Science Friction: Phenomenology, Naturalism and Cognitive Science

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Abstract
Recent years have seen growing evidence of a fruitful engagement between phenomenology and cognitive science. This paper confronts an in-principle problem that stands in the way of this (perhaps unlikely) intellectual coalition, namely the fact that a tension exists between the transcendentalism that characterizes phenomenology and the naturalism that accompanies cognitive science. After articulating the general shape of this tension, I respond as follows. First, I argue that, if we view things through a kind of neo-McDowellian lens, we can open up a conceptual space in which phenomenology and cognitive science may exert productive constraints on each other. Second, I describe some examples of phenomenological cognitive science that illustrate such constraints in action. Third, I use the mutually constraining relationship at work here as the platform from which to bring to light a domesticated version of the transcendental and a minimal form of naturalism that are compatible with each other.

1. Beginning in the Middle

Recent years have seen growing evidence of a fruitful engagement between phenomenology in the contemporary European tradition (that is, phenomenology as pursued by thinkers such as Husserl, Heidegger and Merleau-Ponty) and cognitive science.[1] This intriguing development marks a positive shift in the diplomatic relations between these two mighty intellectual edifices, since, historically

[1] For book-length examples, see: F.J. Varela, E. Thompson and E. Rosch, *The Embodied Mind: Cognitive Science and Human Experience* (Cambridge, MA: MIT Press, 1991); S. Gallagher, *How the Body Shapes the Mind* (Oxford: Oxford University Press, 2005); M. Wheeler, *Reconstructing The Cognitive World: The Next Step* (Cambridge, MA: MIT Press, 2005); E. Thompson, *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* (Cambridge, MA: Harvard University Press, 2007); S. Gallagher and D. Zahavi, *The Phenomenological Mind: an Introduction to Philosophy of Mind and Cognitive Science* (London and New York, NY: Routledge, 2008); and M. Rowlands, *The New Science of the Mind: from Extended Mind to Embodied Phenomenology* (Cambridge, MA: MIT Press, 2010). This is not an exhaustive list.

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speaking, their 'conversations' were either frosty or downright hostile. For example, phenomenological insights were often wielded in order to expose certain supposed limits, or even the fundamental misguidedness, of cognitive science as a branch of knowledge. The benchmark for such arguments was probably set by Hubert Dreyfus's seminal, phenomenology-driven analysis of why artificial intelligence (AI) has so far failed to produce machines that are smoothly and flexibly sensitive to context-dependent relevance, in the way that human beings routinely are.[2] One might wonder why it should matter to cognitive science if the research programme of creating intelligent machines (or of creating them in a certain way) is shown to be suspect. The fact is that AI, in its role as a source of basic concepts and models for mechanistic explanations of intelligence, is plausibly at the very core of cognitive science,[3] so any injurious attack on AI is arguably a blow to the very heart of cognitive science. Dreyfus's critique was just such an attack.

Or at least, that's what some people thought. Many AI practitioners, it must be said, took a rather different view, accusing Dreyfus of various misunderstandings regarding AI, of targeting obsolete programs, and/or of attempting to replace good (even if provisional and incomplete) science with (what they took to be) the nebulous mystery-mongering of phenomenology.[4] As I mentioned, diplomatic relations were not exactly cordial.

The historical furore surrounding Dreyfus's critique of AI, as fascinating as it is, is not the topic of this paper, although some of Dreyfus's philosophical views and arguments will figure importantly in what follows. The point in recalling the fracas here is only to illustrate the fact that the recent enthusiasm for combining phenomenology and cognitive science, even if it seems to some thinkers to be yielding explanatory insights, is far from uncontroversial. There remains work to be done to establish beyond doubt that the philosophical credentials of

[2] See e.g. H.L. Dreyfus, *What Computers Can't Do: A Critique of Artificial Reason* (New York, NY: Harper and Row, 1972); H.L. Dreyfus, *Being-in-the-World: A Commentary on Heidegger's Being and Time, Division I* (Cambridge, MA: MIT Press, 1990, chapter 6); H.L. Dreyfus, *What Computers Still Can't Do: A Critique of Artificial Reason* (Cambridge, MA: MIT Press, 1992).

[3] For this view of AI, see e.g. M.A. Boden, *Mind As Machine: A History of Cognitive Science*, **2** vols. (Oxford: Oxford University Press, 2006, chapter 4).

[4] For evidence and discussion of this response, see Boden, *Mind As Machine*, 838–49.

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any such alliance are in good order. In what follows, I shall endeavour to carry out some of that work.

As our opening, bite-sized history lesson indicates, we are joining the story of phenomenology and cognitive science in the middle. We are at a juncture where, as I like to think of things, two sorts of friction are in evidence. The first, which one might describe as a positive kind of friction, concerns the ways in which advances in our understanding of intelligent and skilful human activity may be achieved by allowing cognitive science and phenomenology to constrain or influence each other's projects and insights, that is, to exert productive cross-disciplinary friction on each other. The second sort of friction, which one might describe as negative in character, concerns the nagging suspicion that something here is not right, that there is a friction, in the sense of a tension or antagonism, between cognitive science and phenomenology, one that can be locked up only for so long before it escapes again to scupper any cosy rapprochement. At the point where these two kinds of friction meet ('collide' might be better) is the question of whether or not it is possible to reconcile the *transcendental* character of phenomenology with the commitment to *naturalism* that, as I shall claim, inevitably accompanies any research programme worthy of the name 'cognitive science'. The prospects for such reconciliation will be the ultimate theme of this paper, so let's bring the central issues into sharper focus by way of a preparatory tour of the intellectual terrain.

2. Something Nasty in the Woodshed

The fundamental character of phenomenology may be revealed, if we pause for a moment to confront the argument of one thinker who remains staunchly unconvinced by the strategy of deploying phenomenological insights within cognitive science. That thinker is Robert Rupert.[5] During his critical response to my own attempts to develop a Heideggerian cognitive science,[6] Rupert highlights my claim that our cognitive-scientific explanations should not be systematically at odds with the results of phenomenological analysis, a claim inspired by (although not identical to) McDowell's thought that our causal explanations of behaviour should not be phenomenologically

[5] R. Rupert, *Cognitive Systems and the Extended Mind* (Oxford: Oxford University Press, 2009).

[6] Wheeler, *Reconstructing The Cognitive World*.

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off-key[7] (more on McDowell later). Rupert's objections to my claim turn partly on the observation that, even though subjects' reports of their own cognitive processing are sometimes used as starting points for, or as data to be accounted for by, cognitive psychology, and even though introspection has occasionally proven useful in cognitive psychology as a guide to cognitive mechanisms, the fact remains that 'cognitive psychology does not give trumping power to such reports or take them as revealing, in some unqualified way, the details of the cognitive processes occurring at the time of the report'.[8] Moreover, Rupert notes, 'a large body of empirical results directly calls into question the reliability of subjects' reports on their own cognitive processing'.[9] Rupert is surely spot-on when he observes that, for most purposes anyway, cognitive psychology has drawn sceptical conclusions about such first-person reports. So, if phenomenology were nothing more than routine first-person introspective reporting of the kind Rupert targets, the claim that phenomenology might in general be a useful tool for constraining or shaping explanations in scientific psychology would be highly dubious, if not manifestly crazy. In that event, Rupert would be correct, and this would be a very short paper.

Although there is undoubtedly *something* right about Rupert's reasoning, our present investigation is far from over; for, in the end, Rupert is, I think, insufficiently sensitive to the nature of phenomenology, as practised centrally by Heidegger and others. To explain: One way of depicting phenomenology is as a theoretical (or, depending on one's account of what constitutes a theory, as a meta-theoretical) philosophical enterprise that, through an attentive and sensitive examination of ordinary human experience, aims to reveal the *transcendental yet historical* conditions which give that experience its form. The historicality in the picture here is ultimately a function of the hermeneutic character of human sense-making. Indeed, on the present view, phenomenological analysis, as an interpretative activity, is itself inevitably guided by certain historically embedded ways of thinking that the phenomenologist brings to the task, meaning that its results remain ceaselessly open to revision, enhancement and replacement. The historicality of sense-making is an issue to which we shall return. For the moment, it is the transcendental dimension of phenomenology that concerns us.

[7] John McDowell, 'The Content of Perceptual Experience', *The Philosophical Quarterly* **44** (1994), 190–205.

[8] Rupert, *Cognitive Systems and the Extended Mind*, 157.

[9] Ibid.

