BOOK REVIEWS

Action in Perception. ALVA NOË. Cambridge: Massachusetts Institute of Technology Press, 2004. ix + 277 p. Cloth $38.00.*

This is a charming and ambitious book that combines careful attention to the phenomenology of experience with an appreciation of the psychology and neuroscience of perception. In some of its aims—for example, to show problems with a rigid version of a view of visual perception as an "inverse optics" process of constructing a static 3-D representation from static 2-D information on the retina—it succeeds admirably. As Noë points out, vision is a process that depends on interactions between the perceiver and the environment and involves contributions from sensory systems other than the eye. He is at pains to note that vision is not passive. His analogy with touch is to the point: touch involves skillful probing and movement, and so does vision, although less obviously and in my view less centrally so. This much is certainly widely accepted among vision scientists—although mainstream vision scientists (represented, for example, by Stephen Palmer's excellent textbook[1]) view these points as best seen within a version of the inverse optics view that takes inputs as nonstatic and as including motor instructions (for example, involving eye movements and head movements).[2] The kind of point that Noë raises is viewed as important at the margins, but as not disturbing the main lines of the picture of vision that descends—with many changes—from the pioneering work of David Marr in the 1980s (and before him, from Helmholtz). But Noë shows little interest in mainstream vision science, focusing on nonmainstream ideas in the science of perception, specifically ideas from the anti-representational psychologist J.J. Gibson, and also drawing on Wittgenstein and the phenomenological tradition. There is a sense throughout the book of revolution, of upsetting the applecart. This is a review from the point of view of the applecart.

* I am grateful to Tyler Burge, John Campbell, Jakob Hohwy, Sean Kelly, Alva Noë, Christopher Peacocke, and Susanna Siegel for comments on a earlier draft.

[1] *Vision Science: From Photons to Phenomenology* (Cambridge: MIT, 1999).

[2] See, for example, Palmer's treatment of position constancy (objects do not appear to jump when the eye moves), on pp. 339–43, and optic flow, pp. 507–09. Helmholtz showed that the information that the brain uses to distinguish a sudden jerky motion of an object in the environment from a sudden jerky motion of the eye does not come from "afferent" (that is, input) sensors in the muscles that move the eye but rather from "efferent" motor commands to the eye. His experiment was simple: use the finger to move the eye, pushing from the side. The world appears to move, supporting the "efference copy" theory. As Palmer notes, an orthodox treatment can easily handle such inputs.

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My comments are in two parts, one mainly a priori, the other largely empirical: first, I will consider Noë's version of externalism in the light of the distinction between causation and constitution. Second, I will argue that on the most obvious reading of Noë's view, one that identifies perceptual experience with the skilled bodily exercise of "sensorimotor knowledge" (I will leave off the scare quotes in what follows) that includes visually guided action, there are empirical results that suggest that the exercise of such know-how does not reflect the phenomenology of conscious vision.

I. CAUSATION AND CONSTITUTION

Tyler Burge, Saul Kripke, and Hilary Putnam have argued for externalism about meaning and content: to take a familiar flamboyant version of it, two people with molecularly identical brains could nonetheless have different 'water'-thoughts because of differences in their physical and/or social environments. Fred Dretske, William Lycan, and Michael Tye hold that the phenomenal character of an experience is or at least supervenes on the experience's representational content, and so they use the Burge-Kripke-Putnam sort of externalism to support externalism about experience. They are Representationists about phenomenal character in the sense that they hold that the phenomenal character of an experience is exhausted by its representational content. Noë argues for what is in one way at least a more radical form of externalism about experience. His externalism is *vehicle* externalism rather than content externalism. The vehicles of contents are the physical items that have or express the contents—sentences for example. His analogy is to the view of Andy Clark and David Chalmers[3] that memory and calculation constitutively include props such as a diary or a pencil and paper. Similarly, according to Noë's view, the skilled active body partially constitutes the vehicle of experience.

Noë sometimes tries to frame the debate in a way that has his side arguing for a mere possibility, for example, "I have been arguing that, for at least some experiences, the physical substrate of the experience *may* cross boundaries, implicating neural, bodily, and environmental features" (221). However, these specks of caution float on a sea of exuberant declarations, such as "A neuroscience of perceptual consciousness must be an enactive neuroscience—that is, a neuroscience of embodied activity, rather than a neuroscience of brain activity" (227).

[3] "The Extended Mind," *Analysis*, LVIII (1998): 7–19. Clark and Chalmers do not apply their vehicle externalism to experience.

The leading idea of the book—what Noë calls the *enactive* view[4]—is a constitutive claim about experience: "Perceptual experience, according to the enactive approach, is an activity of exploring the environment drawing on knowledge of sensorimotor dependencies and thought" (228). What are sensorimotor dependencies (or contingencies) and what is knowledge of them? First, the 'sensori' in 'sensorimotor' is not supposed to be taken to be itself mentalistic. Noë is wary of the pitfall for his view of tacitly appealing to the content of experience in explaining the sensorimotor knowledge that is supposed to serve to explain the content of experience, so wary that he appears to adopt not one but two pieces of machinery for avoiding it. He says that strictly speaking sensorimotor knowledge—knowledge of sensorimotor contingencies—is knowledge of "the way sensory *stimulation* varies as you move" (78, emphasis added). The sensory side of the sensori-motor division is also spelled out in terms of what he calls "appearances," which are supposed to be totally objective. For example, the shape appearance of an object is given by any one of its projection on a plane that is orthogonal to the line of sight, for example, a projection on an imaginary window interposed between the eye and the object. Thus, the objective shape appearance of a round plate seen at an angle is the elliptical projection on such a plane, and so the plate objectively "looks" elliptical (from a certain angle). Sensorimotor knowledge is know-how concerning how objective appearances change as you move and the things you see move. The model for this know-how is knowing how to dance or gesture. The upshot is that perceptual experience, according to the enactive view, is the practical bodily exercise of sensorimotor know-how (see especially §3.5).[5] Noë's controversial conclusion is that perceptual experience does not constitutively supervene on the brain alone but only

[4] This view has been pursued in other works by Noë and his collaborators, notably in Susan Hurley's *Consciousness in Action* (Cambridge: Harvard, 1998); and in J.K. O'Regan and Noë, "A Sensorimotor Approach to Vision and Visual Consciousness," *Behavioral and Brain Sciences*, xxiv, 5 (2001): 939–73. See also Francisco J. Varela, Evan Thompson, and Eleanor Rosch, *The Embodied Mind* (Cambridge: MIT, 1991); and Dan Dennett's somewhat skeptical review of this book in *American Journal of Psychology*, cvi (1993): 121–26. An early precursor is H.L. Dreyfus, "Why Computers Must Have Bodies in Order to Be Intelligent," *Review of Metaphysics*, xxi (September 1967) 13–32.

[5] Christopher Peacocke noted (in conversation) that the devices I just mentioned do not avoid circularity. If you read about how to remove an appendix, that (plausibly) does not affect what it is like to see people who have appendixes, but it does add to one's knowledge of sensorimotor contingencies. The only way to rule out this booklearning kind of sensorimotor knowledge as determining the phenomenology of perception is to say that it is not implied by the perception itself. But that brings in the sensorimotor knowledge ~~in explaining the perceptual content~~ rather than the other way round.

on the active body that is required for the skilled exercise of sensorimotor knowledge.

Although I have described Noë as holding a constitutive externalist view of perceptual experience, I should say that there is considerable variation in the statement of the enactive view. Sometimes it is stated as a constitutive view about perception rather than perceptual experience: "perceiving is constituted by the exercise of a range of sensorimotor skills."[6] In addition to identifying perceptual experience with the exercise of sensorimotor skills, that is, skilled bodily exercise of sensorimotor knowledge, Noë also says that perceptual experience "draws on," is "constrained by," and is "enabled" by sensorimotor knowledge. We are often given declarations about the nature of perception or perceptual experience, but the terms change, frustratingly, from one statement to another. There are even parts of the book in which perceptual experience appears to be identified with a set of expectations rather than bodily activity. I believe that my interpretation of the enactive view as the claim that perceptual experience is the exercise of sensorimotor know-how is justified by the fact that it appears throughout the book, that it is often expressed emphatically ("Perceptual experience *just is* a mode of skillful exploration of the world" (194)) that it is emphasized in the last chapter (labeled "Brain and Mind: A Conclusion") which is on the mind-body problem and that this radical claim will inevitably be a source of controversy.

Noë supposes that the enactive view has a number of philosophical advantages. For example, he argues that it goes some way towards closing the famous "explanatory gap": Why is it that the neural basis of this experience is the neural basis of an experience like this instead of like something else or like nothing? In my view, the appearance of help here comes from a tacit conceptual functionalism (or even behaviorism). To put the point crudely, if you think the concept of a pain is the concept of a state that makes you say "Ouch" and the concept of an itch is the concept of a state that makes you scratch, it is a lot easier to close the explanatory gap for pain and itching and the difference between them.

Another line of argument that Noë offers in favor of the enactive view is based on impressive evidence that in many disparate kinds of cases, perceptual experience depends on sensorimotor contingencies. One point is emphasized by Brian O'Shaughnessy and Michael Martin[7]: our

[6] However, even in this case, the context (for example, the sentences before and after) make it clear that the topic is perceptual experience

[7] O'Shaughnessy, *The Will*, Volume 1 (New York: Cambridge, 1980), and *Consciousness and the World* (New York: Oxford, 2000); Martin, "Sight and Touch," in Tim Crane, ed., *The Contents of Experience: Essays on Perception* (New York: Cambridge, 1992), pp. 196–215. See also A.D. Smith, *The Problem of Perception* (Cambridge: Harvard, 2002).

tactile experience of a solid object depends on sensing its resistance when we push against it, thus showing a causal dependence of experience on action. Another line of thought is experimental: in a variety of paradigms, changing sensorimotor contingencies changes the brain and experience itself. As Richard Held and Alan Hein showed in the 1960s, kittens that are active in exploring the environment have normal visual systems as compared with kittens that have the same stimulation but are passive.[8] Wearing inverting goggles results in considerable reorganization of perception. Hooking up a television camera to a pixel array grasped in a blind person's mouth allows for navigation through space, probably by recruiting "visual" areas of the brain.[9] These results are impressive but what they show is that sensorimotor contingencies have an *effect* on experience, not that experience is even partially *constituted* by—or supervenes, constitutively on—bodily activity. (To say that, for example, the moral facts supervene on the physical facts is to say that there can be no moral difference without a physical difference.)

This distinction between the claim that sensorimotor contingencies affect experience and the claim that experience is constituted by the exercise of sensorimotor know-how poses a major problem for many of Noë's arguments. The problem can be seen in stark form in Noë's discussion of dreaming. He says:

> Let us take it as settled that when we dream there is no dynamic exchange with the environment (although this might turn out not to be true), and let us accept that, therefore, neural states alone *are* sufficient for dreaming (*although this does not follow—e.g., the affective content of dream states may depend on endocrine gland activity, as waking emotional states do...*) (213, emphasis added).

Noë's thought here is that dream experience supervenes on the brain but perceptual experience does not. The suggestion raises the question of whether dream experience could really have a constitutive metaphysical basis that is different from that of perceptual experience, but I will pass over this issue, confining myself to commenting on what for Noë's purpose

[8] "Movement-produced Stimulation in the Development of Visually Guided Behavior," *Journal of Comparative and Physiological Psychology*, LVI, 5 (1963): 872–76.

[9] See Hurley and Noë, "Neural Plasticity and Consciousness," *Biology and Philosophy*, XVIII (2003): 131–68; my "Spatial Perception via Tactile Sensation," *Trends in Cognitive Science*, VII, 7 (July 2003): 285–86; and Hurley and Noë, "Neural Plasticity and Consciousness: A Reply to Block, *Trends in Cognitive Sciences*, VII, 8 (August 2003): 342. Noë thinks that the subjects who have worn the goggles the longest end up finding the world to look as it did before they donned the goggles. Although I disagree with that gloss on the experiments, there can be no doubt that there is considerable experiential adaptation.

is just a parenthetical remark, a revealing aside. Noë supposes that if the affective content of dream states *depends causally on endocrine activity*, then the constitutive supervenience base for dream experience is not just the brain but has to include the endocrine system. But endocrine activity can affect dream experience without being part of the constitutive supervenience base for dream experience if endocrine activity causally affects that supervenience base. Indeed, the upshot of evidence on the brain basis of experience is that effects of the endocrine system on experience are mediated by effects on the brain itself and therefore do not challenge the orthodoxy that says that the brain is the minimal constitutive supervenience base for experience. (This is part of the applecart I mentioned earlier.)[10]

Let us be clear about what the issue is. The issue of the constitutive supervenience base for experience is the issue of what is—and is not—a *metaphysically necessary part of a metaphysically sufficient condition* of perceptual experience. That is, it is the issue of what is—and is not—part of the *minimal* metaphysically sufficient condition for perceptual experience (the minimal supervenience base). Noë's enactive view says that the skilled active body is part of that minimal supervenience base, whereas the view, which I hold and which I have labeled the orthodox view, is that nothing outside the brain is part of it.[11]

Importantly, the minimal supervenience base for an experience that occurs at time *t* is an instantiation of a physical property at *t*—according to the orthodox view. The Representationists mentioned earlier—Dretske, Lycan, and Tye—hold that the minimal supervenience base includes features of the environment from the past—for example, aspects of the evolutionary history of the individual and perhaps aspects of the individual's own lifetime of interacting with the environment. But the Representationists would agree with the orthodox view that if we hold these environmental variables fixed, only the features of the brain *now* are needed to determine the phenomenal character of experience *now*. And this is where the enactive view is more radical: the enactive view holds that even if we hold the evolutionary and immediate past environ-

[10] Note that I am assuming only that the dreamer is experiencing, not that dream experience is perceptual experience.

[11] See my "Two Neural Correlates of Consciousness," *Trends in Cognitive Sciences*, IX, 2 (February 2005): 46–52; and Christof Koch, *The Quest for Consciousness* (Englewood, CO: Roberts, 2004). The orthodox view is also rejected by the Representationists mentioned earlier and by disjunctivists such as John McDowell and Mike Martin. See Susanna Siegel, "Indiscriminability and the Phenomenal," *Philosophical Studies*, CXX (2004): 90–112, for an excellent discussion of one version of disjunctivism.

ments fixed, there is still something outside the brain to be fixed in order to determine the phenomenal character of experience now, namely the activity of the body.

Of course, there is often a process of perceiving that *involves* bodily activity—one moves closer or to the side to get a different view—but that should not be conflated with the very different idea that perceiving *is* an activity or that perceptual experience is an activity. And even if perceptual experience *depends* causally or counterfactually on movement or another form of activity, it does not follow that perceptual experience *constitutively* involves movement.

To illustrate the point, one might ask the question: suppose it was arranged so that the passive kitten in Held's and Hein's experiment had exactly the same brain goings on as the active kitten. The upshot of Noë's view is that that passive kitten still will not have the same experience as the active kitten.

Noë supposes that the main argument for drawing the line at the brain is the assumption that every experience that we can have can be produced by brain stimulation. He says:

> We are now able to produce very simple visual sensations such as the illusion of the presence of flashes of light ("phosphenes") by means of direct neural stimulation...from the fact that it is possible to produce *some* experiences, it does not follow that it is possible to produce *all* experiences. To assume, without further discussion, that we will someday be able to produce all perceptual experiences by direct neural stimulation, or that it is in principle possible to do so, is to assume too much. Indeed, it is to come close to assuming internalism about experience (211).

But the issue is not whether neural stimulation can *produce* every experience but whether if the relevant brain state were to come about—*somehow*—the experience would be instantiated. To suppose that the issue is one of how experiences can be produced is to shift the topic from a constitutive issue to a causal issue. Certainly, the causal sources of our experience include sensorimotor causal loops, but that does not settle the constitutive question.

Sometimes, Noë talks as if the issue is whether, when an experience is produced in a given environment, that environment is causally necessary for the experience.

> It may be that the only nomically possible world in which such a temporal series of brain states could occur would be one in which the animal were dynamically interacting with the very same kind of environment! To imagine the duplication of brain states is thus tacitly to appeal to the more extended setting in which those brain states are placed. Experience

> doesn't supervene on neural states alone, then, but only on neural states plus environmental conditions (223).

There is no plausibility in the claim that there is some nomologically possible series of brain states that can *only be produced by skilled interaction with a certain environment*. To see this point, we need only distinguish between the unlikely and the impossible. It is of course unlikely that all the air molecules in the room will all rush to one side, leaving you in a vacuum but it is not nomologically impossible. In fact, as I understand it, if the room constitutes a "quasi-ergodic" system (which rules out, for example, that the air molecules are perfectly elastic spheres which are hitting the perfectly reflective walls at 90°), it is guaranteed to happen "eventually"—according even to the Newtonian statistical mechanics of particles (although the sun may go out first). Once one adds quantum mechanics to the mix, the conclusion is even stronger. Any state of the brain that can be brought about by normal perception could perhaps occur—although with very low probability—by chance fluctuation.[12]

I will end this section with a side issue. I believe that interaction with the environment in evolutionary history and the history of the individual is constitutively necessary for an experience to have the representational content that it has. A brain in a vat (that has always been in the vat) does not have the same representational contents that that brain—even if relevantly internally the same—would have had in a normal perceptual environment. Indeed, a certain evolutionary background would be required for the brain in the vat to have anything that could qualify as a *perceptual* representation at all. (This is familiar content externalism.[13]) However, it is possible to resist the slide from externalism about the representational content of perception to externalism about the nature of the phenomenal character of perception.[14] In any case, as I mentioned earlier what Noë's

[12] When I pressed Noë on the constitutive/causal issue at the Workshop on the Fundamental Issues in Cognitive Science in Taipei, Taiwan (January 6–9, 2005), and at the Mind and Language Seminar at New York University (March 22, 2005), he disparaged the causal/constitutive distinction. But it should be noted that the book repeatedly makes what ~~has to~~ be read as constitutive claims, including, sometimes, using the word 'constitutive', as in: "Most recent work on the relation of perception and action stops short of making the constitutive claim that defines the enactive standpoint: It does not treat perception as a kind of action or skillful activity (or as drawing on a kind of sensorimotor knowledge)" (18).

[13] See Burge, "Individualism and Psychology," *Philosophical Review*, XCV (1986): 3–45, "Individuation and Causation in Psychology," *Pacific Philosophical Quarterly*, LXX (1989): 303–22, and "Vision and Intentional Content," in Ernest Lepore and Robert Van Gulick, eds., *John Searle and His Critics* (Cambridge: Blackwell, 1991), pp. 195–213.

[14] See my "Mental Paint," in Martin Hahn and Bjørn Ramberg, eds., *Reflections and Replies: Essays on the Philosophy of Tyler Burge* (Cambridge: MIT, 2003), pp. 165–200, and Tyler Burge, "Qualia and Intentional Content: Reply to Block," in the same volume, pp. 405–15.

book is about is not the issue of content externalism, but rather the quite different issue of vehicle externalism.

To sum up so far: Sensorimotor know-how and perceptual experience are causally related, but that is no reason to think that they are constitutively related. I now turn to a very different line of probing having to do with a type of empirical finding that creates difficulty for the enactive view.

II. THE EMPIRICAL ISSUE

Thus far, I have not engaged much with the slippery issue of exactly what the enactive view really is. I will approach this issue by mentioning a line of empirical work that refutes the enactive view, at least on the most straightforward reading of it. Humans and other primates have two distinct visual systems, a conscious visual system that starts in the back of the head, moving to the bottom and side (the "ventral" system) and a much less clearly conscious "dorsal" system that goes from the back towards the top of the brain.[15] These two systems have very different properties. The ventral (conscious) system is slow, is oriented toward long-term visual planning of motion, and uses object-centered coding (objects are represented from a stereotypical point of view instead of the point of view that reflects the perceiver's current position). The dorsal system is fast, uses "egocentric" representations that are distance and orientation sensitive, has virtually no memory or color vision, and is used for the on-line visual guidance of action—for example, guiding the dribbling of a basketball down the court, avoiding obstacles. The last two sentences may sound like mumbo-jumbo to those who are unfamiliar with the concepts involved, so let me mention a few illustrations. Some of us have had the experience of running barefoot on the beach, our feet avoiding stones that we do not seem to see. The dorsal system—which feeds much more strongly than the ventral system to peripheral vision—is responsible for visually guided bodily movements that operate largely out of awareness.[16] There are a number of visual illusions that fool conscious vision but do not fool reaching and grasping motions that are guided by the dorsal system. (And

[15] See A. David Milner and Melvyn A. Goodale, *The Visual Brain in Action* (New York: Oxford, 1995), pp. ??? ??; and Goodale and Milner, *Sight Unseen* (New York: Oxford, 2004). An account aimed at philosophers is Andy Clark, "Visual Experience and Motor Action: Are The Bonds Too Tight?" *Philosophical Review*, CX, 4 (October 2001): 495–519.

[16] I. Schindler, N. Rice, R. D. McIntosh, Y. Rossetti, and Milner, "Automatic Avoidance of Obstacles Is a Dorsal Stream Function: Evidence from Optic Ataxia," *Nature Neuroscience*, VII (2004): 779–84; McIntosh, K.I. McClements, Schindler, T.P.Cassidy, D. Birchall, and Milner, "Avoidance of Obstacles in the Absence of Visual Awareness," *Proceedings of the Royal Society of London B*, CCLXXI (2004): 15–20.

some illusions that work in the reverse way!) It is the ventral system that is mainly relevant to perceptual experience, but—in a surprise result that rivals philosophers' science fiction scenarios—it is the dorsal system that guides action from moment to moment!

Noë summarizes some of this research (describing it as "striking" (18)), but he does not grapple with what seems to me to be the real problem that this research poses for his perspective. (His response is in terms of teleology: perceptual experience is not *for* acting.) I can approach this problem by describing a dorsal/ventral difference which presupposes none of the theory that I have sketched. To understand it, you need to know that the fovea is the central area of the retina that is very densely packed with receptors. If you look at your thumb held at arms length, the fovea will be mainly occupied by the projection of your thumb. Here is the point: as James Danckert and Melvyn A. Goodale say: "The ventral 'perception' pathway...deals primarily with foveal vision—a fact that is consistent with the crucial role this pathway plays in the perception and recognition of objects and scenes.... In contrast, the dorsal 'action' stream, which...is known to play a critical role in the control of actions, such as goal-directed limb and eye movements, has a full representation of the visual field."[17] Goodale and Kelly Murphy[18] provide a dramatic example of this point. They presented 5 rectangular blocks to subjects at various positions in the visual field ranging from 5° to 70° off the line of sight. They compared accuracy of perceptual discrimination of one block from another with accuracy of grip via a device that measured the aperture between thumb and forefinger as subjects reached out to pick up one of the blocks. The basic finding is that subjects' grip accuracy is roughly the same at 5° as at 70°, whereas conscious perceptual discrimination is vastly worse (roughly one tenth as good by standard measure) at 70° than at 5°.

You can get a first person appreciation of this point easily by holding up an object at 70° off of your line of sight. Features—including size—that you can see when you are looking straight at something are invisible or barely visible at an eccentricity of 70°—that is, they are inaccessible to conscious vision. But now try picking up something at 70°: you can do it pretty well. The upshot is that if the activity guided by sensorimotor knowledge with which the enactive approach identifies perceptual experience includes visually guided action, it *simply does not reflect the*

[17] "Ups and Downs in the Visual Control of Action," in Scott H. Johnson-Frey, ed., *Taking Action: Cognitive Neuroscience Perspectives on the Problem of Intentional Movement* (Cambridge: MIT 2003), pp. 29–64, see p. ???.

[18] "Action and Perception in the Visual Periphery," in P. Their and H.-O. Karnath, eds., *Parietal Lobe Contributions to Orientation in 3 D Space* (New York: Springer, 1997), pp. 447–61.

phenomenology of conscious vision. That is, sensorimotor knowledge—to the extent that it involves the visual guidance of action—is not true to perceptual experience.

At this point, however, we encounter a deep obscurity in the enactive view. Does the enactive view include visually guided action in the "activity" which it identifies with visual experience? The enactive view, as I have been understanding it, and as is stated often in the book, is that perceptual experience "is an *activity* of exploring the environment" drawing on sensorimotor know-how. Does the enactive view say that this activity (of exercising sensorimotor know-how) includes visually guided action? It is hard to see how skilled activity of exploring the environment drawing on sensorimotor knowledge-how could *fail* to involve visually guided action or what would be left of that skilled activity if visually guided action were removed.

However, there is one place in the book in which Noë explicitly denies that the sensorimotor know-how he is talking about includes visually guided action (see 90, where he describes visual guidance of action as "humdrum"). And there are a number of places in which he seems to take a view at odds with the often stated view that perceptual experience is an activity. Optic ataxia is a syndrome in which the dorsal system is damaged. If the ventral system is intact, the subject is impaired in visually guided action but apparently unimpaired in visual perception. Noë says that the optic ataxic

> does not undercut the enactive view, for from the fact that a patient suffers optic ataxia, it doesn't follow that he or she lacks the relevant sensorimotor knowledge. What would undercut the enactive approach would be the existence of perception in the absence of the bodily skills and sensorimotor knowledge, which, on the enactive view, are constitutive of the ability to perceive (12).

Here he seems to be identifying perception or perceptual experience with the mere possession of bodily skills and sensorimotor knowledge rather than their exercise in perceptually guided activity. Since the possession of sensorimotor know-how persists while experience changes, this cannot be quite what is meant, but perhaps there is some way other than visually guided action in which sensorimotor knowledge and bodily skills can be exercised and that might be supposed to be constitutive of visual experience?

One possibility is that the view is meant to be dispositional. But *dispositions* to visually guided action do not reflect the phenomenology of conscious vision any better than visually guided action itself. Dispositions to visually guided action are just as "dorsal" as visually guided action itself. Further, it is not clear that the optic ataxic *has* the relevant dispositions. Dispositional functionalists and behaviorists can and do deal with spinal

cord paralysis by claiming that the paralysis affects the *manifestation* of the dispositions without affecting the dispositions themselves. For example, Behaviorists and dispositional functionalists sometimes handle paralysis by appeal to counterfactuals about how a person would move if his body were normal in certain ways ("paradigmatic embodiment," to use Sydney Shoemaker's term[19]), but such an appeal is only appropriate when the paralysis is caused by damage that affects the manifestation of the experience rather than the experience itself, for example, spinal cord damage rather than brain damage. But optic ataxia is a result of *brain* damage—not spinal cord damage—that affects the dispositions themselves, not just their manifestation. So dispositions will not save the enactive view.

There is a deflationary understanding of the enactive view that appears at some points in the book: that a perceptual experience is an instantiation of a *set of expectations* of how appearances will shift with movement. Some comments: first, the instantiation of a set of expectations need not involve any bodily skills or even a body, and so such a view would give up much of what is distinctive and revolutionary about the enactive view. (Recall: "Perceptual experience *just is* a mode of skillful exploration of the world.") Second, the set of expectations might be instantiated in the form of sensorimotor *mental imagery*, but this possibility provides no comfort for the enactive view since sensorimotor mental imagery could be entirely internal and not involve bodily skills in any way that requires a body at the time the motor imagery is exercised. What the enactive view would come down to is the rather un-applecart-upsetting view that perception involves a kind of mental imagery. Third, the point made in the first part of this review applies: even if expectations have an effect on perceptual experience, that is far from showing that perception is partially or totally constituted by the instantiation of expectations. Fourth, presumably the dorsal system involves at least implicit expectations for how objects in the environment shift with visual guided movements. So even the deflationary version of the enactive view under discussion would still clash with the facts about the two visual systems, since the enactive view would dictate that the (in fact unconscious) dorsal states are conscious. Fifth, it is unclear what the evidence in favor of such a view would be. Certainly, the points Noë makes about how changes in sensorimotor contingencies affect experience provide at best a weak argument for such a view.

If there is a constitutive role for anything sensorimotor in perception, I think it is likely to be a matter of one's spatial sense—a sense that is shared by many perceptual systems, including vision and proprioception,

[19] "Embodiment and Behavior," in Amélie Rorty, ed., *The Identities of Persons* (Berkeley: California UP, 1976), pp. 109–37.

and that seems to be embodied in the dorsal system. One of the most interesting parts of the book is Noë's discussion of presence in absence, the phenomenology of the back of an apple that one does not see but senses nonetheless, or the cat that one sees—all of it—moving behind a picket fence. I think that presence in absence may be a matter of multimodal or amodal spatial imagery, and that that imagery may in part be motor imagery—since its brain basis appears to overlap with motor guidance systems in the dorsal visual system. Noë would have been on much stronger ground if he had restricted his enactive account to this aspect of experience instead of trying to capture all of experience. Sean Kelly has made a related suggestion: that knowledge of sensorimotor contingencies could provide an account of the background of perception rather than the foreground.[20] Here is a fact that supports both my view and Kelly's somewhat different view: subjects who have damage to the dorsal visual system that as I said is primarily responsible for visually guided action are worse at avoiding obstacles than in aiming for the main target.[21]

In an epilogue in the last four pages of the book, Noë seems to take back the claim that he has emphasized and spelled out in great detail throughout the book: that sensorimotor contingencies can be characterized objectively, suggesting that the enactive view must appeal to a primitive notion of life. "For living beings are already, by dint of being alive, *potentially conscious*" (230). The idea seems to be that what is common to all experience cannot be explained by appeal to knowledge of sensorimotor contingencies, but the difference between different perceptual contents can be so explained. "You give us a spark of consciousness, we'll give you the world" (230). I would suggest something more like the reverse: something ~~of~~ sensorimotor has a better chance of explaining the spatial sense that is common to all or most perceptual experience than explaining what distinguishes different experiences.

The applecart that I have been defending against Noë's attack has two main tenets. First, the minimal constitutive supervenience base for perceptual experience is the brain and does not include the rest of the body. Second, although motor outputs and motor output instructions affect perceptual experience (as has been known since Helmholtz) much of perceptual experience can be understood in abstraction from such causes.

[20] At the NYU Mind and Language Seminar (March 9, 2004).

[21] See Schindler et al.; see also G.W. Humphreys and M.G. Edwards, "Automatic Obstacle Avoidance and Parietal Cortex," *Nature Neuroscience*, VII (July 2004): 693. This paper introduces the Schindler paper.

Although I have been heavily critical of Noë's book, I did find it interesting, and intriguing. Not coincidentally, I think there is a grain of truth in the enactive view: perceptual experience is causally affected by sensorimotor contingencies and our sense of "presence in absence" may be a matter of sensorimotor imagery.

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