CONSCIOUSNESS AND THE BRAIN-BODY-WORLD INTERFACE
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Precisely what role do one’s body and the world play in constructing conscious perceptual experience? From certain phenomenological assumptions, a wave of recent theorists (enactivists) have proposed that the vehicle of a perceptual experience necessarily involves, not merely sub-personal processes and mechanisms inside one’s head, but additionally the entire living biological organism with which one is associated, situated in space. The truth of such a thesis would have significant consequences for the highly influential Neural Correlates of Consciousness research program, as well as for materialist debates about brains in vats, among other things. However, a series of recent studies on the experience of selfhood expose enactivists' interpretations of the phenomenological claims upon which their externalist thesis stands as being inconsistent with the relevant empirical facts. In this paper I critique enactivist arguments by appeal to the results from these intriguing experiments concerning the inducement of out-of-body experiences in normal, healthy participants. Along the way, hopefully a brain-based, internalist theory of phenomenal experience will begin to emerge.

I.

Precisely what role do one’s body and the world play in constructing conscious perceptual experience? Several theorists, beginning with the premise that “our mental lives involve our body and the world beyond the surface membrane of our organism, and therefore cannot be reduced simply to brain processes inside the head,”¹ propose that dynamic interactions between brain, body, and world play an irreducible part in generating this experience.² In Susan Hurley’s words, “what enables qualitative experience is ongoing embodied interactions with the environment.”³ These theorists, whom I will call enactivists⁴, make the following constitutive claim:

**Vehicle Externalism about Perceptual States (VEPS):** It is nomologically necessary that the vehicles of perceptual states are distributed across brain, body, and world.

That is to say, the vehicle of a perceptual experience necessarily involves, not merely sub-personal processes and mechanisms inside one’s head, but additionally one’s entire body—the entire living biological organism with which one is associated—situated in space. The minimal physical supervenience base of any given conscious perceptual experience consists in dynamic

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¹ Thompson’s (2007), ix.
² I will use the terms “conscious perceptual experience/state”, “perceptual experience/state”, “phenomenal experience/state”, and “qualitative experience/state” interchangeably throughout.
³ Hurley’s (2005), 32.
⁴ The label “enactivist” is not a good one here. Although the authors I am discussing are called “enactivists” in the literature, my discussion proceeds without any special emphasis on the enactive aspect of their proposals. Still, while perceptual state vehicle externalists may have been a more accurate title, it’s rather a mouthful to say. It would also be objected to by Thompson and Stapleton—“the spatial containment language of internal/external or inside/outside…is inappropriate and misleading.”(2009, 26) So I’ll stick, imperfectly, with “enactivist”.

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interactions between one’s brain, one’s body, and the world. VEPS refers specifically to perceptual states. It should not be confused with the following claim:

**Vehicle Externalism about Cognitive States (VECS):** It is nomologically possible that the vehicles of cognitive states (e.g. belief states, desire states) can be distributed across brain, body, and world.

While enactivists accept both VEPS and VECS—the so-called “extended mind thesis” (Clark & Chalmers, 1998)—a commitment to the possibility of external vehicles of belief states does not entail a commitment to external vehicles of perceptual states. Many who endorse the extended mind thesis do not go so far as to endorse vehicle externalism about perceptual states too.

Those who do are proposing a theory of consciousness that would displace various foundational philosophical and scientific assumptions behind much contemporary thought on the matter. For instance, if VEPS is true, then it is false that there exists a clearly defined interface, or point of interactive contact, between the body and the mind (such as the barrier between the brain or the central nervous system and the rest of the body), rendering the phenomenally conscious brain-in-a-vat scenario nomologically impossible. To take away one’s body, and so one’s body’s location and orientation within the world, would be to take away an essential piece of the platform that allows one to have conscious perceptual experiences at all.

More substantially, if VEPS is true then the internalist-oriented assumption that consciousness purely supervenes on neural processes in the brain is also false. This assumption undergirds the highly influential Neural Correlates of Consciousness (NCC) research program; its falsity would render that program misguided in aiming to identify the minimal physical supervenience bases of various conscious experiences in terms of the activation of various neuronal populations in the brain.