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Although the transcendental conditions of possibility whose articulation is the goal of phenomenological analysis are *presupposed by* ordinary experience, which means that they must, *in some sense*, accompany that experience, they cannot simply be read off from the surface of ordinary experience via some pre-theoretical introspective glance. Indeed, if the phenomenologists are right, the conditions in question are standardly concealed from any such untrained inward glance, which is why a disciplined and careful analysis of experience is needed to reveal them, and why phenomenology is not equivalent to routine introspection.

To illustrate this point, let's recall that Heidegger's phenomenological magnum opus *Being and Time*[10] has a spiral structure in which a sequence of interpretations of the conditions for human sense-making produces a systematically ever more illuminating comprehension of those conditions. In the opening phase of this interpretative dynamic, Heidegger claims that our everyday meaningful engagements with entities should be understood in terms of the now-famous phenomenological categories of readiness-to-hand and presence-at-hand. In the domain of readiness-to-hand, the skilled agent is absorbed in the context-dependent hitch-free manipulation of equipmental entities according to holistic networks of social norms, in such a manner that the subject-object distinction, and thus representational consciousness, is absent. For example, while engaged in trouble-free texting, the expert smartphone user will have no explicit conscious recognition of the screen or the (perhaps virtual) keyboard, in the way that one would if one simply stood back and thought about them. Nor indeed will she have any experience of herself as a subject over and against her ongoing activity. Dreyfus[11] calls this kind of activity *absorbed coping*, and notes that it is regulated by (i) the human expert's capacity to sense deviations from a contextually determined optimal balance with her environment, and (ii) her ability to smoothly adapt her behaviour to improve her performance and thus reduce her sense of being out of balance. In stark contrast to

[10] M. Heidegger, *Being and Time*, trans. J. Macquarrie and E. Robinson (Oxford: Basil Blackwell, 1962 [1927]).

[11] See e.g. Herbert L. Dreyfus, 'Why Heideggerian AI Failed and how Fixing it would Require Making it more Heideggerian', in P. Husbands, O. Holland and M. Wheeler (eds.), *The Mechanical Mind in History* (Cambridge, MA: MIT Press, 2008), 331–71, reprinted in J. Kiverstein and M. Wheeler (eds.), *Heidegger and Cognitive Science* (Basingstoke: Palgrave-Macmillan, 2012), 62–104. A shortened version appears under the same title in *Philosophical Psychology*, **20** (2007), 247–68. Another version appears in *Artificial Intelligence*, **171** (2007), 1137–60.

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the domain of readiness-to-hand, the domain of presence-at-hand is characterized by detached subjects who represent entities explicitly as objects with context-independent properties (measurable size, absolute spatial position, and so on). The key point about all this is that even the essentially preliminary structures of readiness-to-hand and presence-at-hand ('preliminary' in the sense that they are conditions of possibility stationed at the very first level of the ever-widening hermeneutic spiral) are the products of careful phenomenological analysis; they (or the entities as revealed by them) cannot simply be read off from philosophically unexamined consciousness. As Heidegger puts it, 'pre-ontologically [i.e., before analysis]… the entities which we encounter in concern [e.g. as ready-to-hand] are proximally hidden'.[12] Indeed, Heidegger's recognition of this proximal concealment means that he embraces an ontologically oriented version of the point that our naïve first-person experiential reports are likely to be misleading. To see why this is, note that when subjects make first-person reports on their own experience of absorbed coping, the very absorption in the world that characterizes such activity will be disrupted, meaning that the ready-to-hand nature of the equipmental engagements in question is ripe to be obscured through an interpretation of that experience in terms of present-at-hand structures such as subject and object. Disciplined phenomenological analysis corrects for this concealment of readiness-to-hand.

What the foregoing considerations tell us is that, in its transcendental dimension, phenomenology is not a matter of subjects merely reporting on their own cognitive processing, in the way that has been shown to be suspect by cognitive psychology. So, from what we have seen so far, Rupert's argument against the claim that cognitive science should refrain from being phenomenologically off-key falls short of its intended target.

That said, there is, as Aunt Ada Doom once reminded us, something nasty in the woodshed. It is surely plausible that a healthy respect for cognitive science requires a generic commitment to some variety of *naturalism* regarding human psychological phenomena. In other words, any philosophy of mind, cognition or human sense-making that rides shotgun with cognitive science must be naturalistic in form. So what is it for philosophy to be naturalistic in form? The animating principle of naturalism is that philosophy should be *continuous with* empirical science. Of course, all this does is make us wonder what 'continuous' means here. This is a tricky matter that will exercise us in what follows. What we can say at the

[12] Heidegger, *Being and Time*, 96.

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outset is this: however one chooses to unpack the notion of continuity in one's understanding of naturalism, it must have the consequence that constraints are placed on our philosophical theorizing about some set of phenomena by those results from empirical science that concern the same or related phenomena.[13]

If, as I have suggested, taking cognitive science seriously requires a commitment to naturalism about psychological phenomena, then the prospects for combining phenomenology and cognitive science rest, in part, on whether or not transcendental phenomenology is, or can be made, compatible with that naturalism. This is where we catch a glimpse into the woodshed, because, on the face of things, the phenomenologist will want to insist that the distinctive mode of human sense-making that is characteristic of cognitive science, which one might gloss as the objectification or mathematization of psychological phenomena, such that those phenomena may be revealed in terms of laws, algorithms, computations and/or statistical principles, will itself presuppose certain transcendental conditions of possibility that cannot themselves be brought within the explanatory reach of that scientific sense-making. For example, Matthew Ratcliffe[14] argues as follows: in a Heideggerian phenomenological framework, science (including cognitive science) reveals phenomena as present-at-hand; but phenomenological analysis tells us that presence-at-hand, as a mode of human intelligibility, tacitly presupposes a sense of *belonging to the world* on the part of the human sense-maker (roughly, this is the idea that the fundamental structures of intelligibility are constituted by us, which means that they are, in a way, familiar to us); and this condition of belonging to the world, because

[13] Some philosophers will want to complain that I have omitted a crucial element of naturalism, namely a commitment to some form of physicalism; for a characterization of naturalism that explicitly includes such a commitment, see e.g. K. Sterelny, *The Representational Theory of Mind* (Oxford and Cambridge MA: Basil Blackwell, 1990). My own current view (which represents a shift since Wheeler 2005) is that this extra requirement is either unnecessary (since some form of physicalism will be assumed by science, which, on continuity grounds, means that a commitment to whatever form of physicalism that is will become a constraint on philosophical theorizing) or wrong (since science will embrace the existence and the causal-explanatory powers of non-physical stuff, which means that continuity with science will not require a philosophical commitment to physicalism).

[14] Matthew Ratcliffe, 'There can be no Cognitive Science of Dasein', in Kiverstein and Wheeler, *Heidegger and Cognitive Science*, 135–56.

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it is presupposed by the very practice of scientific explanation, cannot itself be explained by science.[15]

The woodshed door is now wide open. Given that phenomenology takes itself to be identifying transcendental conditions for intelligibility that are presupposed by, among other things, scientific explanation, and given that naturalism requires that constraints be placed on philosophical understanding (of whatever form) by science, it looks as if the phenomenologist and the naturalist will each demand the unqualified right to trump the other's results. Thus we arrive at what is in truth a turbo-charged version of Rupert's point that there is a fundamental disagreement here over who gets to call the shots. And however one dresses up that disagreement, it doesn't look like the basis for a happy and productive intellectual partnership.

In what follows, I shall endeavour to make the woodshed benign. First, I shall argue that, if we view things through a kind of neo-McDowellian lens, we can open up a conceptual space in which phenomenology and cognitive science may exert friction of the positive kind on each other. Second, I shall describe some examples of what I shall henceforth call phenomenological cognitive science that illustrate this positive friction in action. Finally, I shall use the mutually constraining relationship at work here as the platform from which to bring to light a domesticated version of the transcendental and a minimal form of naturalism that are compatible with each other.

3. A Neo-McDowellian Lens

Although, in his paper 'The Content of Perceptual Experience'[16], John McDowell is not concerned with phenomenology in the contemporary European tradition, he nevertheless draws an important distinction that we can creatively appropriate to help us in our quest to relieve the tension between phenomenology (so construed) and cognitive science. The distinction in question is between two kinds of understanding – *constitutive understanding* and *enabling understanding*. Constitutive understanding, including the constitutive understanding of psychological phenomena, is a characteristic target of philosophy, although presumably not only of philosophy. It concerns

[15] Although this is the kernel of Ratcliffe's argument, I have suppressed some potentially important details. For a fuller discussion, see Michael Wheeler, 'Naturalizing Dasein and other (Alleged) Heresies', in Kiverstein and Wheeler, *Heidegger and Cognitive Science*, 176–212.

