive part of our experience (and not just a constitutive part of the causal story leading to our experience),

then we are no longer left taking the world on trust. When everything occurs normally,<sup>7</sup> and when we take ourselves to know that a table is right there, in front of us, on the basis of our experience, we really do have knowledge that is based on the table itself.<sup>8</sup> Our perceptual experience (and hence our knowledge) constitutively involves the table, just as it seems to.

### Richness

A second, related, aspect of experience for which brain dynamics alone can never be a successful match is its richness. Experience presents the world to me as transcending what I know. Experience outruns us, surprises us. There is always more to find. To take an almost over-simplified example, consider the visual experience of a bowl of salad in a restaurant. To start with, there's just a salad there. But if I look more carefully, I may see the particular leaves. If I look more carefully again, I may see the veins on the leaves and the whorls of their edges. I may start to see particular colours that I had not noticed before. I can start to see the way the light and shade interact with those colours. If I look carefully enough, I will surely

7| “[W]hen we are not misled” as McDowell famously puts it (McDowell 1996: 9), and I very much intend what I say here to echo (as best I can) McDowell's very insightful analysis of perceptual experience.

8| Can this be right? I acknowledge that something else can play the role of the table (say, a very high tech virtual reality environment, if not fully, then certainly well enough to deceive me). Consequently, I will seem to know that there is a table there, but the thing playing the constitutive role in my experience is not a table (it is some aspect of the dynamics of the virtual reality). In that case, I am misled. Following McDowell, I believe that to focus on this would be to miss the point; the agreed fact that I can be misled should not be allowed to undermine the fact that there are other cases where my experience seems to, and does, directly present me with the world itself. It should be particularly noted that it is quite arguable that we cannot even discuss such error cases, *qua* error cases, without presupposing a wide background of normal, successful cases (cf. Davidson 1974; Putnam 1981: chapter 1; Martin 2006). The point, then, is that fully justified, true belief, extending all the way to the world, is both perfectly possible and quite normal.

start to see types of things that I have never noticed before.

The idea, here, is that the above considerations should lead to a specific phenomenological claim about experience. Various strengths of claim are possible. The strongest claim is that experience is inexhaustibly rich – that there is always more to be found. If (perhaps for theoretical reasons) we find that implausible, we might prefer to say that experience typically, or often, contains aspects, there to be found, that go beyond anything we might now have a name for or might have thought about as such before. It is, and it should be, hard (in some sense, impossible) to convey this richness in words. Examples (recalled or, preferably, lived through) are required. The bowl of salad scarcely does the issue justice. But consider car lights reflecting on a rainy road. Consider a bright, sunlit cornfield on a windy day. Or consider whatever view you now have, even if it is of a man-made, antiseptic office. Now, stop taking the world for granted, and look again at what is there to be found. You will find (I would suggest) that experience always goes beyond what we expect, is always capable of surprising us. This is the richness in question.

This richness of experience has been widely discussed in the debate over conceptual versus nonconceptual content (McDowell 1996; Peacocke 2001). However, I do not wish to discuss the conceptualism/non-conceptualism debate directly here but instead to make another point. The internalist conception of experience seems committed to supposing that experience, conceived of as occurring “in the head,” already contains all this richness (at least in key cases, such as looking whilst not moving). Thus, it would seem, the richness of the lettuce is somehow copied into corresponding rich dynamics in the brain. Then, on this view, our conceptual thought would be able to examine the richness of the lettuce because of these rich experiential dynamics, thereby finding what was already there to be found in the internal experience but was just not yet attended to.

However, according to the externalist conception of experience that I am defending here, it is the salad itself that contains all this rich detail, and our experience – which is the right type of skilful, involved interaction with the salad – is what enables us to

encounter new aspects of this richness as we attend to it.

Therefore, the internalist view can perhaps match the phenomenal richness of experience if experience is not really as rich as it at first seems to be. If experience is rich, but not inexhaustibly rich, then a certain complex brain dynamics, caused by the world, can be a good match for this. But if we really take seriously what we find when we stop taking the world for granted – that experience is inexhaustibly rich, because the world is inexhaustibly rich – then no brain dynamics can directly correspond to this encounter with worldly richness. However the ongoing dynamics of our entire brain-body-world interaction can be this encounter with richness.

## The role of counterfactuals

### Problems for direct and action-based analyses of experience

Despite the arguments above, there are various seemingly insuperable objections to any externalist, action-based analysis of perception. Here, I outline three such problems and respond to them. I will argue that they can all be addressed by one particular, additional, technical move, which is not often made, but which seems to me entirely necessary in order to defend an externalist view of experience successfully.

Firstly, we have a challenge (already mentioned above at the end of the section “Neurophenomenology and experience”) that applies not just to action-based accounts of perception in general but also to direct accounts of perception in general. Part of the aim of the present paper has been to argue that the sensorimotor account can be understood as a way of naturalising a certain, I hope reasonable, form of direct realism (see especially the claims above, in the subsection on “Directness,” about the constitutive involvement of physical objects in our veridical perception of them). The problem is that it may seem that neither type of view can deal with those forms of sensory experience that (seemingly) do not involve the world at all. I am referring to problematic cases such as hallucination and imagination; and especially, one might think, cases such as imagination of objects that do not exist at



all, such as unicorns, or even (alleged) cases of imagination of objects that cannot exist at all, such as square circles.

A second problem for action-based views of perception, which is often (and fairly) raised, is that such views seem incapable of dealing with the phenomenal experience of normal subjects who are not currently moving, and, *a fortiori*, with the experience of subjects who cannot move, such as patients suffering from locked-in syndrome (Laureys 2005).

Finally, it is very difficult (coming from a certain Western scientific background) to so much as begin to understand how experience could possibly depend constitutively on anything beyond the brain.

I will briefly say something about how one might respond to this last, more general worry, before returning to give a more detailed response to the first two challenges.

In support of the claim (which I wish to contest) that experience cannot possibly depend constitutively on anything beyond the brain, it may well be pointed out that changes in the brain generate changes in experience, and that changes in the world without changes in the brain apparently do not generate changes in experience. "Therefore," it might be argued, experience must "be in" (i.e., supervene on, correlate with the state of, etc.) the brain. This certainly is not a strict deduction, but I accept that it is a persuasive line of argument nonetheless, for the widely accepted claim that experience is somehow "in" the brain entails these two observations. Therefore any opposing theory, of the type I am proposing here, seems to be caught on the horns of a dilemma. Either it entails that changes in experience can occur with no changes in the brain, in which case it seems to be starkly false; or else, it seems, it amounts to no more than the unmotivated assertion that experience "just does" constitutively involve (certain aspects of) the interaction between agent, body and world. But if all changes in experience do in fact require a corresponding change in brain dynamics, why not just accept that experience directly involves only brain dynamics, which seem to be all and only what has to change in order to change experience?

In fact, it is not clear that either horn of the dilemma can successfully pierce the defences of the sensorimotor position. With

regard to the first horn, work in minimal robotics demonstrates that the very same state of the very same (type of) controller can be involved in two quite different types of structured action if that controller is embedded in two quite different worlds (Izquierdo & Buhrmann 2008). Therefore, if we are claiming that the structure of experience corresponds to the structure of available meaningful action, it is no longer obvious that changes only in the world cannot relevantly change that structure. As regards the second horn, I do not think the assertion in question is unmotivated. Indeed, I have tried to motivate it above. I have tried to argue that when we look at what we already (i.e., more or less pre-theoretically) mean by experience (including from the first-person perspective), we find that this corresponds much better to aspects of the extended dynamics of meaningful action than to anything occurring just in the brain. In particular, the discussion of phenomenal richness and directness aimed to show that the flow of experience can be better understood, from both the first and the third person, if we accept that veridical experience constitutively involves the experienced objects.

However, the arguments presented so far have concentrated mainly on interaction with present, veridically perceived objects, and may appear to have problems in other cases. So now consider again the case of the salad: if I choose to attend to a different detail, then I have indeed changed my brain state (or at least, my brain state has changed); but I have also changed my relation to the world. I am now poised to take different actions, to respond to different aspects of the world. This is not just a philosophical point: psychophysical experiments on covert attention do indeed show that subjects become poised to react differently when they attend to different parts of the world, even whilst keeping their gaze fixated on one unchanging point and their bodies effectively stationary (e.g., Carrasco & McElree 2001).