To bring out the contrast between VEPS-endorsing enactivists and those subscribing to the NCC research program, consider the following example. A simple NCC theory, such as Block’s “biological theory of consciousness”, states that phenomenal visual awareness depends on specific biological substrates in the posterior visual areas of the brain. Suppose we were to isolate the neural correlates of phenomenal awareness of motion, perhaps in V5/MT. Then someone endorsing a theory such as Block’s would be committed to the claim that two conscious individuals, A and B, with exactly the same V5 activity at a time would be having exactly the same phenomenal experience of motion. However, an enactivist would not jump so quickly to this conclusion. She would instead insist that we must take into account not only A’s and B’s V5 activity, but additionally their entire brain and bodily states, and their relationships to their respective environments, in order to determine whether A and B are having the exact same phenomenal experience of motion.

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5 “The world” should be read locally, as including only the immediate environment with which a perceiver’s body is physically coupled. Enactivists needn’t claim that the state of affairs in a rural village in China is part of the vehicle of my current perceptual state as I sit writing this in my office in the States.

6 Of course neither of these theses should be confused with content externalism about either perceptual or cognitive states. There is a rich literature surrounding these latter claims which my discussion here entirely avoids.

7 That is, phenomenally conscious in just the same way as you or I, who are presumably embodied.

8 For an overview of various theories of consciousness that subscribe to the NCC program and their relative merits, see Hakwan Lau’s (2010).
I believe VEPS is false. However all I intend to demonstrate here is that VEPS is unsupported by a standard argument enactivists provide for it. There are (at least) two broad sorts of argument that enactivists provide, the conclusion of either of which ostensibly entails VEPS. The first argument concerns the ontology of perceptual experiences as a whole. Perception, enactivists claim, is a kind of skilled activity involving the entire embodied organism exploring her environment. Perceptual experience consists in an organism exercising mastery of sensorimotor contingencies—i.e. “the laws of covariation between actions of the organism and resulting changes in sensory input.” As Noë writes, “Perceptual experience just is a mode of skillful exploration of the world.”

If you take away the perceiver’s body situated in the world, and so take away her ability to skillfully explore the world, the line of thought goes, then you take away her capacity to perceive at all.

The proposal of perception qua embodied action has been saturated with criticism in the past few years that I will not rehash here. Instead, I would like to focus on a second, albeit related, form of enactivist argument. This argument concerns claims about particular properties of perceptual experiences—namely their “for-me-ness” and perspectival/egocentric properties.

The “for-me-ness” property of perceptual experiences can be isolated with the following helpful description from Dorothée Legrand:

Compare two different experiences: the smelling of fresh coffee and the seeing of midnight sun. These experiences differ in their phenomenality, i.e. in “what it feels like” to undergo them. More precisely, the experiences differ from each other both in terms of content (coffee vs. sun) and mode of presentation of these contents (smelling vs. seeing). However, these experiences do not differ in every aspect. They share a specific dimension in the fact that they are all given from the first-person perspective, they are given (at least tacitly) as my experiences, as experiences I am undergoing: they feel like something for me.

Legrand labels this property pre-reflective self-consciousness or pre-reflective consciousness of the self-as-subject.

The perspectival/egocentric feature of perceptual experiences, on the other hand, (itself perhaps a component feature or dimension of pre-reflective self-consciousness), is simply isolated as follows: it is that feature of perceptual experiences which grounds the fact that the contents of a perceptual experience are always presented relative to a certain point of view, and never merely presented full stop, relative to no point of view in particular (in the manner that, say, the contents of a belief might be presented). Or as articulated by Blanke and Metzinger (2008), it is a “geometric feature of an egocentric model of reality…[that] possesses a centre of projection, which functions as the geometrical origin of the ‘seeing’ (or ‘hearing’ etc.) organism’s embodied perspective.”

Enactivists’ claims concerning the pre-reflective self-consciousness and perspectival...
features of perceptual experiences are based largely on phenomenological observations. In introducing a special journal issue on enactivism, Steve Torrance has observed that one of the core elements of the enactive approach to consciousness is relying upon “the phenomenology of an organism’s experience of the world and of selfhood.” However enactivists attempt to do this “in ways which are consistent…with maintaining scientific rigour.”14 Enactivists consider their theorizing about the nature of perception and mind to be both phenomenologically and scientifically informed. Thompson writes that “the enactive approach has from its inception maintained that cognitive science and phenomenology need to be pursued in a complementary and mutually informing way.”15

As I will enumerate in the next section, VEPS does seem to be entailed by certain interpretations of phenomenological claims that enactivists make concerning individuals’ experience of selfhood (particularly concerning the features of perceptual experience I just noted). However, enactivists interpretations of these claims so that they entail VEPS are not consistent with recent scientific studies on the experience of selfhood. Enactivists must either abandon their interpretations of the phenomenological observations that entail VEPS, or abandon the claim that their theorizing maintains scientific rigor. If they opt for the former, then they must either abandon VEPS or supply different argumentation for it.16 If they opt for the latter, then it is difficult to see how their project actually relates to the empirical scientific work on consciousness to which they have presented their project as an important alternative.