[16] McDowell, 'The Content of Perceptual Experience'.

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the identification, articulation and clarification of the conditions that determine what it is for a phenomenon to be the phenomenon that it is (e.g. what it is for a certain kind of creature to competently inhabit its world). Enabling understanding is the characteristic target of empirical science, including cognitive science, although presumably not only of empirical science. It reveals the causal elements, along with the organization of, and the systematic causal interactions between, those elements, that together make it intelligible to us how a phenomenon of a certain kind could be realized or generated in a world like ours (e.g. how some creature-specific mode of competent world-inhabiting is causally enabled in a purely physical universe). The distinction between constitutive and enabling understanding, as manifested in the vicinity of mind, is nicely illustrated by McDowell when he writes:

> Of course, there is a relevant organ, the brain, and none of what I have said casts doubt on investigating how it works. But on pain of losing our grip on ourselves as thinking things, we must distinguish inquiring into the mechanics of, say, having one's mind on an object from inquiring into what having one's mind on an object is.[17]

Now if, as seems correct, phenomenology as we are thinking of it may be interpreted as seeking to provide us with a distinctive (transcendental) kind of constitutive understanding of human psychological being (in the widest sense of 'psychological'), and if, as also seems correct, cognitive science seeks to provide us with an enabling understanding of (i.e. the mechanics of) the same set of phenomena, then reflecting on the relations between constitutive understanding and enabling understanding will help us to chart the relations between phenomenology and cognitive science. In this context, the quotation from McDowell reproduced immediately above might be interpreted as suggesting that, in his view, constitutive understanding and enabling understanding are wholly independent of each other. However, that would be a misinterpretation of McDowell's position; for he actually claims that the two kinds of understanding will standardly engage in a process of mutual constraint and influence that he tags with the enticing phrase 'a perfectly intelligible interplay'.[18] Although McDowell himself says disappointingly little about the details of this interplay,

[17] John McDowell, 'Naturalism in the Philosophy of Mind', in M. De Caro and D. Macarthur (eds.), *Naturalism in Question* (Cambridge, MA and London: Harvard University Press, 2004), 104.

[18] McDowell, The Content of Perceptual Experience', 197.

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its broad contours seem clear enough, so we can begin with those, stated specifically in relation to phenomenology and cognitive science. Along one dimension of the interplay, there will be constraints that flow from phenomenology to cognitive science. This is because phenomenology, as a source of constitutive understanding, will isolate and articulate phenomena for which the corresponding cognitive science will then try to identify the underlying causal mechanisms. Along the other dimension of the interplay, there will be constraints that flow from cognitive science to phenomenology. This is because the causal profiles discovered by cognitive science may sometimes lead us to revise our conception of what the phenomena under investigation are. These general characterizations of the bi-directional influences in play here are no more than the abstract bones of a view. To put some flesh on the skeleton, we need to sample phenomenological cognitive science itself.

4. The Interplay in Action

Let's begin with a case in which a constitutive understanding, achieved through phenomenological analysis, exerts positive friction on cognitive science, by acting as a constraint on what might count as a compelling enabling account of a target phenomenon. That phenomenon is the fluid and flexible context-sensitivity of everyday skilled human activity.

Even in the sorts of dynamically shifting scenarios in which we often find ourselves, human beings are extraordinarily proficient at maintaining psychological and behavioural focus on what is contextually relevant in a situation, while ignoring what is contextually irrelevant. In his analysis of such dynamic relevance-sensitivity, Erik Rietveld[19] observes that, in a specific situation, some affordances (possibilities for action presented by the environment)[20] are no more than *mere* possibilities for action, where the qualification 'mere' signals the fact that although the agent *could* respond to them, such a response would be contextually inappropriate. For example, the table at which I am working currently affords 'dancing

[19] Erik Rietveld, 'Context-Switching and Responsiveness to Real Relevance', in J. Kiverstein and M. Wheeler, *Heidegger and Cognitive Science*, 105–34.

[20] The term 'affordance' is famously due to J.J. Gibson. See, e.g. J.J. Gibson, *The Ecological Approach to Visual Perception* (Boston: Houghton Miffin, 1979).

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on top of', but that possibility is not a feature of the paper-writing context in which I am presently embedded, so right now I am not primed to respond to it. Some affordances, however, precisely because they are directly contextually relevant to the task at hand, or have proved to be relevant in similar situations in the past, prime us for action by being what Rietveld calls *bodily potentiating*. It is these bodily-potentiating affordances that Rietveld, drawing on Merleau-Ponty,[21] identifies as *solicitations*. In Rietveld's framework, *figure solicitations* are those affordances with which we are explicitly concerned, in some extant context of activity. Thus, for example, in my current paper-writing context, my keyboard summons typing from me, because my bodily potentiation for the affordance in question has been activated. By contrast, *ground solicitations* are those with which we are not currently explicitly concerned, but for which we are nevertheless currently bodily potentiated, and which are thus poised to summon us to act. For example, the tea cup on my table that is peripheral with respect to my current focus of activity is nevertheless a feature of my paper-writing context and so is poised to summon me to act in appropriate ways. The shifting kaleidoscope of figure and ground solicitations, plus the fact that mere affordances can transform into solicitations as contexts change, provides the phenomenological structure of our skilled relevance-sensitive activity.

Crucially, according to Merleau-Ponty, the skilled know-how that is manifested in patterns of solicitation and summoning is not somehow internally represented by the agent.[22] To illustrate this idea, consider an example from Shaun Gallagher.[23] Phenomenological analysis teaches us that the skilled mountaineer does not build an inner representation of the mountain before her and infer from that plus additionally represented knowledge of her own abilities that it is climbable by her. Rather, from a certain distance, in particular visual conditions, the mountain 'simply' looks climbable to her. Her climbing know-how is 'sedimented' in how the mountain looks to her and thus may solicit the action of climbing from her. So what

[21] M. Merleau-Ponty, *Phenomenology of Perception*, trans. C. Smith (London and New York: Routledge, 1962 [1945]).

[22] For this point, see e.g. Dreyfus, 'Why Heideggerian AI Failed and how Fixing it would Require Making it more Heideggerian', 340.

[23] Shaun Gallagher, 'Are Minimal Representations still Representations?', *International Journal of Philosophical Studies*, **16** (2008), 351–69, special issue on 'Situated Cognition: Perspectives from Phenomenology and Science', M. Ratcliffe and S. Gallagher (eds.).

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are the phenomenologically identified transcendental conditions for this nonrepresentational experiential structure? In relation to this question, Dreyfus writes that 'all coping… takes place on the background of [a] basic nonrepresentational, holistic, absorbed, kind of intentionality, which Heidegger calls being-in-the-world'.[24] This introduces us to the phenomenon of the *background*. As described by phenomenologists, the background is the vast, holistic, indeterminate, and therefore *unrepresentable*, web of embodied, psychological, social and cultural structures that constitute one's world and that are implicitly presupposed by concrete examples of human sense-making. It is, as Taylor[25] puts it, 'an unexplicated horizon' providing 'the vantage point from out of which' every experience is relevant to one in a certain way. And the associated phenomenon of knowing one's way around the background (Heidegger's being-in-the-world, as Dreyfus interprets it, and, in effect, what Ratcliffe calls our sense of belonging to the world – see earlier) amounts to one's nonrepresented, indeed one's *nonrepresentable*, familiarity with one's world. Dreyfus calls the exercise of this nonrepresentational know-how *background coping*.[26] It is, then, the configuration of the skilled mountaineer's background and her familiarity with that configuration which determine that her experiential encounter is of the mountain as being climbable by (i.e. as potentially soliciting climbing from) her.[27]

[24] Dreyfus, 'Why Heideggerian AI Failed and how Fixing it would Require Making it more Heideggerian', 345–6.

[25] Charles Taylor, 'Engaged Agency and Background in Heidegger', in C. B. Guignon (ed.), *The Cambridge Companion to Heidegger* (Cambridge and New York, NY: Cambridge University Press, 1993), 325.

[26] Dreyfus, 'Why Heideggerian AI Failed and how Fixing it would Require Making it more Heideggerian'.