Given the relevance of what the subject is poised to do, the suggestion offered in this penultimate section of the paper is that the structure of experience corresponds to the structure of actual, and available, meaningful action. This fits with the Gibsonian no-

tion that we experience the affordances of objects (Gibson 1979). As far as I can see, such a move is necessary in order to achieve a defensible externalism about experience.

In order to discuss the structure of available action properly, we need to introduce the technical notion of the counterfactual. However, I will argue below, this apparently slightly abstruse philosophical notion refers to no more than a necessary and commonplace part of normal science.

A counterfactual is simply a statement about what would be the case if only some state of affairs *x* obtained. The key feature of *x*, in such counterfactual claims, is that *x* is, in at least some particulars, not the state of affairs that actually does obtain (hence, counterfactual). For instance, the following are all perfectly normal, justifiable and justified (in easily imaginable circumstances) counterfactual claims: that glass would break if I hit it with a hammer; I would be tired if I climbed all the steps in that building; I would see the pillar if only that mirror was not in the way, reflecting a different pillar.

### Arguments from illusion, hallucination and imagination

What do counterfactuals have to do with the problematic types of experience mentioned above as the first challenge for action-based views of experience? Consider the case of hallucination, for instance a hallucination of a tomato. In this case, the subject is either acting, or poised to act, as if there were a tomato in front of them when there is not. Thus, for instance, they would point out the directions in space of the outline of the tomato if asked. Or, if they are in a less cerebral frame of mind, they might still act as if there were a tomato-shaped object in front of them (with all the regularities for action that implies) when there is not. Note that counterfactuals are already in play, even if a subject is actively responding to their hallucination: they are responding as if what they hallucinate were the case, when, by definition, it is not. But we can also deal with the case where a subject is having, but not acting on, their hallucination. In that case, the subject remains disposed to act as if there were a tomato-shaped object there when there is not. The claim is that the at least counterfactual tendency to such action

is a central, constitutive part of the hallucinatory experience.<sup>9</sup>

There need be no specific, finite set of behaviours that corresponds to this disposition, for we are talking about meaningful norm-governed action, not mere meaningless behaviour. Nevertheless the relevant, at least counterfactual actions (which form a part of the creature's abstract "space of actions," as one might say) have objective (and objectively verifiable) structure, in this case, the structure of interaction with a tomato-shaped object.

I need not, and do not, claim that the action structure in hallucination is exactly like the action structure when encountering a real object. This would be to negate the two claims above, about the richness and directness of truly world-involving experience. Nevertheless, to a hallucinating subject, experience can seem (falsely, in this case) to have as much richness and directness as a real interaction with the world. It can seem, falsely, to such a subject as if they have normal, non-hallucinatory, rich, direct access to the world; they can (be disposed to) act, incorrectly, as if there were such access.

On the other hand, the structure of the action that a hallucinatory experience seems to make available may certainly be (in this case, not merely seemingly) for the subject, and for an observer, as if the subject were encountering the actual object – in relevant respects. For instance, this may be the case in respect of what actions they would take if they wanted to interact with the hallucinated object. This is important because this similarity can be quite enough to determine that it is a tomato that is being hallucinated, without having to be enough to entail that illusory experience is as richly structured as veridical experience. (Remember, it was suggested above that the true richness of an experience of an actual tomato consists precisely in its going beyond tomato-as-already-understood to the always unexpected more.)

9| On this interpretation, then, the sensorimotor approach must reject the coherence of cases such as super-Spartans (Putnam 1962), in which it is supposed that it is possible for agents to be in pain without, even counterfactually, being disposed to show behaviours corresponding to dislike or avoidance of that sensation.

Lastly, on this topic, since the position being defended claims that hallucinating or imagining subjects are at least poised to act as if they were encountering an actual example of the object that their experience only intentionally posits, there would seem to be a problem with experiences as of non-existent objects, such as unicorns or ghosts. Let us take it that there are no unicorns or ghosts. As such, it would seem to be impossible to act as if one were encountering a unicorn or a ghost, for there is no such way to act. If there is no such way to act, this counterfactual-act-based analysis of illusory experience must fail, it might be argued. However, I do not think this argument works. It relies on the implicit premise that if there are no such things as unicorns and ghosts, then nothing can even count as acting as if there were. But can this really be right? Is it not rather, as Shoemaker puts it at one point, that we can make little or no sense of a subject's hallucinating a ghost, unless "we at least have some idea of what would count as someone veridically perceiving ... a ghost" (Shoemaker 1994: 26, original emphasis)? For clearly, in point of fact, we do have some idea of what would count as actually perceiving a ghost (to wit: transparency, passing through walls, moaning; perhaps displaying a continuous mental life with some deceased human or other animal). We have this (perhaps only partial) understanding of what would count, even though we may well also believe that there are no ghosts as such anywhere and never will be.<sup>10</sup>

It might seem that the present position is still stuck on the case of impossible objects: imagining a square circle, say. But can we really imagine such things fully clearly? I agree that it may seem to me as if I am imagining such a thing fully clearly (as long as I am at least partially misled). But I think the correct general move here must be the same as Shoemaker's move just quoted: we can only really make sense of the idea of a subject imagining a square circle to the extent that we have some idea of what would count as encountering a square circle. If it ever seems

10| Indeed, it would seem equally hard to make any sense of the basic claim that there are no ghosts unless we have at least some idea of what would count as its being the case that there were.

to a subject that they are imagining a square circle, and if perhaps it even seems to one of us, as an observer, that such a subject is imagining a square circle, then this must be because we do have at least some idea of what would count as encountering a square circle.

### The challenge posed by locked-in syndrome

It is by now quite well-known that various brain scanning (functional magnetic resonance imaging, or "fMRI") experiments have shown strong evidence of preserved higher mental function in some severely paralysed patients (Laureys 2005), including some who had been previously diagnosed as being in a persistent vegetative state (i.e., effectively with no preserved mind and no hope of recovery). In a key experiment in this vein (Monti et al. 2010), one such patient was voluntarily able to imagine one of two different actions, in order to answer "yes"/"no" questions. The two imagined actions were either moving around a house or playing tennis, mental tasks already known to activate selectively two quite different, distinctive brain regions in normal subjects (thus the differential responses were in principle accessible by fMRI). The experimental protocol (what to imagine, how to use it to answer questions) was verbally explained to the patient. The patient then (to judge by the convincing results presented) voluntarily and actively engaged in the task, producing coherent, consistent and correct responses to the majority of the questions they were asked. The questions were chosen such that the answers were not known to the experimenters until after the questions had been asked, and the fMRI data evaluated.

From experiments such as these (and also from earlier, purely behavioural evidence, including first-person accounts – Bauby 1997) it is now widely recognised that a condition called locked-in syndrome exists. In this condition, patients have extremely limited or even no voluntary control of movement (e.g., only the ability to blink one eyelid), yet nevertheless retain, to a greater or lesser degree, conscious awareness of their environment and situation. The condition may persist over extended periods of months and years. Locked-in syndrome (LIS) seems to present a direct challenge to sensorimotor (and possibly other enactive)

views of experience. For instance, if perceiving a 3D object is knowing how to enact it (in the specific, externalist sense described above), then in exactly what sense (if any) does an LIS patient still know how to enact 3D objects, given that they cannot enact them?

Before attempting to answer this question, I will briefly outline some alternative responses that I believe are not sufficient. The sensorimotor view, as outlined above, claims that the structure of experience constitutively involves the at least counterfactual structure of perceptually-guided action. In contrast, most broadly enactive views take first-person, phenomenal experience to correspond most directly to some internal property of those physical systems that have it. Indeed, despite their label, enactive views typically follow Varela, Thompson & Rosch (1991) in taking certain key, internally-directed features of the dynamics of life (self-maintenance, autopoiesis) as key to a naturalist understanding of phenomenal experience. Nevertheless, all broadly enactive views emphasize action (at some level or scale) as at least one important part of their story. Thus, there are existing enactivist responses to the challenge proposed by locked-in syndrome.

One such proposed response is to argue that all mind is life, and that all life essentially involves continual, ongoing movement, at some scale or other (Froese 2012). Perhaps the initial part of this line of thought remains controversial, but the latter part seems eminently supportable. At the micro-level, cells are indeed continually active – literally in motion – in order to maintain life (see, e.g., Kapanidis et al. 2006 or the videos provided by the Harvard BioVisions website<sup>11</sup>). Nevertheless, this observation seems to be at the wrong level of explanation: how can sets of micro-movements amount to the kinds of things we have talked about above, such as knowledge of how to move in 3D space? This is not to suggest that there is no answer to such a question, but rather to suggest that we remain in need of such an answer. If micro-movements on their own are not enough, we still need to understand what is.

11 | Retrieved from <http://biovisions.mcb.harvard.edu/> on 24 May 2013.

Another enactive response to the LIS issue (Kyselo 2012) has been to argue that even though many types of interaction are lost in LIS, one key part of human identity, namely social interaction, can still be preserved, whether this is via eye-blinks or, in more extreme cases, only by the use of brain-computer interfaces. I certainly do not wish to question the relevance of this response to the locked-in condition, but it is not directly relevant to a defence of the specifically sensorimotor view of perception that I am endorsing here. It might furthermore be argued (Kyselo 2012) that certain purely internal, intentional transitions should already be counted as actions. There may well be a certain sense in which certain internal transitions can be counted as actions. But to count these directly as actions of the relevant type in the context of the issues being considered in this paper would be to lose track of the central role of actual, external, meaningful, embodied action that the sensorimotor view emphasizes.

However, Noë's own response to these issues would also seem unable to address fully the worries raised here. For instance, he observes that "strong empirical evidence ... suggests that some minimal amount of eye and body movement is necessary for perceptual sensation" (Noë 2004: 13). Such evidence certainly exists (Rolfs 2009): our eyes do indeed need to be continually in micro-motion in order to see. But can this requirement of minimal motion really be fundamental? Is it simply unimaginable that a non-micro-moving, artificial eye could successfully replace our own eyes (for instance in some, perhaps quite near, future scenario)? Or equally, do we really wish to be committed to claiming that any creature with such non-moving eyes could never truly see? Or never truly see except whilst moving its head? This hardly seems a strong line at which to defend the theory.

Noë also notes the importance of active (not just passive) stimulation during ontogenetic development (Noë 2004: 13). I have no wish to reject the importance of interaction with the real world, over both ontogenetic and phylogenetic time, in order to explain how it is so much as possible that any creature might come to see. But if that is all that is required, now, in order to be able to see, this changes the theory's key require-

ment for perceptual experience from the requirement of knowing how to interact to the requirement of having once interacted.

Several other points that Noë makes about this issue seem quite correct but they only go so far (Noë 2004: 12–14). Their force seems to be to emphasize, in various ways, how important it is to be able to interact knowledgeably with the world in order to see. Which returns us again to the case of locked-in patients. The key claim of the sensorimotor theory is that being able to perceive 3D objects (for instance; and *qua* 3D objects) involves pre-reflectively knowing how to interact fluently with such things in certain characteristic ways (the ways outlined above in the section on "Perspectival experience"). But in what sense, if any, can locked-in patients be said to have such knowledge, given that they cannot enact it? As discussed just above, if we give an internalist analysis of such knowledge, it threatens to destroy the externalist character of the account being developed here. But if we want to try to defend an externalist account (specifically, the externalist sensorimotor account being developed here), then we are forced back to the original question: in what sense, if any, can such paralysed subjects be said to have a current, ongoing, relational ability to perform these actions? The challenge posed by LIS to the sensorimotor theory consists, surely, in the *prima facie* obvious truth of the claim that these experiencing subjects have no such abilities. If this apparently obvious truth is correct, the most central claim of the sensorimotor theory must be wrong or, at best, seriously changed in character: for the ability to perceive could not then consist in the possession of such abilities. However, I will suggest, there remains an important sense in which such patients do still possess such abilities. Spelling out the relevant sense requires the use of counterfactuals. There are third- and first-person aspects to the response thereby made available, to the challenge to the sensorimotor theory posed by LIS.

On the third-person side, the compelling nature of the fMRI evidence about locked-in patients seems like strong evidence in favour of internalism. It is brain scanning that reveals preserved, coherent, reason-respecting activity, and we find these brain scans to be

good evidence for preserved internal mental life. I fully agree that such data is very good evidence for preserved “internal” (i.e., phenomenal, first-person) mental life, but I think it is far from clear that it is good evidence (only) for an internalist view of experience, because, I will argue, opposing theories (such as this externalist, sensorimotor one) can fit this data at least as well.

The externalist can and must appeal to counterfactual action to make sense of all this. In what sense does the locked-in patient still know how to interact with the 3D world? In precisely the counterfactual sense outlined above. The patient still could interact with the world if only  $x$  were the case, where  $x$  is (at least partly) counterfactual. For instance, if only they were provided with (and trained in the use of) a brain-computer interface device (which would allow them to act once again on their knowledge and desires); or, if only the localised, but crucially important, damage to their brain stems were somehow repaired or reversed, allowing them to act once again. As such, the sensorimotor theorist can and should maintain that (at least counterfactual) action remains a central, constitutive aspect of experience, even in the case of locked-in patients. Equally, I think, the sensorimotor theorist can maintain that the fMRI evidence mentioned above is good third-person evidence of preserved mental life, precisely because it (rightly) gives us a strong sense of what these patients would still do, if only they could.

It might sound as if this defence threatens to descend into triviality. Surely even a fully vegetative patient could successfully act again, if only their brain were replaced by a fully functioning new one or if only the extensive damage to their brain were somehow repaired or reversed. In response to this objection, we can note that in the case of LIS, but not in the case of the full-blown persistent vegetative state, it is the physical locked-in patient, without any counterfactual additions, who still knows how to act. How so? In the locked-in case only, what the patient wants to do (would do, if only they were enabled to) is up to them. More reductively, it is physically determined by their physical state, as it is now (i.e., as it is actually, not counterfactually). Thus the interesting parts of the relevant counterfactuals (i.e., the facts

about what the patient would do, if only they could) are already determined by the actual state of the patient, even though they may only be realised counterfactually. This is why it is right to say that it is the patient who still thinks, still has beliefs and desires, still wants, and knows, how to act.

Perhaps, then, this use of counterfactuals allows the sensorimotor theory to respond to the challenge posed by locked-in cases, at least as viewed “from the outside.” But does talk in terms of counterfactual action shed any light on the first-person case of LIS patients themselves? I have certainly tried to make it plausible above (especially in the sections “Perspectival experience” and “Cases where brain dynamics cannot match experience”) that thinking about the structure of experience in terms of the structure of available, meaningful action does indeed offer an excellent match for our first-person phenomenology. Here, I propose that once we have an understanding of the sense in which the relevant actions are available to the locked-in patient (to wit: actually available, if only some genuinely possible counterfactual were to obtain), then we can still argue that the first-person structure of their experience directly corresponds to the objective structure of the actions they would, might or could take, just as it does for us.

### Counterfactuals in everyday science

It should be noted that this talk of counterfactuals is not special pleading, which might make an already implausible theory even less plausible. Any such line of thought would be misplaced, for this type of counterfactual reasoning is omnipresent in everyday science. For instance, a physicist will happily say that something is a proton in virtue of how it interacts with other things, and will agree that anything else that would interact in exactly the same way is also a proton (essentially, by definition).<sup>12</sup> We do not refuse to categorise something as a pro-

12| Matter and anti-matter, sometimes raised as a counter-example to this kind of view, do not interact with things in exactly the same ways as each other, even though it is true that (most of) the differences between them can only be defined relationally and indexically.

ton because it is not (*per impossibile*) undergoing all the interactions that protons can undergo, at once. Rather we identify something as a proton when and because we have good reason to believe that it would interact as a proton interacts. Often, but not always, this good reason is that it has interacted in the past as protons do interact. But another reason, for example, might be that we have just done an experiment that we have good reason to believe produces protons.

The same goes for everyday objects such as tables. It is true that you might be misled (as you might be about a proton or about the presence of a mind) and that what you think is a table might not be a table. But usually, you take things to be tables when and because they are tables (i.e., things that afford table-ish interactions). So also with protons. And so also with subjective experience. It is already standard to accept that in belief-desire psychology, a belief is defined by its interaction with other mental states, including desires. Not, that is, just by the interactions it does have, but also by the interactions it could, or might, have. For instance, an eventual upshot of a belief can be (but need not be) action. Equally, a possible (neither necessary, in any individual case, nor sufficient, in any case) cause of beliefs is perceptual experience. Thus perceptual experience is another mental term in this same rich set, to be understood in terms of its interaction with other mental states and with their at least counterfactual upshot in meaningful action.

It should be emphasized again (cf. the sub-section on “Directness” above) that as with protons, so with minds: our understanding of actual cases of normal, non-misled, non-prevented, perceptually guided action are a central, non-optional part of this “at least counterfactual” action-based picture of experience.

## Qualia

This paper has discussed sensory experience, yet may seem to have neglected completely one key aspect of such experience, namely first-person phenomenal feels: qualia, or “what it is like.” Noë and O’Regan have, at different times, variously claimed either that the sensorimotor theory does provide a full account of phenomenal con-



sciousness, including qualia (O'Regan & Noë 2001: section 6), or else that something more is needed. Perhaps this is something related to the unity inherent in life, according to Noë (2004: section 7.8), or something more along the lines of Metzinger's self-model, according to O'Regan (2011).

It does seem that what we mean by "qualia" must be intimately related to the nature of self-knowledge (Beaton 2009a). However, I would suggest that Metzinger's model of self-knowledge is too cognitivist to fit comfortably with the sensorimotor account as presented here. Shoemaker, on the other hand, has offered a very deep analysis of the relation between self-knowledge and the ability to act for reasons (Shoemaker 1996). With the help of Shoemaker's account, it is possible to argue that the view of experience presented here already contains first-person, phenomenal properties (Beaton 2009a, 2009b).<sup>13</sup> Space precludes any detailed analysis of this issue here, but a brief account follows.

The claim is not that colour (to take the standard example), as experienced, exists purely in structure in the world (which we must learn how to "enact," i.e., behave appropriately towards). Nor is it that colour exists purely in our minds and not really in the world at all (as many have claimed, cf. Sellars 1956: §41). Rather, as we might expect from the preceding lines of argument, it is that colour exists in our interaction with the world (see Thompson 1995 for extensive arguments towards a similar conclusion).

However, an important part of what we bring to colour includes not just our knowing what colour is (*qua* interactable element of the external order, i.e., those aspects that O'Regan has done much to elucidate, as we saw in the section on "Other aspects of sensorimotor experience" above), but also our caring about colour: having affective, valenced reactions towards it. We also bring a long history of learnt association: red literally is like something for me, for instance, like spilled blood, or like burnt cinnabar. These personal reactions and associations are aspects of experience that O'Regan and

13| To avoid confusion, I should clarify that I thereby end up disagreeing with several aspects of what Shoemaker has, famously, said about qualia (e.g., Shoemaker 1982).

Noë barely mention. Perhaps some aspects of emotion and valence could be said to fall under their heading "grabiness" (aka "alerting capacity") (O'Regan, Myin & Noë 2005, 2006) but certainly not all. I have argued elsewhere (Beaton 2009b) that these personal, affective and associative parts of our mental lives are key elements in the full story about first-person, phenomenal experience. In particular, they are the key to the naturalisation of terms such as "qualia." Although these aspects of experience are personal (thus subjective, in a certain sense), they do not stray outside the full story about action for reasons.<sup>14</sup> Emotion or affect, for instance, is certainly required in such a story: you cannot have belief without desire, or action without motivation.

The overall claim, then, is that terms such as "phenomenal mind" and "subjective experience" (and, indeed, terms such as "belief," "desire," "knowledge," "emotion" – all personal-level mental terms) are not about brain dynamics; rather they are about the subject's (at least counterfactual) meaning-respecting, active relation to the world. If we keep this normative dimension in mind, then (I am claiming in this brief section and have argued in some detail in Beaton 2009b) we may find qualia, or something close enough to count, already present in this externalist, sensorimotor account of experience.

Note, in closing, that even if qualia exist in the structure of norm-governed action, this is not the whole story. We still need a satisfactory, naturalistic, but not reductive, account of the origin and nature of normative action itself. As Noë (2004: section 7.8) has indicated, it may be at this point that we find the most natural connections between a sensorimotor account of perception and other enactive views about the relationship between life and mind.

14| I would like to clarify that, in opposition to one important and well-known aspect of McDowell's work (as expressed, e.g., in McDowell 1996: 114–123), I would endorse the thesis that it is genuinely appropriate to talk about action for reasons in the case of some animals and of human infants, not just language-using human adults (see, e.g., Hurley 2003).

## Conclusion

This paper starts by briefly reviewing phenomenology and arguing that it can be defended against the charge that it is no more than a variant of the failed, late 19th century introspectionist programme. The paper then reviews neurophenomenology, and argues, with the help of several examples, that this research programme – as currently practised – shares one key assumption in common with cognitivism and internalism: the assumption that the most direct correlates of sensory experience are to be found in the structure of brain activity.

The paper then proceeds to argue for an alternative, externalist view of sensory experience. Based on Noë and O'Regan's sensorimotor theory of perception, it is argued that the structure of sensory experience should be seen as constitutively involving the structure of the meaning-respecting action that is made available to a creature in, and directly by, its encounter with the world. The perspectival experience of occupying a three-dimensional world is used as a case study from which to clarify and argue for this view. It is suggested that the same approach can be applied to all modalities of sensory experience.

The sensorimotor approach claims that there is very rich, mathematical structure to our experience; structure that we are normally oblivious to, in any explicit manner, but structure that is nevertheless implicit in the phenomenology, and equally present in the structure of our embodied action. It should certainly not be supposed that every truth about experience can be captured mathematically, for experience is norm-governed, not rule-governed. On a conception of norms that, I also suggest, the sensorimotor theory should endorse, normative facts cannot be reduced to rule-governed facts. Nevertheless there exists rich, phenomenologically relevant, mathematically tractable structure to our personal-level, norm-respecting action in the world.

It is next argued that there are certain phenomenologically apparent aspects of experience that must be a mismatch for how experience really is, if experience corresponds most directly to neural dynamics. However, these same aspects of experience can be exactly how things are, if experience



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itself is extended and interactional, as argued here. In particular, it is argued that the apparent directness and richness of experience can be exactly how things are, only according to an externalist view. According to such a view, experience literally (and simply) is an encounter with the world itself, in all its never-ending richness. It is the central advantage of the sensorimotor view of perception that it allows us to begin to spell out in some detail, and in a scientifically tractable manner, how this might be so.

Nevertheless, many readers will suppose that all externalist and action-based views of experience are doomed to failure. In particular, it may be supposed, arguments from illusion and hallucination show that experience cannot be a direct encounter with the world. Moreover, cases such as locked-in syndrome are taken to demonstrate that experience cannot fundamentally involve action.

Since these objections are often supposed to be infeasible, this paper takes the time to spell out a response to such challenges based on the notion of counterfactuals (hypothetical situations that are, in some way, counter to how things actually are). It is argued that the structure of experience corresponds to the structure of actual, and available, meaningful action. We can use counterfactuals to talk about the structure of available, but not necessarily taken, actions and thus to spell out the details of the

sensorimotor account of experience, such that it applies equally to normal and locked-in subjects. Furthermore, it is argued, illusion, hallucination and imagination are also best seen as at least counterfactual, action-based relations to the world. For instance, in imagining a tomato, we are acting (or are at least disposed to act) as if there were a tomato in front of us, when in fact there is not. More precisely, we are at least disposed to enact relevant aspects of that characteristic, sensorimotor profile of action that is only truly available, in its full richness, when we are in interaction with a real tomato.

Finally, it may seem that any purely action-based view of perception must lose touch with certain intrinsically first-person aspects of experience, such as qualia. This paper can do no more than briefly refer the reader to earlier work in which it has been argued that qualia themselves (or something recognisably like them) can be found already present within such an action-based view of perception.

The upshot of the above line of argument is not that we should abandon neurophenomenology (except, perhaps, for its misleading label). On the contrary, much of the present paper proceeds by means of a mutually informative, two-way exchange between the phenomenal first-person and the scientific third-person perspectives, exactly as advocated by proponents of neurophenomenology, from Varela (1996) on-

wards. Nevertheless, it is argued, we do need to abandon the last remaining internalism at the heart of the enactivist and dynamicist views: the essentially internalist claim that experience itself corresponds most directly to some aspect of internal dynamics. Typical enactivist views clearly emphasize that neural dynamics are richly intertwined with the dynamics of body and world. Nevertheless, as the examples at the beginning of this paper aimed to demonstrate, such views remain wedded to the assumption that subjective experience itself corresponds to some features of the internal dynamics, not to features of the open interaction with the world. We should abandon this last remaining internalism by adopting the sensorimotor view of experience. We thereby discover an account of experience that better unifies science and phenomenology.

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