The main thrust of my critique is based on the results from an intriguing series of recent experiments concerning out-of-body experiences (OBEs). The results suggest that the appropriate interpretations of the phenomenological observations enactivists make are not those that support VEPS. Before discussing the relevant experimental data and working through their philosophical consequences though, I will first present the enactivists’ claims in more detail and more precisely orient the debate.

II.

Consider first the VEPS-entailing phenomenological claims found in Thompson’s book, Mind in Life. There, drawing from the tradition of Husserl, Thompson observes that “things are perceptually situated by virtue of the orientations they have to our moving perceiving bodies.”17 This claim seems to be borne out by reflection on everyday experiences. For example, it is in virtue of a certain piece of chocolate being oriented in my mouth and not in the wrapper beside me that it is perceptually situated to be tasted by me. Or again, it is in virtue of certain people being oriented right outside the room in which I am typing and not downstairs that their voices are perceptually situated to be heard by me.

Thompson takes the “crucial point” about this Husserlian reflection to have two aspects. The first is that “the body functions as the ‘zero point’, ‘null point of orientation’, or absolute indexical ‘here’ in relation to which things appear perspectively.”18 The second is that

14 Torrance’s (2005), 8 (my italics).
15 Thompson’s (2005), 408.
16 Such as the perception-is-action argumentation that I mentioned above, and which I do not discuss here.
17 Thompson’s (2007), 248.
18 Ibid, 248-49.
perceptual experience involves a non-object-directed and implicit awareness of one’s lived body, an intransitive and pre-reflective bodily self-awareness”. As he goes on to clarify, “intransitive or nonintentional bodily self-consciousness is constitutive of perceptual experience.” This nonintentional bodily self-consciousness is Thompson’s understanding of the intrinsic “for-me-ness” feature of phenomenal experience that I discussed in the introduction (Thompson’s notion overlaps with a part of what Legrand calls pre-reflective consciousness of the self-as-subject). It is nonintentional in the sense that it does not consist in a consciousness of one’s bodily self as an intentional object of one’s perceptual experience; that would occur say, when one views oneself in a full-length mirror. Instead of nonintentional bodily self-consciousness consisting in consciousness of one’s “body-as-object”, it consists in consciousness of one’s “body-as-subject”—“an implicit and practical ‘I can’ of movement and motor intentionality.” Thompson seems to endorse Legrand’s account of the notion of bodily self-consciousness: it partially “consists in experiencing one’s body as a locus of the convergence of perception and action.”

Concerning the first aspect of Thompson’s crucial Husserlian point, it is certainly reasonable to suppose that all of one’s conscious perceptual experiences are necessarily perspectival, in the sense that their contents are always presented relative to a certain point of view, and never merely presented in the manner that the contents of cognitive states might be presented, relative to no point of view in particular. Of course, if it is one’s body that determines that point of view, that orients the presentation of the objects of one’s perception, as Thompson maintains, then the body and its particular spatial location/orientation must be a constitutive feature of the vehicle of one’s conscious perceptual experiences—VEPS. And furthermore, if Thompson’s articulation of the “for-me-ness” of conscious perceptual experience in terms of nonintentional bodily self-consciousness is correct, then we have the following consequence: to take away one’s body—and thus one’s experience of it as the point of convergence of one’s actions (which will also be taken away) and one’s perceptions—is to take away perceptual experience. Perceptual experience essentially involves one’s having a body in the world, in addition to a brain—VEPS again.