[27] Here I do not have the space to discuss in detail the arguments that might carry us from 'vast and holistic' to 'indeterminate' and, ultimately, to 'unrepresentable'. For present purposes it is enough to register (i) the general thought, which is surely plausible enough, that massive holism and indeterminacy are obstacles to representation, (ii) the fact that phenomenologists, especially those of a Heideggerian persuasion, often adopt a nonrepresentational constitutive account of human sense-making on precisely those grounds, and (iii) the fact that, as we shall see, a nonrepresentational constitutive account of sense-making has, in some quarters, placed a constraint on the cognitive-scientific account of the enabling mechanisms underlying relevance-sensitivity. That said, it is worth noting that the central considerations in the frame here are Heidegger's account of everyday contexts as massively holistic networks of meanings, coupled with his

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So, phenomenological analysis, a form of constitutive understanding, reveals background coping to be a transcendental condition for relevance-sensitive activity, and, moreover, characterizes such coping as essentially nonrepresentational in character. If we now activate the constitutive-to-enabling dimension of our neo-McDowellian interplay, the job for cognitive science is to specify the causal elements and their organization that make it intelligible to us how background coping could be realized in a world like ours. With due caution, and with caveats about defeasibility, the intelligibility condition in force here can plausibly be met in those cases where we are able to specify a candidate mechanism for background coping that, in some nontrivial way, is *structurally isomorphic* to the target structure as characterized by phenomenology.[28] What we are looking for, then, is a nonrepresentational mechanism that makes the relevance-sensitivity of ordinary human activity unmysterious.

Although Dreyfus doesn't explicitly articulate any between-level constraint flowing from phenomenology to cognitive science, in the way that I just have, the fact remains that an implicit commitment to such a constraint on his part would explain why, when he discusses the kinds of mechanisms that might underlie our capacity for background coping, he turns to the neurodynamical framework developed by Walter Freeman.[29] According to Freeman, the brain is a nonrepresentational dynamical system primed by past experience to actively pick up and enrich significance. It is a system whose constantly shifting attractor landscape causally explains how newly encountered significances may interact with existing patterns of inner organization to create new global structures for interpreting and responding to stimuli. As Dreyfus puts it, when considering the kind of bodily potentiating affordances highlighted earlier:

> If Freeman is right [...] our sense of other potentially relevant familiar situations on the horizon of the current situation, might well be correlated with the fact that brain activity is not simply in one attractor basin at a time but is influenced by other attractor basins in the same landscape, as well as by other

admittedly sketchy treatment of what he calls *value-predicates*; Heidegger, *Being and Time*, 97, 132. For discussion, see e.g. Dreyfus, *Being-in-the-World*, chapter 6; Wheeler, *Reconstructing The Cognitive World*, chapter 7.

[28] For a more careful justification of this appeal to structural isomorphisms, see Wheeler, *Reconstructing The Cognitive World*, 225–36.

[29] See e.g. W. Freeman, *How Brains Make Up Their Minds* (New York: Columbia University Press, 2000).

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> attractor landscapes which under what have previously been experienced as relevant conditions are ready to draw current brain activity into themselves.[30]

Dreyfus's Freeman-inspired model thus plausibly captures an important dimension of the mechanisms underlying our relevance-sensitive behaviour, by showing us how flexible relevance-sensitivity in response to shifting patterns of solicitation may be enabled by a nonrepresentational neural economy of reconfigurable attractor landscapes. It is arguable, however, that the resulting picture of the mechanisms underpinning background coping is ultimately incomplete. Here I want to focus on one aspect of this alleged incompleteness, by raising the possibility that the *blanket* anti-representationalism of Dreyfus's account is, in truth, misguided, and that in *proactive* as opposed to *reactive* cases of contextual shifts, representational resources, paradigmatically in the form of (what I shall call) preparatory embodied routines, may sometimes reconfigure the background so as to promote future behavioural success.[31] This is an interesting prospect in itself, but the main point of exploring it here is that, following some phenomenological ground-clearing, it will allow me to give an example in which an inter-level constraint flows not from phenomenology to cognitive science, but rather in the reverse direction.

To bring our putative representational contribution into view, let's begin with the observation that skilled sportsmen and sportswomen, actors and actresses, dancers, orators, and other performers often execute ritual-like gestures or other fixed action routines as performance-optimizing elements in their pre-performance preparations, especially when daunting or unfamiliar conditions are anticipated. Thus, as John Sutton points out, expert batsmen in cricket use

[30] Dreyfus, 'Why Heideggerian AI Failed and how Fixing it would Require Making it more Heideggerian', 360.

[31] This particular idea is developed and defended in more detail in Massimiliano Cappuccio and Michael Wheeler, 'Ground-Level Intelligence: Action-Oriented Representation and the Dynamics of the Background', in Z. Radman (ed.), *Knowing without Thinking: Mind, Action, Cognition, and the Phenomenon of the Background* (Basingstoke: Palgrave-Macmillan, 2012), 13–36. For additional considerations regarding the causal basis of relevance-sensitivity, which explain why a key contribution will additionally be made by a kind of intrinsic context-embeddedness that is realized by non-Dreyfusian mechanisms of special-purpose adaptive coupling, see Wheeler, 'Naturalizing Dasein and other (Alleged) Heresies'.

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preparatory embodied routines to reset their response profiles at key moments in the game. As Sutton observes:

> When the match situation is changing rapidly and continually – over the crucial dying overs of a decisive one-day game, for example – good players will be constantly resetting their response repertoire in ways which may have been discussed or partly planned out in advance, either deliberately or simply as the result of the sedimented history of relevant experience. This doesn't mean deciding in advance that only one stroke is allowable "no matter what," but rather altering the probabilities of attempting certain shots to certain ranges of possible deliveries [...] One successful case was when, during the one-day internationals before the 2005 Ashes series, Andrew Strauss set himself more than once to get way across to the offside, outside the line of good-length balls from Jason Gillespie and use the pace to lift them over fine leg, a shot unthinkable in less audacious circumstances.[32]

For another example, consider the way in which King George VI, before broadcasting his historic announcement that the United Kingdom was entering the Second World War, furiously repeated certain tongue-twisters in an effort to overcome his relentless stutter.[33] In cases such as these, the extant local context of activity, far from smoothly summoning appropriate behaviour, actually hinders such behaviour to such an extent that the skilled agent's response is to suspend that particular pattern of direct coupling with his or her environment, and to use embodied routines in an attempt to reconfigure the local background into a more favourable set of solicitations into which to transfer his or her performance. The context-shifting at work here is thus not a reactive response to changing environmental circumstances, but rather a proactive intelligent strategy for adaptively structuring behaviour.

[32] John Sutton, 'Batting, Habit, and Memory: The Embodied Mind and the Nature of Skill', *Sport in Society* **10** (2007), 763–86, quotation from page 775. Sutton's example may be opaque to those readers who have not been initiated into the wonders of the incomparable sport of cricket. The key point of the example is that the batsman in question, Strauss, increased his scoring possibilities by expertly using his pre-shot bodily positioning and posture to alter the kind of shot that would be solicited from him by a certain sort of ball, as bowled by Gillespie.

[33] As immortalized in the 2010 movie *The King's Speech*. For further discussion, see Cappuccio and Wheeler, 'Ground-Level Intelligence'.

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How is this phenomenon to be explained? In order to establish a more favourable local configuration of the action-soliciting background, the intelligent agent must distance herself from the operative solicitations and summonings that are hindering, or that would hinder, her skilled performance. To appreciate what this process of 'distancing' involves, we can draw on Heidegger's analysis of the phenomenon of *un-readiness-to-hand*.[34] According to Heidegger, when absorbed coping is disturbed by broken or malfunctioning equipment, discovered-to-be-missing equipment, or in-the-way equipment, our encounters with entities have the character of un-readiness-to-hand, a phenomenological domain in which entities are revealed as presenting us with context-specific practical problems to be solved. With the agent no longer fully absorbed in hitch-free skilled activity, a kind of cognitive distance between that agent and her world is opened up, in the form of a nascent subject-object distinction. At this point, the agent-world distinction may become ever more pronounced with increasing levels of disturbance, until eventually the entities under study are encountered by the agent-as-subject as removed from the settings of everyday practical concerns altogether, and thus as fully-fledged present-at-hand objects. Alternatively, the cognitive distance involved in the problem-solving phase may be eliminated, as absorbed coping is re-established by the agent's problem-solving measures. I suggest that, phenomenologically speaking, the 'distancing' dimension of preparatory embodied routines may be understood on the model of un-readiness-to-hand, even though, in the case of such routines, the 'distancing' in question is proactive rather than reactive in nature.

So, how is it that an agent is able to gain competent and appropriate epistemic access to its world, in cases where it is not merely distinguishing itself from that world, but distinguishing itself from that world in a particular way – that is, precisely as a proto-subject distinguished from a collection of independent proto-objects? Although an answer to this question may not strictly necessitate the presence of cognitive structures that *stand in for* or *encode* worldly states of affairs, that is, of *representations*, it certainly warmly invites such a story. Therefore, we appear to be warranted in treating preparatory embodied routines as representing background structures, in the form alternative sets of solicitations. It is with this suggestion, however, that we run headlong into a problem; for if the phenomenological analysis of the background presented earlier is correct, then the background is not merely unrepresented, it is

[34] Heidegger, *Being and Time*, 102–7.

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unrepresentable. How can preparatory embodied routines represent the background, if the background is unrepresentable?

It is here that work in the sub-field of AI known as *situated robotics*[35] has plausibly made an important contribution to the conceptual toolkit available to the phenomenologist. In designing complete autonomous robots that are capable of integrating perception and action in real time so as to generate fast and fluid embodied adaptive behaviour, situated roboticists have shunned the classical cognitive-scientific reliance on detailed inner world models, on the empirical grounds that such structures are computationally expensive to build and, in dynamic environments, prohibitively difficult to keep up to date. The classical thought, that intelligent agents should build complete, detailed representations of the world, has been replaced by a different thought, namely that intelligent agents should regularly sense their environments to guide their actions. As the roboticists concerned are fond of pointing out, regular sensing is computationally cheap and the environment is always up to date. It is this distinctive behaviour-generating strategy, which Brooks tagged with the memorable phrase, 'using the world as its own best model', that marks out situated robots *as* situated.[36]

One might think that situated robotics, as characterized, identifies a class of wholly nonrepresentational enabling explanations. However, although many nonrepresentational mechanisms have been explored by the roboticists concerned, sensorimotor coupling of the kind advocated by such models has not always excluded representational structures. To cite an old (but far from rare) example of representational

[35] See, most famously, Rodney Allen Brooks, 'Intelligence Without Representation', *Artificial Intelligence* **47**: 1–3 (1991), 139–159, and 'Intelligence Without Reason', in *Proceedings of 12th International Joint Conference on Artificial Intelligence* (San Mateo, California: Morgan Kauffman, 1991, 569–95). Both of these seminal papers in situated robotics are reprinted in Brooks' *Cambrian Intelligence: the Early History of the New AI* (Cambridge, MA: MIT Press).

[36] In arriving at his enabling-level idea that the world is its own best model, it is possible that Brooks may even have been influenced, perhaps indirectly, by Dreyfus's phenomenological claim that 'The meaningful objects […] among which we live are not a *model* of the world stored in our mind or brain; *they are the world itself*'; Dreyfus, *What Computers Still Can't Do*, 265–6. For a description of the historical context that makes this a genuine possibility, see Dreyfus, 'Why Heideggerian AI Failed and how Fixing it would Require Making it more Heideggerian', 331–7.

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situatedness that I have used a number of times before,[37] Nicolas Franceschini and colleagues built a robot that successfully accomplishes the goal of navigating its way to a light source while avoiding obstacles.[38] In order to achieve the obstacle avoidance aspect of this goal, the robot identifies contrast points in the optic flow that were generated by its own bodily movement at the previous time-step. Taking these contrast points to indicate the presence of obstacles, it builds a temporary 'snap map' of regions to be avoided, located in terms of roughly specified bearings relative to the robot's own body. That information is then fused with information concerning the angular bearing of the light source (supplied by a supplementary visual system) and a direction-heading for the next movement is generated. That heading is as close as possible to the one that would take the robot directly towards the light source, adjusted so that it avoids all detected obstacles. Following a short movement along that heading, the process begins again with the building of the next temporary snap map.

For present purposes, the key point about all this is that the kind of enabling-level representation – sometimes called an *action-oriented representation*[39] – that is exemplified by the Franceschini et al. maps does not aspire to the sort of complete or detailed modelling of the world that tends to paralyze real-time action. Indeed, neither the shape nor the absolute position or orientation of detected obstacles is calculated or stored. Instead, a sparse, outcome-directed, egocentric and context-specific encoding supports a behavioural solution that, rather than being specified in advance in some internally represented objective space, is dynamically constructed through precisely the kind of repeated sensorimotor interaction that is indicative of situatedness.

This enabling-level, action-oriented representational solution is relevant to the apparent tension that exists between, on the one hand, the phenomenological analysis of the background as unrepresentable and, on the other, the representational understanding of background-reconfiguring strategies such as preparatory embodied routines. What our foray into situated robotics demands of the phenomenologist is that she separate out (a) the suggestion that we might

[37] See e.g. Wheeler, *Reconstructing The Cognitive World*, 196–8.

[38] N. Franceschini, J.M. Pichon and C. Blanes, 'From Insect Vision to Robot Vision', *Philosophical Transactions of the Royal Society, series B* **337** (1992), 283–94.

[39] See e.g. A. Clark, *Being There: Putting Brain, Body, And World Together Again* (Cambridge, MA: MIT Press, 1997); Wheeler *Reconstructing The Cognitive World*.

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engage with the background by determinately representing that structure in its entirety, from (b) the suggestion that we might engage with the background by selectively representing egocentrically specified, goal-specific aspects of it, and so facilitate an ongoing coupled interaction with structures that are sampled from it by way of those representations. Strategy (a) looks all set to run aground conceptually on the massive holism and indeterminacy of the web of conditions that constitute the background (just as it runs aground empirically at the enabling level). Strategy (b), which takes its cue from action-oriented representation, promises success precisely because the representational resources it deploys, such as preparatory embodied routines, encode solutions the exact form of which will be determined by the ongoing trajectory of our competent engagement in the world, rather like a traffic detour sign that, given one's practical know-how, indicates the way home. On the model of (b), representations do not detach the agent entirely from the background that defines her world (as might be concluded if representations are thought of solely as present-at-hand structures), but instead serve to reconfigure the solicitations which delineate her operative background, as part of her strategic inhabiting of the background as a whole. This implies that there are cases in which one should expect phenomenological analysis to uncover representations whose contents are sparse, outcome-directed, egocentric and context-specific. In other words, in rejecting blanket anti-representationalism regarding background coping, our understanding of the transcendental conditions for intelligent behaviour, as targeted by phenomenological analysis, has been shaped by what we have discovered in cognitive science about the kinds of mechanisms that may causally enable that same behaviour.[40]

I have now given a detailed example of each of the general constraints that are operative in our neo-McDowellian intelligible interplay. These are not isolated cases. For example, in the constitutive-to-enabling direction, Shaun Gallagher and Dan Zahavi[41] argue that, since disciplined phenomenological analysis suggests an experiential profile according to which perception is always perspectively

[40] In previous treatments (e.g. Wheeler, *Reconstructing The Cognitive World*, 'Naturalizing Dasein and other (Alleged) Heresies'.) I have presented the discovery of constitutive-level representations with an action-oriented profile as hailing largely from a creative phenomenological unpacking of Heidegger's notion of un-readiness-to-hand. These treatments were incomplete in that they were insufficiently sensitive to the extent to which this is a case of the science driving the philosophy.

[41] Gallagher and Zahavi, *The Phenomenological Mind*, 10.

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incomplete (i.e. we never see all of an object at once), even though objects are presented to us in perception as having aspects that, right now, we cannot see, the cognitive science of perception must respect and account for that profile. And in the enabling-to-constitutive direction, Helena De Preester[42] presents an analysis in which a consideration of mirror neuron research is used explicitly to drive the phenomenological-level claim that Merleau-Ponty's account of self-other understanding as world-mediated presupposes a Husserlian notion of pairing or bodily similarity. Such examples could be multiplied

Where are we in our analysis? Once we view the relations between phenomenology and cognitive science through a neo-McDowellian lens, it turns out that what is in force is a mutually constraining dialogue between those different intellectual frameworks that leaves no room for the kind of *unqualified* trumping of science by phenomenology of the sort that disturbs Rupert, but which might seem to be required by transcendentalism. Equally, however, that same dialogue leaves no room for the kind of *unqualified* trumping of phenomenology by science of the sort that will upset the transcendental phenomenologist, but which might seem to be required by naturalism. If this is right, however, then the philosophical waters stationed between cognitive-scientific naturalism and contemporary European phenomenology in which we are swimming seem to have become worryingly more, rather than comfortingly less, murky. What have we done?

5. Minimal Naturalism

As noted earlier, the animating principle of naturalism is that philosophy should be *continuous with* empirical science. In the present context, that thought gets translated into the demand that phenomenology should be continuous with cognitive science. One way of applying this demand would be to understand continuity in terms of the across-the-board reduction of pre-scientifically identified psychological phenomena to scientifically identified states and processes. But this sort of hard-headed reductionism is not the only option. As an alternative, we might read continuity with empirical science as requiring no more than *consistency with* such science. Let's call the resulting position *minimal naturalism*.

[42] Helena De Preester, 'From Ego to Alter Ego: Husserl, Merleau-Ponty and a Layered Approach to Intersubjectivity', *Phenomenology and the Cognitive Sciences* **7** (2008), 133–142.

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Minimal naturalism allows that, in specific cases, philosophically articulated psychological phenomena may be reduced to scientifically identified states and processes, since reduction, as distinguished from elimination, will trivially guarantee the consistency of philosophy and science.[43] Nevertheless, by taking continuity to require *only* consistency, minimal naturalism does not necessitate across-the-board reductionism in this area. Looked at another way, the minimalist position countenances the existence of psychological domains in which scientific-reductionist demands are inappropriate, without that fact necessarily posing any threat to the continuity constraint that animates naturalism. For example, the minimal naturalist might well hold that evolutionary psychology delivers important information about the cognitive mechanisms responsible for our moral deliberations. Moreover, that enabling understanding of the causal processes at work may identify, or place limits on, the kinds of factors to which a constitutive account of our moral reasoning ought to count us as being sensitive. But, given an interpretation of continuity in terms of consistency, even the latter contribution from psychological science, which exploits one of our channels of influence identified previously, doesn't compel the minimal naturalist to endorse other, less palatable views that might emerge in the general area of evolutionary naturalism, for example, that what a human being *should* judge to be morally correct should be reduced to whatever provides the best available outcome with regard to biological fitness.

One might worry that minimal naturalism, as I have just characterized it, waters down the scientific acid to such an extent, that the position now on offer, however attractive it may be as a philosophical view, no longer warrants the title 'naturalism'. Any such worry is, I think, misplaced, because the way to understand the all-important consistency condition is in terms of a further principle, one that has obvious naturalistic bite. That principle is (what I once dubbed[44]) the *muggle constraint*. To explain: In J.K. Rowling's Harry Potter

[43] Somewhat mysteriously, the distinction between reducing a phenomenon and eliminating that phenomenon is not always respected in philosophy. Nevertheless, that distinction is a crucial weapon in, for example, the arguments for eliminative materialism about the propositional attitudes, as developed by Paul Churchland. As he puts it, 'folk psychology is a radically inadequate account of our internal activities, *too confused and too defective to win survival through intertheoretic reduction*' (my emphasis); see Paul Churchland, 'Eliminative Materialism and the Propositional Attitudes', *The Journal of Philosophy*, **78** (1981), 67–90, quotation from page 72.

[44] Wheeler, *Reconstructing The Cognitive World*, 4–5.

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books there are two co-existing and intersecting worlds. The first is the magical realm, populated by wizards, witches, dragons, dementors, and the like. This is a realm in which, for example, getting from A to B can be achieved by flying broomstick, the floo network or apparition, and in which one object can be transformed into another by a transfiguration spell. The second world is the non-magical realm, populated by non-magical folk called muggles – muggles like us. Muggles are condemned to travel by the boringly familiar (to us) kinds of planes, trains, and automobiles, and to operate without the manifest benefits of supernatural object-altering powers. Now, if you want an understanding of how muggles work, you had better not appeal to anything magical. So one's explanation of some phenomenon meets the muggle constraint just when it appeals only to entities, states and processes which are wholly non-magical in character. But how are we to tell if the muggle constraint is being met on some particular occasion? The most reliable check we have is to ask of some proposed explanation (philosophical or otherwise), 'Does it conflict with science?'. If the answer is 'yes', then that explanation fails to pass the test, and must be rejected. As it concerns us here, then, the muggle constraint runs from science to philosophy. It demands that, if and when there is a genuine clash between philosophy and empirical science (in the sense that philosophy demands the presence of some entity, state, or process which is judged to be inconsistent with empirical science), then it is philosophy and not science that must ultimately concede, through the withdrawal or the revision of its claims.[45]

The inclusion of the qualification 'ultimately' in the preceding sentence is both well-motivated and problematic. It is well-motivated because even the most enthusiastic naturalist should not expect good philosophy to concede to bad science, so some sort of caveat is needed to protect naturalism from having that unwanted consequence. But it is problematic, because it is a reasonable inference from the history of science, which is a veritable graveyard of theories

[45] My claim that we should unpack naturalism not in terms of reduction, but in terms of the general conditions under which philosophy should concede its ground, bears an affinity with Huw Price's formulation of what he calls 'subject naturalism' as being the view that "[s]cience tells us that we humans are natural creatures, and if the claims and ambitions of philosophy conflict with this view, then philosophy needs to give way"; Huw Price, 'Naturalism without Representationalism', in D. Macarthur and M. de Caro, *Naturalism in Question*, quotation from page 4. This is not to say that my minimal naturalism is equivalent to Price's subject naturalism; it is not.

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that were once accepted as true but which were subsequently discarded as false, that any scientific view we might happen to accept as true or as approximately true right now will turn out to be false sooner or later. Under these circumstances, one might think that the only science that really has the warrant to *demand* that philosophy should concede in the face of a clash with it is some *final* science (final in the sense that we know it to be complete and correct). But if that is the full force of the continuity that defines minimal naturalism, then, assuming the idea of a final science even makes sense[46], the worry is that minimal naturalism can offer us no intellectual guidance as to how we should respond to clashes between science and philosophy that happen along the way to that final science (e.g. that are happening right now). Fortunately, for the minimal naturalist, there is a fallback position available to her, one that restores her teeth. According to that position, if and when there is a genuine clash between philosophy and some *eminently well-supported (by the data) empirical science*, then there is good reason for the philosopher to at least revisit her claims, with a view to withdrawal or revision. The envisaged clash, on its own anyway, puts no such pressure upon the scientist.

To generalize an earlier point, the minimal naturalism that I have just sketched tolerates the *possibility* of cognitive domains that are insulated from the reach of empirical cognitive science, simply because the application of science does not stretch as far as the questions that delineate those domains, meaning that, for those particular deployments of philosophical reflection, there is no room for any conflict with science. One plausible candidate for such insulation would be the moral correctness or otherwise of at least many ethical judgments, although there is an important caveat. As mentioned earlier, to the extent that one's constitutive account of our ethical lives makes predictions about properties in the world to which our moral reasoning capacities ought to be sensitive, that account will be susceptible to revision in the wake of our best current scientific psychology telling us that we are cognitively incapable of tracking those properties, since, on minimal naturalist grounds, that empirical result ought to be sufficient for one to cast a critical eye over one's ethical theory. That caveat aside, in addition to allowing the possibility of a kind of limited insulation of parts of phenomenology from cognitive science, minimal naturalism endorses the claim that

[46] This parenthetical remark regarding the very idea of a final science signals a hesitancy which will become important later, when we revisit the understanding of science required by minimal naturalism.

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phenomenological analysis may place defeasible constraints on cognitive science, since phenomenology legitimately articulates the constitutive character of phenomena for which cognitive science is tasked with supplying enabling explanations.

The minimalist picture on offer will, of course, fail to satisfy those of a more radical naturalistic persuasion. Nevertheless, as far as I can tell, having a healthy respect for science, to the extent of giving good science a certain priority over philosophy in domains where the two sources of knowledge may potentially conflict, is what a sober naturalism ought to require of us. And that does not compel us to worship unthinkingly at the altar of science. What it does demand, however, is that any constitutive understanding delivered by philosophy – for example, the accounts of human psychological phenomena delivered by phenomenological analysis – must be open to the possibility of revision or replacement, in the wake of what eminently well-supported empirical science – for example, eminently well-supported cognitive science – tells us, either at the time or indeed subsequently. The worry in the present context, of course, is that even this minimal naturalism, as I have characterized it, is inconsistent with the transcendental aspect of phenomenology. Our final task for this paper, then, is to allay that fear.

6. The Domesticated Transcendental

It is obvious enough that there will be notions of the transcendental that succeed in screening off the transcendental conditions of possibility of psychological phenomena from scientific influence altogether. And it would of course be a disaster for the present project if all notions of the transcendental were like that. However, just as hardcore blanket reductionism about psychological phenomena emerged as an optional aspect of naturalism, I shall (more controversially, I suppose) suggest that the same is true of the screening off of the transcendental from scientific influence. Indeed, as unlikely as it may seem, given the 'anti-science' spin that is all too often put on his philosophy, I shall argue that it is precisely *Heidegger's* transcendental phenomenology that provides a model for how this might be so.

It is here, finally, that we return to the historicality that, as I mentioned earlier, characterizes Heidegger's notion of the phenomenological transcendental. According to Heidegger, historicality is part of the existential constitution of human existence, which is just another way of saying that the transcendental conditions of possibility of

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specific enactments of human sense-making do not stand outside of human history. Indeed, those conditions of possibility are concretely embedded in our history. Consider, for example, the account of temporality as a transcendental condition of human sense-making given in *Being and Time*.[47] Heidegger strongly suggests that the *most abstract form* of temporality, which is *thrown projection plus falling/moment-of-vision*, will be a universally shared feature of human sense-making. So far, this schema doesn't much look like a recipe for concrete historical embeddedness, whatever the technical language of *thrown projection plus falling/moment-of-vision* might mean (more on which in a moment). In truth, it is debatable whether the historicality that characterizes Heidegger's phenomenology leaves any room for the claim that there are universal features of human experience, but fortunately we don't need to engage with that thorny exegetical issue here, because even if the most abstract form of temporality is, in some sense, a human universal, the specific transcendental structures in virtue of which events of human sense-making take the particular forms that they do (the culturally dependent, content-laden elements that, as it were, fill the slots in the abstract temporality schema) are undoubtedly historically embedded. To see why this is, we need to say a little more about the phenomena of thrownness, projection and falling/moment-of-vision.[48]

Thrownness – predominantly the past dimension of the human sense-maker's temporality – concerns the fact that the human sense-maker always finds herself embedded within a pre-structured field of intelligibility into which she has been enculturated. Projection – predominantly the future dimension of the human sense-maker's temporality – concerns the way in which she interprets herself in terms of culturally determined possibilities for action that hail from that same field of intelligibility. And falling and moment-of-vision – predominantly the present dimension of the human sense-maker's temporality – concern (roughly) the ways in which she either loses sight of her thrown and projective character due to the distractions of the now as established by the crowd (falling) or comes to own her particular thrown and projective character by appropriating the past in the present as a set of templates for

[47] Heidegger, *Being and Time*.

[48] Heidegger's full account of temporality is much more complicated than my necessarily brief treatment here will suggest. For my own more detailed interpretation, see M. Wheeler, 'Martin Heidegger' *Stanford Encyclopedia of Philosophy*, fall 2011, E.N. Zalta (ed.) http://plato.stanford.edu/entries/heidegger/.

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self-interpretation onto which she may creatively project herself (moment-of-vision). On the Heideggerian model, then, the content of each transcendentally presupposed temporal dimension of human sense-making is culturally conditioned. Now for the crucial point. A consequence of this temporality-driven cultural conditioning of the transcendental is that although there will be specific factors that are transcendentally presupposed by any particular act of sense-making, there is no expectation that those factors will be permanently fixed for all human psychological phenomena across space and time. Instead, they will be susceptible to variation and transformation, as the various structures and background attitudes characterizing different cultural ways of being differ over space and shift over time. And once the transcendental is domesticated in this way, there should be no appetite for insulating the transcendental from science. After all, science as a practice is itself an activity located within human history, one whose results often shape the ways in which human beings, as enculturated agents, make sense of things through the temporalizing dimensions of thrown projection and falling/moment-of-vision.

It is worth pausing here, in order to get clear about the claim on the table. According to Heidegger, science reveals entities as present-at-hand objects, that is, as the bearers of context-independent, paradigmatically measurable properties. In order to achieve this, science must function ontologically so as to suspend or to strip away the holistic contextual networks of culturally and historically conditioned meanings that characterize our ordinary ready-to-hand and unready-to-hand dealings with entities as equipment (as tables, chairs, computers, baby-bouncers, kettles, tourniquets, and so on). What I am proposing goes beyond this picture, by suggesting that our scientific understanding of the world can sometimes invade, and then be absorbed by, or integrated with, the cultural structures that, for Heidegger, constitute the transcendental conditions of everyday sense-making. Unless I am missing something, this process of invasion, absorption and integration does not have the consequence that science is a social construction, or at least, not in any pernicious, objectivity-in-science-undermining sense (more on this sort of issue below). Rather, it shows us how science influences the suite of socially and historically embedded transcendental structures in virtue of which we find the world to be intelligible. To give just one example. In most forms of western culture, we would not interpret a spate of sudden infant deaths as being caused by the actions of blood-sucking witches, and we take the behaviour of the inhabitants of Tlaxcala, Mexico, who do offer such an interpretation, to be an

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instance of a common pattern in which tragic human misfortune is blamed on supernatural assault.[49] One does not do proper justice to this inter-cultural difference by depicting it as a quarrel between alternative explanations, one of which must be false. That would place the dispute too close to the periphery of the sense-making practices concerned. What one needs to say is that the culturally embedded structures that condition the most widespread of the sense-making practices that characterize western culture simply do not leave room for supernatural assaults by blood-sucking witches, precisely because those structures have been invaded, in a way that the sense-making practices of the Tlaxcala residents have not, by what contemporary science tells us is possible.

I have argued that the transcendental conditions of possibility that are the business of a properly understood domesticated transcendental are open to the possibility of revision from science, at least in certain contexts, and regardless of what Heidegger himself may have said about such things. If this is right, then, as a special instance of the general dynamic indicated, and for just those versions of phenomenology that are based on, or open to, the domesticated form of the transcendental, cognitive-scientific research on the causal enabling conditions of human psychological phenomena may sometimes shape our phenomenological understanding of the historical transcendental structures in virtue of which those phenomena take the forms they do.

A critic here might complain that the general claim for which I have argued is not quite the claim that is needed, if we are to accept that minimal naturalism and the domesticated transcendental are compatible with each other. The driving thought here is that the process of incorporation that I have described is an essentially undirected, meme-like affair that may occur through all kinds of contingent historical accidents. For example, in a particular culture, a scientific idea may grip the public consciousness through a combination of entrenched science, high quality popular science writing, a well-oiled public relations machine, and mass media (including social media) coverage, such that, after a bedding down period, that idea becomes part of that culture's core way of being open to the world. So much may well be true. According to the present worry, however, what is required for minimal naturalism is something more than an observation that the structures of the domesticated transcendental *are*

[49] Horacio Fabrega and Hugo Nutini, 'Witchcraft-Explained Childhood Tragedies in Tlaxcala, and their Medical Sequelae', *Social Science and Medicine* **36** (1993), 793–805.

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sometimes revised through contact with science, but rather a methodological principle which instructs us that, in the relevant circumstances of conflict (as identified earlier), those structures *should* be deliberately and consciously revisited.[50]

The critic is right that there is a distinction here, but wrong that it poses any sort of problem for my argument. To be sure, establishing that transcendental conditions of possibility are open to revision from science does not secure minimal naturalism itself, since, in principle, one could presumably agree that the domesticated transcendental is sometimes shaped by science, while refusing the principle that such shaping should necessarily be on the cards, as a matter of philosophical methodology, in the appropriate conflict situations. However, what the removal of any blanket immunity of the transcendental to revision from science does achieve is a clearing of the path for minimal naturalism, by eliminating a potential barrier. With the path cleared in this manner, the missing naturalistic ingredient, namely the distinctive methodological principle of conflict resolution, is then imported as part of an additional, positive commitment to minimal naturalism.

A second threat to the compatibility thesis for which I have been arguing might seem to come from the pincer-movement combination of the following two claims: (i) naturalism, however minimal, entails scientific realism – understood as the generic view that 'our best scientific theories give true or approximately true descriptions of observable and unobservable aspects of a mind-independent world'[51]; (ii) scientific realism is incompatible with the domesticated transcendental. This objection raises a host of subtle and complex issues that I cannot hope to address in full in the space that remains available to me here. However, I shall endeavour to do just enough to show that neither (i) nor (ii) is uncontroversially true, so that at the very least the matter is not an open and shut case.

Taking (ii) first, it is arguable that it is consistent with the concept of the domesticated transcendental that one of our cultural practices, the practice of science, has the special quality of revealing natural entities as they are in themselves, that is, independently of our culturally conditioned uses and articulations of them. Indeed, I have argued elsewhere that precisely this kind of scientific realism may tentatively

[50] Many thanks to Peter Sullivan (in discussion) for raising this objection.

[51] A. Chakravartty, 'Scientific Realism' *Stanford Encyclopedia of Philosophy*, fall 2011, E.N. Zalta (ed.) http://plato.stanford.edu/archives/sum2011/entries/scientific-realism).

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be attributed to the Heidegger of *Being and Time*.[52] On this interpretation of Heidegger, when science strips away the holistic contextual networks of culturally and historically conditioned meanings that characterize our ordinary dealings with equipment, it reveals a mind-independent world (what the present-at-hand amounts to on this account) to which the descriptions provided by our empirical science may or may not correspond. The Heidegger of this interpretation is the Heidegger who declared that, 'in the field of natural science […] nature immediately takes its revenge on a wrong-headed approach'.[53]

One might worry that there is a problem waiting in the wings for this kind of realist gloss, a problem that would have to be faced by any advocate of the domesticated transcendental who, like Heidegger, holds that an empirical science will inevitably be structured in such a way that, in order to deliver any particular example of its distinctive species of enabling understanding, it must assume certain basic concepts and principles – the regional ontological foundations of the discipline – that determine the constitutive character of its target phenomena (see, e.g., the presupposed notion of internal representation which provides the form of the empirical data mined from observation and experiment in much cognitive psychology). In truth, however, the extent to which there is a genuine threat to scientific realism here turns, in part at least, on exactly how we conceive of the relationship between the ontological foundations in question and the ongoing empirical research in the relevant science. For example, the threat is seemingly less severe if we think of the ontological foundations in question as something akin to the hard core of a Lakatosian research programme[54], and so allow that if those structures become identified as the source of stalled empirical models that consistently fail to account for new or historically recalcitrant data, then the science itself will tend to revise or replace those presuppositions. *Modulo* legitimate observations regarding the hard-to-shift character of certain deeply held background social attitudes that may shape scientific theories, this principle of the revision of

[52] Wheeler, *Reconstructing The Cognitive World*, 137–8, 152–7; 'Martin Heidegger' *Stanford Encyclopedia of Philosophy*, section 2.4.

[53] M. Heidegger, *Basic Problems of Phenomenology*, (Bloomington: Indiana University Press, 1982), 203.

[54] Imre Lakatos, 'Falsification and the Methodology of Scientific Research Programmes', in I. Lakatos and A. Musgrave (eds.), *Criticism and the Growth of Knowledge* (Cambridge: Cambridge University Press, 1970), 91–196.

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fundamental concepts in the face of empirical stagnation or degeneration would seem to hold even where the presuppositions in question have an 'extra-scientific', ideological dimension.[55] With this principle in place, the observation that scientific theories themselves have historical transcendental conditions does not upset the minimal naturalist demand that where good science and phenomenological philosophy clash, the phenomenologist has a reason to revisit her account that the scientist does not have, since, for the naturalist, the ontological foundations of the science will carry the extra credit of having indirectly survived the rigours of empirical scientific testing, through the direct testing of the hypotheses and models that they underpin and shape. This is not to say, of course, that the ontological foundations of the science in question are necessarily unassailable, or beyond critique, since even today's well-supported science may be discarded in the future, but it does mean that, for the minimal naturalist, there is a strong presumption in favour of the correctness of those assumptions.[56]

Despite the upbeat message of the last few paragraphs, there is of course *something* to be said for the claim that scientific realism is incompatible with the domesticated transcendental, enough I think that we ought to be wary of putting all our eggs in the one basket of defending the compatibilist project by rejecting that claim. As I

[55] An example of such a dimension would be the long-standing sexist distinction in biology between the sperm cell as an active heroic force that burrows through the egg coat to penetrate the egg and activate the developmental program, and the egg cell as passive matter transported along the fallopian tube until it is assaulted and fertilized by the sperm. This distinction was duly elaborated over many years by experimental work in biology before the egg was finally granted its own active contribution. See Emily Martin, 'The Egg and the Sperm: How Science has Constructed a Romance Based on Stereotypical Male-Female Roles', *Signs*, **9** (1991), 485–501; Evelyn Fox Keller, 'Gender and Science', in D.L. Hull and M. Ruse (eds.), *The Philosophy of Biology* (Oxford: Oxford University Press, 1998), 398–413.

[56] Many thanks to James Williams for discussion of this issue. The position sketched at this point in the main text is supposed to be duly sensitive to Williams' Deleuzian claim that the realm of the transcendental must remain a space in which critique may happen, rather than simply 'part of a vast and gradually filled in account of reality'. See, James Williams, 'Science and Dialectics in the Philosophies of Deleuze, Bachelard and DeLanda', *Paragraph: a Journal of Modern Critical Theory*, **29** (2006), 98–114, quotation from page 103. I strongly suspect that Williams will judge that I am not being sensitive enough.

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have indicated, much here depends on precisely what the relationship is between a science's ontological foundations and its ongoing empirical research. Perhaps the more radically Kuhnian one becomes regarding that relationship, such that theory change is conceived as akin to religious conversion,[57] the less scientific realism remains a genuine option. Moreover, there are plenty of textually justified interpretations of Heidegger, our front-line representative of the domesticated transcendental, that would shy away from the scientific realist gloss that I have suggested is a genuine option. Thus, for example, Dreyfus argues that, for Heidegger, two scientific theories that contradict each other might conceivably be equally valid ways of understanding nature.[58] In light of these points, it is worth recording that the objection under consideration – the pincer movement realized by the combination of claims (i) and (ii) above – might also be blocked by a recognition that claim (i) – the claim that naturalism, however minimal, entails scientific realism – is strictly false. If it is possible to articulate minimal naturalism in a scientific anti-realist register – defined as a register in which at least one component of the realist picture is denied – then any incompatibility of scientific realism and the domesticated transcendental is of less concern to the present project. So, can this be done? The answer, I think, is yes: minimal naturalism, as I have depicted it, demands only that philosophy be *consistent with* empirical science. It leaves open the question of whether science is best conceived in realist or anti-realist terms. Admittedly, when I characterized minimal naturalism initially, I did so, somewhat hesitantly, by way of an unanalysed notion of approximate truth and the vague idea of a complete and correct final science towards which we are, in some sense, progressing. This way of talking has an undeniably realist ring to it. However, the formulation of minimal naturalism with which I ended up relaxed the realist-sounding teleological component, requiring only the notion of an *eminently well-supported science* as part of its demand that, if and when there is a genuine clash between philosophy and some empirically buttressed science, there is good reason for the philosopher to at least revisit her claims, with a view to withdrawal or revision. This formulation of the minimal naturalist constraint is consistent with a range of anti-realist accounts of science. Indeed, even if one thought that the idea that philosophy

[57] T. Kuhn, *The Structure of Scientific Revolutions*, (Chicago: University of Chicago Press, 1962/1970, second edition, with postscript).
[58] Dreyfus, *Being-in-the-World*, 261–2.

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should reconsider itself in the wake of a genuine clash with science could be secured only given a sense of scientific progress, there are anti-realist views of science that make room for such progress. For example, Kuhn replaces the standard (realist) cumulative notion of progress in science with one cashed out in terms of increases in puzzle-solving power.[59] If minimal naturalism does not entail scientific realism, then, even if the domesticated transcendental is in tension with such realism (which I am not convinced it is), that would not render minimal naturalism and the domesticated transcendental incompatible with each other. The pincer-movement objection to the compatibility project under consideration is thus significantly less cogent that first impressions might have suggested.

If the arguments I have offered in this section are correct, then the 'something nasty' that we glimpsed in the conceptual woodshed occupied by phenomenological cognitive science turns out to be more of a snapping terrier than a growling Rottweiler. That woodshed is thus revealed to be a philosophically benign, or at least a not obviously philosophically hostile, place to reside.

7. Time for a Song

With the transcendental domesticated and with naturalism made minimal, there is no palpable conflict between transcendental phenomenology and naturalism. Under these interpretations, the transcendental phenomenologist and the philosophical naturalist, just like the feuding figures of the farmer and the cowman in the song by Rodgers and Hammerstein, should forget their differences and be friends. After some twists and turns in the plot, the eventual outcome in *Oklahoma* is that Laurey and Curly get married and leave for their honeymoon in the surrey with the fringe on top. The outcome here is a reconciliation that reveals the philosophical credentials of phenomenological cognitive science to be in good order. So, despite how things looked at the beginning of our investigation, the point at which the transcendental dimension of phenomenology meets the naturalistic dimension of cognitive science is not necessarily the site of a barrier to an alliance between these two modes of inquiry. Conceptual space is thus secured for precisely the kind of neo-McDowellian interplay that, as we have seen, has been emerging within the work itself. This dynamic of selective mutual constraint

[59] T. Kuhn, *The Structure of Scientific Revolutions*, 160ff.

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and influence which characterizes this interplay means that the friction in force here is of the positive (productive) and not the negative (antagonistic) kind. Now that does sound like the basis for a successful intellectual marriage.[60]

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[60] Some sections of this paper include passages of text adapted from: Cappuccio and Wheeler, 'Ground-Level Intelligence'; Wheeler, 'Naturalizing Dasein and other (Alleged) Heresies'. For useful critical discussion of the ideas presented here, many thanks to James Williams, and to audiences at Bochum, Bristol, Copenhagen, Hull, Lyon and Stirling. Thanks also to Havi Carel for valuable editorial feedback.

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