Another example of the phenomenal claims enactivists make which seem to entail VEPS comes from Noë and Thompson’s (N&T) bold critique of the NCC program of neuroscientific research. It runs as follows: We can all readily observe that a distinctive feature of phenomenal experiences is that they are experiences relative to, or occupying a certain position in, our egocentric space. My having the visual experience of a coffee mug at such an angle that the handle is occluded by the rest of the mug, say, rather than at such an angle that the handle is in view, is a matter of how the coffee mug is situated in space relative to me, the observer. “The perceptual experience as of a vertical line,” N&T offer, “will represent the line as against a background and as occupying a certain position in egocentric space, i.e., as occupying a certain spatial relation to you, the embodied observer.” My phenomenal experiences are the particular experiences they are partly in virtue of the orientation that their perceived objects have in my egocentric space. Furthermore, N&T find it “reasonable to assume” that egocentric space “is

19 Ibid., 264.
20 Ibid., 249.
21 Ibid., 252.
22 N&T’s (2004), 11-12.
defined by one’s whole body and the possible ways it can move [in the world].”**23** Thus a given 
phenomenal experience is the experience that it is (in part) as a matter of the orientation of its 
objects with respect to the perceiver’s whole body and the possible ways it can move in the 
world. In addition to one’s brain, one’s body and the world are a constitutive part of one’s 
phenomenal experiences. “The substrates of consciousness,” they write, “seem to cut across the 
brain-body-world division.”**24** VEPS again.

III.

I will now present a series of recent empirical studies regarding individuals’ centers of awareness 
and senses of bodily self-consciousness. They demonstrate actual dissociations between one’s 
perspective and one’s experience of one’s bodily self-consciousness, on the one hand, and one’s 
actual bodily spatial location on the other. Afterwards, I will discuss how exactly the results of 
these studies threaten the scientific integrity of enactivists’ VEPS-entailing interpretations of 
their phenomenological claims.

Consider first a study conducted by Lenggenhager et al. (2007), in which virtual reality 
and multisensory conflict were used to manipulate the sense of whole-body/global ownership in 
healthy subjects, and to thereby induce out-of-body experiences (OBEs).**25** “Healthy 
participants,” the study reports, “experienced a virtual body as if it were their own and localized 
their ‘selves’ outside of their body borders at a different position in space.”

Participants were presented, via a head-mounted display, with either an image of their 
own back filmed from a distance of 2m, an image of the back of a fake body projected as though 
at a distance of 2m, or an image of a body-sized noncorporeal box projected as though at a 
distance of 2m. The participants’ backs were then stroked with a stick either synchronously or 
asynchronously with respect to the stroking of the virtually presented image. Immediately after 
the stroking in each condition (with the display screen then black so the participants were in 
effect blindfolded) the participants were passively displaced posteriorly and asked to return to 
their initial positions. In the synchronous stroking conditions, when the participants had been 
presented either their own body or the fake body, they showed a significant anterior drift toward 
the virtual-body position, suggesting an illusory global self-localization. This illusory global self-
localization was corroborated by the participants’ reports on a questionnaire they filled out after 
the experiment.**26** When asked whether it felt as if the virtual character was their body, 
participants reported that they strongly self-identified with the illusory body, in the synchronous 
stroking conditions. They also reported that they felt as if they were feeling the touch of the 
stick in the location where they saw the virtual body stroked, and that it seemed as though the 
touch they felt was caused by the stick touching the virtual body. These results regarding 

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21 Ibid., 15.
24 Ibid., 26.
25 More accurately, the experiment induced the closely related experience of *heautoscopy*, which differs 
from a full-blown out-of-body experience in that the latter involves overt disembodiment and vestibular 
disorientation but the former only involves perceiving from the perspective of an extracorporeal, illusory 
body.
26 The questionnaire was adapted from the “rubber-hand illusion” experiment (Botvinick & Cohen, 1998), 
which successfully manipulated participants’ sense of body-part ownership (though not whole-body 
ownership) by synchronously stroking a seen fake rubber-hand and one’s unseen own hand.
illusory self-localization to a position outside one’s body lead Lenggenhager et al. to conclude that bodily self-consciousness can be dissociated from one’s physical body position.

A second study (Ehrsson, 2007) published the same month produced similar experimental results through a similar setup. The only variations were that participants’ were sitting rather than standing, and had their chests (rather than their backs) stroked either synchronously or asynchronously with respect to the stroking of a virtually presented image. Ehrsson reports a perceptual illusion “in which individuals experience that their center of awareness, or ‘self,’ is located outside their physical bodies.” In order to provide objective evidence for the inducement of an OBE in his subjects, and to corroborate their responses on the questionnaire27, Ehrsson conducted a control experiment. After a period of either synchronously or asynchronously touching the participant’s chest and the “chest” of the illusory body, he then swung a hammer at the lower portion of the “face” of the illusory body. To monitor the participant’s level of anxiety and sense of being physically threatened, Ehrsson had attached a pair of skin conductance electrodes to participants’ fingers and thus measured their skin-conductance responses (SCRs) when the illusory body was hit.28 In the synchronous condition (which, recall, was the one in which an illusory self-localization of the participant’s body was reported), Ehrsson observed significantly greater SCRs than in the asynchronous condition. This provided “objective evidence that participants were emotionally responding as if they were located behind their physical bodies.” Ehrsson thus concluded that “the sense of being localized within the physical body can be fully determined by perceptual processes, that is, by the visual perspective in conjunction with multisensory stimulation on the body.”

Even more far-reaching along these lines of investigation, Petkova and Ehrsson (P&E) released a study in (2008) in which they claim to have successfully induced in healthy volunteers the feeling of global ownership of a different body—i.e. the illusion of having swapped bodies with another actual person. They write, “the effect is so robust that, while experiencing being in another person’s body, a participant can face his or her biological body and shake hands with it without breaking the illusion.” The general framework of the experiments was much the same as in those discussed above. From the results of P&E’s objective tests of subjects’ conscious states during the illusion-inducing synchronous stroking condition (again carried out by presenting a “threat” to subjects’ non-biological bodies and measuring their biological bodies’ SCRs), P&E conclude that “the participant’s emotional systems reacted more strongly when the new body was threatened than when their own body was under threat.”

IV.

One upshot of these studies is that the definition of “egocentric space” provided by N&T in their critique of the NCC research program looks inappropriate. First of all, note that whatever else it may involve, egocentric space (or at least the notion of egocentric space that allows their initial observation—i.e. that egocentric space is something to which perceptual experience is inextricably bound—to come across as intuitive and unobjectionable) involves one’s center of awareness and one’s bodily self-consciousness. I don’t imagine that N&T would contest this claim; they probably simply suppose that it is subsumed by or is derivative of their preferred definition of “egocentric space” as involving one’s body and its possible movements. And of

27 Again adapted from (Botvinick & Cohen, 1998).
28 SCR is standardly taken to be an objective measure of anxiety. See, e.g., Petkova and Ehrsson (2008).
course, in absence of any evidence that one’s center of awareness and bodily self-consciousness, on the one hand, and one’s body and its possible movements, on the other hand, could or do ever come apart, it isn’t essential that N&T commit one way or the other to which features are the most fundamental in defining “egocentric space”. But what Lenggenhager et al. and Ehrsson demonstrate is precisely that a perfectly normal and healthy individual’s center of awareness and bodily self-consciousness can come apart from her body and its possible movements. While holding both body and the set of possible bodily motions fixed in the two experimental setups, a shift in egocentric space, qua center of awareness and bodily self-consciousness, is exactly what was produced. Participants reported to have shifted their egocentric spaces to an extracorporeal illusory or real body (i.e. in the self-attribution questionnaires). Participants were also monitored to have shifted their egocentric spaces outside their bodily borders (i.e. by observed bodily drift in the post-experiment self-localization task and by skin-conductance response monitoring in response to a threat to the virtual and mannequin bodies).

N&T could be recalcitrant and maintain their original definition. Nothing in principle prevents them from denying that, according to their notion of egocentric space, center of awareness and bodily self-consciousness are distinctive, essential features of egocentric space. However if they do deny this, they are left with a significant explanatory burden; why should we be interested in a notion of egocentric space defined by one’s body and its possible movements? As demonstrated in these experiments, those features can come apart from bodily self-consciousness and individuals’ felt centers of awareness, and it is the latter that correlate with phenomenal experiences (e.g. with the anxiety of being “threatened” with a hammer blow to one’s “face” or a knife cut to one’s “hand”). Clearly, they ought to revoke their original definition in favor of one that recognizes center of awareness and bodily self-consciousness as distinctive features of egocentric space. This definition will not make reference to one’s actual body and its possible movements (since these can be dissociated from one’s bodily self-consciousness). But then, of course, the phenomenological observation that phenomenal experiences are constitutively experiences relative to, or occupying a certain position in, our egocentric space will not entail VEPS.

These studies also affect Thompson’s phenomenological claims’ being VEPS-entailing. Consider again his Husserlian thesis that things are perceptually situated by virtue of the orientations they have to our actual, perceiving bodies. Monitored and reported results indicate that participants in the Lenggenhager et al. study sensed the touch of the stick stroking their backs not where their backs were located but where they perceived their backs to be located, 2m in front of themselves; monitored and reported results indicate that that participants in the P&E study felt anxious and physically threatened by a knife presented not at where their hands were located, but at where they perceived their hands to be located, at the location of the mannequin’s/experimenter’s hands. In these experimental settings, the relations between the perceived tactile/anxiety sensations and subjects’ bodies were radically different from the relations between type-identical sensations and people’s bodies in normal circumstances. Holding one’s body fixed, very differently oriented physical stimuli can produce equivalent phenomenal experiences. Similarly, it is then at least very likely that holding the orientation of the physical stimuli fixed, differently orienting one’s body can also produce equivalent phenomenal experience (as one could imagine would be the case, for example, if Ehrsson’s participants were actually displaced 2m posteriorly and freed of their display screen at the moment when he was swinging the hammer there). Consequently, Thompson’s thesis that things are perceptually situated by virtue of the orientations they have to our actual, perceiving bodies
cannot be a nomological necessity. What the OBE studies instead suggest may be a nomological necessity is that things are perceptually situated by virtue of the orientations they have to our perceived bodies—that is, to some sort of inner representations we have as of bodies and bodily spatial locations. As consideration of OBEs makes apparent, our perceived bodies can come significantly apart from our perceiving bodies; our inner representations of our bodies may dramatically misrepresent our actual bodies.²⁹

The strength of the first aspect of Thompson’s thesis—that the body functions as the absolute indexical ‘here’ in relation to which things appear perspectivally—as an argument for VEPS is directly threatened by these OBE studies. They reveal the possibility of one mislocalizing one’s body—even if one is a perfectly normal, healthy subject. People can be quite mistaken about where the ‘here’ of their actual bodies is. We as conscious perceivers have only fallible access to information about our bodily ‘here’ and can experience equivalent sensations even when we’re profoundly mistaken about that information. So maintaining that one’s body functions as the absolute indexical ‘here’ in relation to which things appear perspectivally is only contingently true, and therefore does not entail VEPS.

The second aspect of Thompson’s thesis—that nonintentional bodily self-consciousness, qua experiencing one’s body as the locus of convergence of perception and action, is constitutive of perceptual experience—also loses its bite as an argument for VEPS. Consider again the Lenggenhager et al. (2007) study. In the experimental setup that successfully induced OBEs in subjects, the subjects were physically displaced backwards after having experienced an OBE, and were then charged with the task of returning to their original location. They demonstrated a significant anterior drift toward the location where, as they indicated in the questionnaire, they had felt their bodies to be located during the experiment. That is to say, subjects’ post-illusion motor actions exposed that subjects had genuinely mistaken the spatial location of their body qua agent. Furthermore subjects reported that they felt as if they were perceiving the touch from the stick stroking their actual back at the location where they saw the virtual body’s back being stroked (i.e., near the anterior spatial location toward which they moved in the circumstance just described). That is to say, their reports exposed that they had genuinely mistaken the spatial location of their body qua perceiver. The upshot is that a subject’s experience of the locus of convergence of her motor and perceptual faculties was not experienced at the location of her actual body. In fact, it looks as though there may have been no locus of convergence of subjects’ motor and perceptual faculties at all; no subject’s anterior drift forward was so great as to place her squarely on the spot at which the image of the virtual body with whose touch she identified

²⁹ The sort of inner representation I am speaking of here is (a part of) what is the body image, not the body schema. The body schema is widely regarded as the body representation responsible for guiding action, and is associated with “a sensori-motor map of the body based on the information one needs in order to move one’s own body.” The body image, on the other hand, is regarded as the representation associated with “all the information about the body necessary to make judgments about bodily properties. It includes a visuo-spatial map of the body, a semantic body representation and affective attitudes toward one’s own body.” Whether the body image is a single type of body representation or not is somewhat controversial. However there is at least widespread agreement about the distinction between the body schema and non-body schema bodily representations. See §1 of de Vignemont’s (2010).
A general description of the findings of the Lenggenhager et al. (2007) study is the following: it is possible for an individual to have a perceptual experience unaccompanied by nonintentional bodily self-consciousness a la Thompson (either because the perceptual experience is unaccompanied by a) an experience of the body as the locus of convergence of action and perception or by b) any experience of a convergence point of action and perception at all). Thompsonian nonintentional bodily self-consciousness appears not to be a constitutive feature of all phenomenal experience. Thus VEPS cannot be supported on the basis of Thompson’s claim that it is. The identification of the “for-me-ness” of phenomenal experience (which we are granting is a constitutive feature of phenomenal experience) with nonintentional bodily self-consciousness cannot be maintained.

V.

The conclusions we have reached by this point in the discussion are that 1) the egocentric/first-person-perspectival orientation of perceptual experience is not necessarily determined by one’s actual body’s orientation in the world, and that 2) the pre-reflective self-consciousness or “for-me-ness” of perceptual experience should not be identified as consisting in the experience of one’s actual body as the point of convergence of one’s actions and perceptions (nor, perhaps, even as the experience of any point of convergence between what one takes to be one’s actions and one’s perceptions at all). Thus, claims to the effect that these features are somehow essential components of perceptual experiences cannot be employed, as enactivists intend to employ them, to argue for vehicle externalism about perceptual states.

Based on the arguments for an enactive view of perception that I have discussed, there is no reason for researchers to jettison the assumption that the machinery of conscious perceptual experiences is “in the head.” Yet enactivists’ phenomenological emphasis, while it has not ultimately provided reason to completely re-conceptualize our assumptions about the vehicles of conscious perceptual experiences as partly being outside the head, has certainly contributed to the identification of features of those experiences that are worth further investigation. We are left with interesting questions as to what the features of perceptual experience that enactivists have discerned and emphasized do consist in.

Concerning these questions, it is worth noting that a common factor in all of the experiments discussed above is multisensory conflict—between vision, on the one hand, and touch and proprioception on the other. The successful integration of these various sense modalities (and the vestibular, as well) is widely supposed to be a necessary condition for successful attribution of a body as one’s own. Research into such intermodal matching has implicated the temporo-parietal junction (TPJ) as a “crucial structure for the conscious experience of the normal self, mediating spatial unity of self and body.” Interference with the TPJ via transcranial magnetic stimulation (basically, a big magnetic shock to some region of the brain) can induce OBEs in subjects or disrupt their capacity to perform mental spatial-transformations of their bodies (Blanke, 2002, Blanke et al., 2005). Furthermore, localized TPJ damage has been noted in several neurological patients who have experienced OBEs or autoscopy (Blanke et al., 30)

30 The measured anterior drift from subjects’ initial bodily locations, in the experimental setup in which it was statistically significant, was [24.1 ± 9.0 cm (mean ± SEM)]; the image of the virtual body with whose touch subjects identified was projected at 200 cm anterior to the subjects’ initial bodily locations.
2004). All of this suggests that one’s egocentric perspective and sense of bodily self-consciousness are intimately connected to neural activity in the TPJ. The perspective relative to which experiences are had seems to supervene on the manner in which input from various sensory modalities—visual, tactile, proprioceptive, vestibular—is integrated in this region of the brain. When the normal causal chains of input to the TPJ are altered, as in the OBE experiments, the perspective relative to which perceptual experiences are had is oriented around a point in space at some distance from one’s actual perceiving body. As a working hypothesis for further investigation, then, perhaps the minimal physical supervenience base for the perspectival feature of perceptual experiences simply consists in TPJ processing, together with a background of other maintenance activity in the brain.

Pre-reflective self-consciousness seems as though it must require a more extensive explanation. I will not venture to give one here, although the curious reader may find helpful suggestions in de Vignemont’s (2007). And considering the promise that a purely brain-based explanation of the perspectival feature of perceptual experience holds, it is not unreasonable to pursue such an explanation for pre-reflective self-consciousness too.

“Although for every subjective and phenomenal experience there is presumably a corresponding change in one’s brain,” Evan Thompson reminds us, “it remains an open question to what extent these changes are explicable independent of the sensorimotor and environmental contexts of brain activity.” I acknowledge that the question is still open, but also believe that answers are on the horizon. As the present paper has hopefully conveyed, the experimental data thus far collected points favorably toward a brain-based, internalist theory of phenomenal experience.

REFERENCES:
