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Defending Noe's Enactive Theory of Perception

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DEFENDING NOË'S ENACTIVE THEORY OF PERCEPTION: A RESPONSE TO SOME
OBJECTIONS

by

LUCAS KEEFER

Under the Direction of Andrea Scarantino

ABSTRACT

Theories of perception can broadly be divided into two groups: orthodox and heterodox theories (Noë & Thompson, 2002). Orthodox theories of perception consider perception as a neurological process, i.e. as a phenomenon which can be explained solely in terms of intracranial facts. Heterodox views expand this scope, maintaining that an understanding of perception must include extracranial facts, or facts about the environment in which a perceiver is situated (ibid.). This thesis will attempt to defend a particular exemplar of this heterodox approach, namely the *enactive theory of perception* proposed by Alva Noë.

The thesis has two primary goals. First, I will attempt to offer an exegesis of Noë's theory, attempting to clarify the scope and strength of Noë's view. Secondly, I will consider the particular objections leveled against Noë, and heterodox theories more generally, by Ken Aizawa. I conclude that Noë's theory can better account for the nature of perception.

INDEX WORDS: Perception, Noë, Philosophy of mind, Philosophy of science

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CHAPTER 1

INTRODUCTION

According to Noë and Thompson, theories of perception are largely separable into two distinct camps (2002). Some theories constitute an *orthodox view* of perception. To quote Noë and Thompson: “According to this orthodoxy, perception is a process whereby the brain, or a functionally dedicated subsystem of the brain, builds up representations of relevant features of the environment on the basis of information encoded by sensory receptors” (Noë & Thompson, 2002, 2). The tradition in philosophy and psychology has been to understand perception in terms of the activity of discrete neuronal systems.¹

The orthodox view, which considers perception a process in the brain, makes certain assumptions about a science of perception. For example, if perception is the result of a neural system encompassing the visual cortex and other peripheral regions in the cortex, then any philosophical or scientific study of perception should focus its analysis on these neural mechanisms and how they process information. On this view, the neuroscience of perception holds the key to fully understanding how humans perceive.

Noë and Thompson also suggest that there is also a slowly developing camp of *heterodox views* of perception. These views are united by “their convergence on certain fundamental criticisms of the orthodox view and their insistence on the inseparability of perception and action” (Noë & Thompson, 2002, 3). Heterodox theories are united by the view that *something is missing* from the orthodox view of perception. To understand perception as a process occurring in the brain of a perceiver is to miss the way that perception relates us to the

¹ In philosophy, Noë and Thompson cite primarily Fodor (for example see Fodor's defense of the orthodoxy, co-authored with Pylyshyn, 1981 reprinted 2002) but this orthodoxy is far more historically established in the scientific literature. For example, one might consider the work by Helmholtz and Hering in the late 19th century which attempted to discover the particular process by which the retina processed light information.

world. Perception is not merely a process by which brains process information from the retina², but rather a means by which organisms gather information used for guiding action. A full explanation for how organisms perceive in an environment must make reference to more than just the brains of those organisms because what those brains are capable of, and what they in fact do while perceiving, is contingent upon the environments in which organisms find themselves. On this view, perception cannot be fully explained without considering extracranial facts, or facts which go beyond the cortex of the perceiver.

For some, such as Gibson, these extracranial facts include ecological information about the optic-array (1972, reprinted 2002). We can not understand perception, by a Gibsonian view, without understanding the ways in which our environments present certain information to perceivers. The configurations of objects to be perceived, as well as the nature of the perceivers, affect how organisms receive and process information as they navigate an environment. Other heterodox theorists, such as Alva Noë, argue that a full theory of perception must take into consideration the role of the perceiver's movements and actions. Perception involves a great deal of behavior on the part of the perceiver. We move around things, we crane our necks, we squint, etc.³ All of these behaviors are important for how perception is actually achieved.

The stakes of the debate, then, should be clear. If orthodox theories are too narrow in their construal of perception, as claimed by heterodox theorists, then the science of perception has been neglecting something essential about how human beings perceive. The heterodoxy demands that a science of perception attempt to situate the perceiving brain in a body, and to situate that body in an environment. It is only in light of these additional, extracranial facts that

2 This thesis will focus almost exclusively on visual perception in human beings, a common bias in the literature. Some things I have to say may be easily extended to other sensory modalities, other organisms, or both. Given that both Aizawa and Noë emphasize human visual perception, I will maintain this narrower focus.

3 Noë cites these behaviors as well as others which are less obviously an automatic part of our perceptual behavior, such as reaching for glasses (2004, 1-2). I think these are the more intuitive cases.

we can describe the phenomenon of perception as it plays a central role in our lives, i.e. as it puts us into contact with a world of facts and events that are significant for us.

To be clear, to say that the orthodoxy misses something essential about perception is not to say that heterodox theorists maintain that the neuroscience of perception is pointless. Even if a full theory of perception must reference extracranial facts, such as the configuration of the optic array for Gibson or sensorimotor knowledge for Noë, then intracranial facts may still be very significant. A theory which demands that the science of perception consider extracranial facts can still meaningfully maintain that intracranial facts are important for understanding how those extracranial facts are made available to a perceiver.

The purpose of this thesis will be to contribute to the growing literature regarding this debate. More specifically, I will focus on the debate between Alva Noë and Ken Aizawa., who offer, in the author's opinion, two of the clearest and strongest expressions of their respective camps. Alva Noë has become a leading proponent of the heterodoxy, much of which he synthesizes into a unitary account in his book *Action and Perception* (2004). Ken Aizawa (2006a, 2006b, 2008, unpublished) has emerged as Noë's fiercest critic, and a defender of the orthodox view. Importantly, Aizawa tries to defend the orthodoxy while still remaining sensitive to the role of extracranial facts in shaping perception. I will offer a number of objections to Aizawa's arguments against Noë, and defend Noë's account..

Here is how I will proceed. In Chapter 2, I will offer an explication of Noë's theory of perception, trying to establish the extent to which it differs from the orthodox view. In Chapter 3, I will reconstruct and evaluate the central arguments that Aizawa has offered against Noë's theory, and argue that they ultimately fail to refute Noë's heterodox view. In Chapter 4, I will revisit Noë's theory in light of Aizawa's arguments, and explain why heterodox approaches offer

important new insights on the nature of perception. I will suggest in conclusion that future work in the science of perception must seek to unify the orthodoxy with the heterodoxy.

CHAPTER 2

NOË ON ACTION IN PERCEPTION

The distinction between orthodox and heterodox theories applies to more than just theories of perception. Orthodox views, broadly speaking, start from the assumption that minds are best understood as brains, or that all mental activity can be understood as reducible to neuronal activity. For example, an orthodox philosophy of mind might maintain that the best way to make sense of a mental activity, such as remembering, is to investigate the neuronal activation (through fMRI or PET scans) correlating to this mental act.

Some philosophers, however, have recently challenged this orthodoxy by offering heterodox views in the form of embodied and extended theories of mind. Andy Clark, to pick a prominent example, has suggested that we should conceive of minds as extended (Clark & Chalmers, 1998). Consider the frequent use one makes of a checkbook (Clark and Chalmers 1998) in order to remember the ever-changing total of our checking account.

Clark and Chalmers claim that the ability to readily retrieve this information from the checkbook *constitutes a kind of memory*. On this picture, the checkbook allows us to store and retrieve information *in much the same way* as neurons in the hippocampus. Thus the heterodox philosopher of mind endorses a view of mind as *extended* beyond the neurons of the individual. Notice how this heterodox view of an *extended mind* attempts to include elements of the environment – e.g. the checkbook - as constituents of mental processes. In contrast, the orthodox view excludes such elements by considering the cranium a natural boundary for the mind. What is outside the cranium is also outside the mind. This clearly puts the brain in a position of privilege: mental activities are first and foremost brain activities.

Noë fits squarely in this heterodox movement because he attempts to offer a theory of perception which draws on extracranial facts about the perceiver's action in an environment. In both the case of Noë and Clark, the attempt to give an account of some aspect of the mind involves a theory which draws upon the relations between the agent and the world. For Clark, this means that a full theory of cognition must consider the perceiver's use of objects in the environment to process information. For Noë, this means that a full theory of perception must consider the perceiver's interactions with objects in the environment, and how this affects the perception of the perceiver.

I will bracket the question as to whether or not Noë actually endorses an extended view of mind. It will suffice to indicate merely that he is similar to Clark insofar as he maintains that the neuroscience of perception misses something essential about the phenomenon (Noë, 2, 2004). Clark's extended view of mind suggests that the neuroscience of cognition fails to capture certain extracranial facts, such as the use of a checkbook, and hence the orthodox, neuroscientific view misses something essential about the phenomenon of cognition. Noë's theory similarly suggests that perception, the result of a perceiver's interaction with an environment, can not be explained in terms of neuronal activation or mechanisms alone (Noë, 2004, 2).

Not only does Noë intend to be a member of the heterodoxy, but his theory draws on a number of important insights from the heterodox camp, making it arguably the best informed theory from among those available in the heterodoxy. I will attempt to spell out in more detail precisely what advantages his theory offers us, with respect to capturing the phenomenon of perception.

2.1 Noë on Sensorimotor Knowledge

The core of Noë's theory can be captured by two ideas. The first is that “our perceptual experience acquires content due to our possession of certain bodily skills” (Noë, 2004, 1). The second is that perception is “a skillful activity on the part of the animal as a whole” (Noë, 2004, 2). I will illustrate each in turn.

According to Noë, perceptual experience,⁴ i.e. the conscious experience of a perceiver, is constituted in part by “bodily skills”, or, equivalently, “sensorimotor knowledge.” This does not mean that bodily skills are, in isolation, enough to constitute perceptual experience. For instance, no bodily skills could lead to perceptual experience in the absence of an environment to be perceived. Moreover, an individual with the relevant bodily skills who loses their eyes, or receives damage to their optic nerves, or any other part of the biological system involved in visual perception will lose visual perceptual experience.

I mention this only to clarify: sensorimotor knowledge contributes to the constitution of our perceptual experience, but is not sufficient for it. This is, I take it, part of what Noë means by his first thesis: sensorimotor knowledge, or bodily skills, are a necessary condition for perceptual experience. Now the question becomes: in what way does sensorimotor knowledge serve as a necessary constituent of perceptual experience?

Noë's answer, by my interpretation, is that sensorimotor knowledge makes possible two constitutive features of perceptual experience. The first is *virtual content*. The second aspect is the emergence of *p-properties*. Explaining what Noë means by each will lead us to understand the role of sensorimotor knowledge in perceptual experience.

2.1.1 Virtual Content

⁴ I am intentionally avoiding a complex defense of why a theory of perception should start from perceptual experience, i.e. from the conscious experience of perception, as opposed to starting from a 3rd person perspective on perception. Noë takes his theory as phenomenological (2004, 33).

The first aspect of perceptual experience made possible by sensorimotor knowledge is what Noë calls *virtual content*. To illustrate the phenomenon, Noë relies on a fairly ordinary example: visually perceiving a tomato (2005, 75-76). When one looks at a tomato, there is only one side of the tomato available to visual perception. We visually perceive the tomato as a whole, with a roughly spheroid shape. Since what is actually available to the perceiver is not a spheroid shape, Noë suggests that part of the experiential content of seeing a tomato is *virtual*.

Another example can help us understand virtual content. Consider seeing a cat behind a picket fence (Noë, 2005, 67). The picket fence is comprised by a series of boards with small slits. What is available to visual experience in the case of a cat is a number of separate cat segments, as the boards of the fence make it impossible to see the entirety of the cat at once. But we do not experience this visual arrangement as a collection of disconnected cat parts conveniently placed to appear like a whole cat. We see the cat as a whole, with a roughly cat-like shape. Since what is actually available to the perceiver is not a cat-like shape, Noë suggests that part of the experiential content of seeing a cat behind a picket fence is *virtual*.

These examples demonstrate an important distinction between kinds of content available in perceptual experience. Some aspects of the visual landscape, such as the front of the tomato or the cat parts behind the gaps in the fence, are immediately perceived. They are *occurrent* to our perceptual experience of the world. Other aspects of the visual landscape, such as the obscured portion of the tomato or the parts of the cat hidden by the boards of the fence, are present as *virtual content*. Virtual content, as Noë uses the expression, refers to any aspects of objects which are available to perceptual experience without direct, occurrent perception.

Virtual content is also present in at least one other sensory modality, namely touch, and this provides an illustrative case of virtual content. Noë suggests that tactile sensations, the result

of the cutaneous receptors and their pathways to cortex, are insufficient for describing perceptual experience (Noë, 2004, 14). The isolated sensations one receives, for example, when they feel a coffee mug, fail to ever present the whole coffee mug. I am incapable of simultaneously sensing the entire surface and shape of the object. Yet I experience the mug as a whole object,⁵ even though I am not simultaneously touching every aspect of the mug: my perceptual experience organizes the isolated, occurrent sensations into an awareness of the mug as a whole object. Just as portions of the tomato are obscured or unavailable visually, portions of the mug are unavailable tactilely as well.

How does sensorimotor knowledge, the “bodily skills” central to Noë’s theory, make virtual content possible in our perceptual experience? The clearest statement of the relationship between sensorimotor knowledge and virtual content comes from Noë & O’Regan (2002). In this article, Noë and O’Regan offer a theory of vision based on the idea of *sensorimotor contingencies*, the relations between possible movements and possible experiences.

To explain this view, let us return to the example of the tomato. When we see the front of the tomato, we are familiar with tomatoes as objects which generally have a spheroid shape, a homogeneous red hue, and so on. Some of this shape is available as occurrent, while most of it is available only as virtual. What is present as virtual, Noë and O’Regan argue, is *present only in virtue of our having mastered basic sensorimotor contingencies*: we understand that if we were to rotate around the tomato, we would find that its roundness does not abruptly stop, and that the

5 The coffee mug is experienced as an object with a muglike shape (having an hollow cylinder, opened on one end, with a handle) despite my only feeling parts of the mug at any given time. If you are skeptical, think about how you might reach for and attempt to drink from a coffee cup you couldn’t see. Presumably you would use the handle to position the hollow, open cylinder just to the left of your hand (assuming you grab the mug with your right hand). You can interact with the mug as a whole object, even though only the handle is available to your occurrent tactile perception. The rest of the mug is present as virtual, including the rim. A more obvious example might be an object like a tennis racket: you experience a racket as occupying some region of space though most of the racket is only present as virtual.

tomato is indeed roughly spherical. Virtual content is present as content to be experienced, if the observer were to move in a certain way relative to the object (or if the object moves in a certain way relative to the observer) (Noë & O'Regan, 2002, 569). Sensorimotor knowledge for Noë is a mastery of these sensorimotor contingencies, and it is only by mastering these contingencies that one can experience virtual content. A perceiver could not perceive a tomato as being constituted by occurrent and virtual content unless they were aware of the ways in which the tomato would continue to present them with a spheroid shape, if they were to rotate around it.

What is the character of this mastery of sensorimotor contingencies? Noë is explicit in stating that sensorimotor knowledge “is not knowledge of propositions describing the sensory effects of possible or actual movements” (Noë, 2004, 118). Noë offers two arguments for this central claim that sensorimotor knowledge is non-propositional.

The first argument Noë offers is that if sensorimotor knowledge were propositional, “it is unlikely that perceivers actually have that knowledge” (Noë, 2004, 118). It would be extremely difficult, if not impossible, to explain what propositions might constitute a human perceiver's virtual content. When I see the tomato as a three-dimensional whole, there are *infinitely many* propositions contained within my virtual content: I understand that if I move x degrees, I will see $y\%$ more of the tomato, that if I move $x+1$ degrees, I will see $y+1\%$ more of the tomato, and so on. Given the infinite possible perspectives from which to perceive the object, and hence the infinite sensorimotor contingencies, the virtual content seems simply too complex to be understood in terms of propositions. For Noë, it seems absurd to attribute an automatic knowledge of these infinite propositions to a perceiver.

Secondly, and more crucially, a propositional view of sensorimotor knowledge would be question-begging. Noë rejects such a view on the grounds that “the counterfactuals themselves

presuppose a prior grasp on such content” (Noë, 2004, 118). To clarify, consider what it would mean for sensorimotor knowledge to be a knowledge of these conditionals. We would have to say that our perceptual experience of virtual content in the tomato would be a knowledge of some conditional: if we were to move around the tomato, we would experience the full three-dimensional shape of the object. But according to Noë: it is *because* we experience the tomato as three-dimensional and voluminous that we are committed to the relevant counterfactual conditionals” (Noë, 2004, 118). The conditional does serve to describe our experience of virtual content, but these conditionals are only comprehensible in light of the original experience of virtual content.

Sensorimotor knowledge is in Noë's view a kind of practical understanding⁶ (2004, 120). Noë likens sensorimotor knowledge to dance: while we could describe dance behaviors in terms of propositions, the dancer does not need to entertain or know any propositions related to her dancing to be able to dance. Likewise, just as we could use subjunctive conditionals or counterfactuals to describe what sensorimotor knowledge is knowledge *of* (i.e. sensorimotor contingencies), the skill of understanding sensorimotor contingencies is itself not propositional. To use an old distinction: sensorimotor knowledge is a knowledge-how, not a knowledge-that.⁷

I would like to consider one last clarification on the role of sensorimotor knowledge with respect to virtual content. Does Noë's view of sensorimotor knowledge and virtual content in perception commit him to the claim that every perceptual experience has a virtual component?⁸

6 Some may object that the use of “understand” sounds too intellectual/cognitive/propositional. Noë uses this term (2004, 66) to describe sensorimotor knowledge as an “implicit, practical understanding.” I will follow him in this convention.

7 This distinction is Gilbert Ryle's (1953).

8 Paul Coates (2007) raises an important objection to Noë along these lines: namely, that Noë's theory seems to commit us to experiencing distant and extinct stars as partially constituted by virtual content. The worry is that Noë's theory would then require a perceiver to perceive what is in fact not there, or worse yet, for sensorimotor knowledge to suggest that a non-existent entity has some properties.

The fact is that we cannot have sensorimotor interaction with some things we perceive. That we have no sensorimotor contingencies to experience for some objects, e.g. distant stars, is consequently no threat to the thesis that *sensorimotor knowledge is required for virtual content*. An object which reads as particularly small, like a star that appears as a speck of light, should preclude the possibility of virtual content because there are no sensorimotor contingencies to understand. Changes in position do not impact the perceptual properties of the thing perceived because it is perceived invariably as a speck of a fixed shape (a dot?). So the point worth clarifying is that on Noe's theory not every visual experience involves virtual content. Virtual content is only possible for those objects for which sensorimotor contingencies, i.e. possible changes in the perception of an object relative to changes in the position of the perceiver, are possible.

2.1.2 P-properties

According to Noe, sensorimotor knowledge is also required for the emergence of perspectival properties (henceforth, p-properties) in experience. The distinction between properties and p-properties is, for example, that between the actual size of an object and its size in the visual field (Noë, 2004, 82). An object has a fixed size, which remains the same regardless of whether it is perceived or not. Size in the visual field, however, varies greatly depending on the distance from which one perceives the object.

Consider the case in which one sees two trees of similar size, one of which is closer to the perceiver than the other (Noë, 79, 2004). Our perceptual experience of this scene allows for two levels of description, according to Noë.⁹ On the one hand, we perceive that one tree is

⁹ The distinction here is Husserl's between hyletic and noetic acts (see *Ideas I*). The hyletic data of this experience, the pure sensual data prior to any interpretation, presents two trees of different sizes in the visual field. However, by interpreting this content through the noetic act, we can see the trees *as* being similar in size, despite the difference in the respective *hyle*.

smaller than the other, in the sense that all distant objects look smaller than closer objects of the same size. In this sense, one tree has a smaller p-size (size in the visual field) than the other. But from this perceptual experience, we can also use the p-size of the trees as a cue for seeing them as being similar in *actual* size. We can describe the visual scene in terms of p-properties (size in the visual field) or actual properties.

But what does sensorimotor knowledge have to do with these p-properties?

Understanding p-properties is only possible given mastery of certain sensorimotor contingencies: for me to move from one level of description, size in the visual field, to the other level, the actual size of the objects perceived, I must have sensorimotor knowledge of how possible movements (e.g. reducing the distance from the tree with the smaller p-size) could change my perceptual experience. Sensorimotor knowledge makes p-properties meaningful by allowing a perceiver to perceive p-properties as relative to a pattern of movement. In the case of the trees, the one tree is seen as smaller than the other in the occurrent perception of the trees. But at the same time, because our perceptual experience is informed by an awareness of sensorimotor contingencies, we can perceive the trees as being of similar size, despite the apparent size difference.

2.1.3 Sensorimotor Knowledge

I take it that virtual content and p-properties represent the core of Noë's theory of perception. Both are clearly impossible without the possession of some implicit understanding of sensorimotor contingencies. This is precisely what Noë means when he claims that sensorimotor knowledge is a necessary condition for perceptual experience. Visual experience is rich with virtual content and p-properties. Having established the aspects of perceptual experience that presuppose sensorimotor knowledge, I will now turn to the relationship between perception and action.

2.2 Sensorimotor Knowledge and Action

At the beginning of the last section, I suggested that Noë's theory is based around two core theses. The first thesis, explored in the previous section, that perceptual experience is constituted by sensorimotor knowledge. Now I will turn to Noë's second thesis, that perception is a skillful activity on the part of the organism as a whole (Noë, 2004, 2). I will attempt to spell out precisely how Noë's theory establishes the connection between perception and action and why establishing this connection is an advantage of Noë's theory over orthodox accounts.

One might be inclined to argue from Noë's view of sensorimotor knowledge that the implicit understanding of sensorimotor contingencies misses something important about the phenomenon of perception. Sensorimotor knowledge, as an implicit understanding of sensorimotor contingencies, does not seem germane to how we experience virtual content. One might argue, as Taylor Carman does, that virtual content in experience is only present relative to our goals: the rear-half of the tomato is not merely present because of some implicit understanding, it is present because I see the tomato with which I can interact (Carman, 2005). The presence of virtual content in my experience is not merely an implicit presence of an unseen tomato portion, but an understanding of what that presence means for my interactions with the tomato.

Noë seems to preempt a criticism of this sort by a comment in an earlier article:

For an animal to be, in addition, *perceptually aware* of that to which it is perceptually sensitive is not only for it to be appropriately coupled perceptually, but for it to integrate its coupling behavior with its broader capacities for thought and rationally guided action. (Noë & O'Regan, 2002, 569)

Noë maintains that perceptual experience is more than *just* a mastery of sensorimotor contingencies, which Noë describes as a “coupling of animal and environment that consists in the animal's access to environmental detail thanks to its mastery of the relevant sensorimotor

contingencies” (Noë & O'Regan, 2002, 569). Perceptual awareness, in Noë's terms, also requires that an understanding of sensorimotor contingencies be connected with future action. A perceiver who is only sensitive to sensorimotor contingencies still will not have full perceptual experience, as Noë describes it.

The upshot of Noë's remark above is, I take it, that sensorimotor knowledge is not divorced from the actions of an organism. Sensorimotor knowledge is an implicit understanding of the relationship between possible movements and possible perceptions. This does not mean that sensorimotor knowledge is divorced from actual movement. In fact, actual movement by the perceiver is informed by sensorimotor knowledge, or by an awareness of possible movement. Perceptual experience is in part constituted by an implicit understanding of both relations (Noë & O'Regan, 2002, 569).

Let us get back to the tomato. When I stand in the grocery store staring at a large display case full of tomatoes, my perceptual experience is informed by my sensorimotor knowledge. I gauge the different sizes of the tomatoes, relative to my current perspective (using p-properties) and I see the tomatoes as whole objects, complete with occluded insides and outer surfaces hidden from my view. Whatever I choose to do with the tomatoes, such as picking out the biggest or ripest one, will necessarily also be informed by sensorimotor knowledge. The tomatoes will be at varying distances from me, requiring an understanding of p-properties to gauge their relative size. To be a human perceiver is to do more than have sensorimotor knowledge and the kinds of experiences it makes possible (complete with virtual content and p-properties). To be a human perceiver, on Noë's view, is to have sensorimotor knowledge and to guide actions by the information provided by sensorimotor knowledge.

While possible movement is the means by which sensorimotor knowledge contributes virtual content and p-properties, this perceptual experience is still integrally linked with our actual movements in our environment. How we interact with our environment, such as when we pick up tomatoes or play a guitar, is influenced by how our perceptual experience is shaped by sensorimotor knowledge. Moreover, some actual movement is required to acquire sensorimotor knowledge. To understand sensorimotor contingencies, I must be able to move relative to the objects in my environment. It is through movement that I experience sensorimotor contingencies, and my understanding of those contingencies informs my future interactions with the objects of my environment.

To summarize, sensorimotor knowledge is “an implicit, practical understanding of the way movements produce changes in sensory stimulation” (Noë, 2004, 66). The two adjectives here are crucial for Noë's two theses: it is implicit, no explicit judgment is required to understand the sensorimotor contingencies between possible movements and possible perceptions and most essentially the understanding is practical. Sensorimotor knowledge is practical by being both based on our actions in exploring our environment, and action-guiding insofar as it partially constitutes a perceptual experience which provides information guiding our actions.

Lastly, it is worth situating this discussion in terms of the orthodoxy/heterodoxy schism. If Noë is correct, and perception is best understood as something which is the result of acquiring certain sensorimotor knowledge from action (and subsequently acting upon perception informed by sensorimotor knowledge), then we must seemingly make reference to extra-cranial facts to explain perception. Sensorimotor contingencies are facts about perception relative to a body and an environment. A brain, on its own, can only process information about these contingencies

because of certain facts about how human beings move around the world and how that world affords certain possibilities for movement that affect perception. Perception is more than just the activity of the brain: it is the activity of a brain, using a body to navigate its environment, and surrounded by objects which make possible certain sensorimotor contingencies. This means that Noë's theory of perception plants him squarely within the heterodoxy.

2.3 Conclusion: Noë and the Orthodox View

Noë's theory of perception, if correct, would seem to demand that a science of perception consider more than just the neural mechanisms involved in processing information from sensory modalities. Sensorimotor knowledge, or the perceiver's implicit understanding of sensorimotor contingencies, must at the least be explained in terms of the relation between the organism and the environment (Noë & O'Regan, 2002). It is in this sense that Noë's theory can be seen as belonging firmly to the heterodoxy, with respect to theories of perception. Perception seems not to be something that a brain does, but rather *something that an organism as a whole does*. The kinds of sensorimotor knowledge that are possible for an organism depend not only the brains and sensory organs that the organism has, but also on the possibilities for movement around the environment. It is worth pointing out at least one qualifier to this conclusion. Namely, Noë himself maintains a healthy skepticism about the possibility that neuroscience can account for experience, but he does not endorse the claim that neuroscience is doomed to fail in this project (Noë, 2005, 217-218). Now I would like to turn to the core of this thesis, namely presenting criticisms raised against Noë's theory by Aizawa, who attempts to defend the orthodox view.

CHAPTER 3

AIZAWA'S DEFENSE OF THE ORTHODOXY

As stated at the outset of the thesis, the orthodox view has long been adopted by philosophers and scientists interested in perception. Heterodoxy threatens this long established tradition in the scientific research, and recasts the findings of orthodox perceptual science as incomplete. The challenge of the heterodoxy has not gone unanswered. In this chapter I will provide a critical evaluation of a series of arguments raised against Noë by Ken Aizawa, who attempts to defend the orthodox view from the threat raised by the heterodoxy.¹⁰

3.1 Aizawa and the Orthodoxy

Aizawa's rejection of heterodox theories of perception is driven by two hypotheses (2008, 9). Adams and Aizawa write:

Despite the growing popularity of the hypothesis of extended cognition, we remain defenders of orthodoxy. We argue that there are principled reasons for believing that the kind of cognitive processing cognitive psychologists care about is, essentially without real-world exception, intracranial (Adams & Aizawa, 2008, 9).

Adams and Aizawa give two reasons for thinking that cognition should be considered intracranial (forthcoming and 2008).

The first is that cognition is understood, by Adams and Aizawa, as a process performed on non-derived content (2008, 32).¹¹ Adams and Aizawa write:

Roughly speaking, the idea is that derived content arises from the way in which items are handled or treated by intentional agents...Underived content arises from conditions that do not require the independent or prior existence of other content, representations, or intentional agents. (2008, 32)

10 The arguments I emphasize in this thesis come from two separate papers presented by Ken Aizawa (2006a, 2006b) and the arguments from both are presented in the book *The Bounds of Cognition* by Adams and Aizawa (2008).

11 I will avoid packing too much into the notion of “content” used in this thesis. Adams and Aizawa seem to use the term to refer to the representations processed in cognition. While I disagree with Adams and Aizawa about how they use non-derived content, nothing hangs on having a precise definition of content for this thesis.

According to Adams and Aizawa, cognition operates using representations and the content of these representations in cognition is underived: it is not the result of some prior content or representation.¹²

Adams and Aizawa are cautious in this hypothesis, claiming that they do not mean to offer a definition of cognition, nor do they wish to stipulate that non-derived content is limited only to the brain (Adams & Aizawa, 55). Rather, Adams and Aizawa take it as a contingent empirical fact that, as far as we know, brains are the only systems which are capable of manipulating non-derived content or representations and moreover that this manipulation of non-derived content is essential for cognition.

The motivation behind seeing non-derived content as a constituent of cognition, for Adams and Aizawa, is because it clearly marks off human cognition as something apart from other kinds of information processing or representation (2008, 32). Computers and telephones are able to process information, broadly speaking, and a number of objects are capable of representing (e.g. a thermometer can represent the temperature). What distinguishes these forms of representation and information processing from human cognition is that these objects can only represent or process information, they only have *content*, because of the relations they have to human thinkers. The informational content of a thermometer, for example, is only present because it allows a human being to interpret the signs of mercury rising as representing some fact about the environment, namely the rising temperature. What brains are able to do, unlike these other forms of information processing or representation is to have content that does not depend on any prior representation or intentional agent. This content is non-derived content.

12 This is the core of the disagreement between Adams/Aizawa and Clark, mentioned earlier in the thesis. The content of the checkbook, claim Adams and Aizawa, is derived by the cognition of the person recording information, and hence such a checkbook can not be part of the cognitive process of remembering the balance of one's checking account.

A second reason for endorsing the claim that cognition is limited to intracranial processes is based on the principles through which cognitive mechanisms operate (forthcoming and 2008). The idea, I take it, is that cognitive processes follow distinctive principles¹³ and that these principles are realized only by neural systems. Adams and Aizawa write: “We think it is eminently plausible to conjecture that neurons have sufficiently distinctive forms of information processing that they are plausibly construed as realizing, or serving as a supervenience base, for cognitive processes” (Adams & Aizawa, 2008, 68).

Adams and Aizawa maintain that the latter reason for endorsing the view that cognition is intracranial is illustrated clearly in the case of perception (2008, 70). Some optical principles, such as the behavior of light as it refracts, take place in the “extraneuronal world.” These principles are wholly divorced from the principles which operate on light at the neuronal level, such as those by which retinal ganglion cells activate in response to incoming light (2008, 69-70).

Because there is a special kind of processing taking place at the level of the neuronal systems, Adams and Aizawa take this as a good reason to argue for the claim that cognitive systems are intracranial. The principles by which light information is processed by cells differ from the principles by which light is reflected off of a surface. Only the latter principles, those based on neuronal activation, mark a cognitive process. To consider another analogy Adams and Aizawa offer, think of what distinguishes human perception from the way light input is processed in a camera (forthcoming). A digital camera has some receptors which digitally encode light information and store it on an SD card as an image. Human cognition does something similar, functionally speaking, but what marks perceptual cognition as a kind of

13 I take it that the term “principles” is meant to be a less-heavy handed way of speaking of “laws” or other regularities with respect to cognitive phenomena.

cognition is that neurons process information differently. The SD card stores a digitally encoded representation of an image, but the brain uses a variety of subsystems to process information about the objects perceived and their movement relative to the perceiver. For example, the camera lacks edge detectors, which human perceivers have in V1.

One last note about Aizawa's views is important: namely, for Aizawa perception represents a kind of cognitive process. As the example in the above discussion shows, perception is considered as a paradigm case (in both 2008 and forthcoming) for the view of intracranial principles Adams and Aizawa suggest. This fact will become important for the further discussions of how Aizawa argues against Noë's theory of perception.

3.2 Aizawa's Arguments Against Noë's Interpretation of the Evidence

Aizawa has offered two papers explicitly against Noë's theory of perception. Aizawa argues that Noë's evidence and arguments support, at best, the claim that “(CAH) Perceptual experience is caused in part by sensorimotor skills” (Aizawa, 2006a, 2006b)¹⁴. The stronger claim “(COH) Perceptual experience is in part constituted by sensorimotor skills,” is Noë's thesis, but Aizawa argues that this is ultimately unsupported by the evidence. I will show that Aizawa fails to refute Noë's theory on the basis of the empirical evidence and that we should follow Noë in endorsing the constitutive claim (COH).

Aizawa's attack on Noë's theory of perception takes two major approaches. First, Aizawa considers Noë's discussion of “experiential blindness” and argues that his examples support, at best, CAH and not COH (2006a and 2008). Secondly, Aizawa considers the case of paralysis as evidence against Noë (2006b and 2008). I will deal with each argument in turn.

14 Aizawa, K. (2006a) “Understanding the Embodiment of Perception” presented 2006 Meeting of the Pacific Division of the American Philosophical Association. March 22-26, 2006, Portland Hilton, Portland, OR. and Aizawa, K. (2006b). "Paralysis and the Enactive Theory of Perception." 2006 Meeting of the Central States Philosophical Association. October 13-14, 2006. Both presentations available from Kenneth Aizawa's personal website.

3.2.1 Experiential Blindness

First I will consider the discussion of “experiential blindness” and what conclusions we should draw about the constitution of perception. To introduce the phenomenon in Noë's terms:

The enactive view of perception predicts that there are, broadly speaking, two different kinds of blindness. First, there is blindness due to damage or disruption of the sensitive apparatus. This is the familiar sort of blindness. . .Second, there is blindness due not to the absence of sensation or sensitivity, but rather to the person's inability to integrate sensory stimulation with patterns of movement and thought. Let's call this second kind of blindness experiential blindness because it is blindness despite the presence of something like normal visual sensation (Noë, 2004, 4)

It is important to bear in mind precisely what Noë's distinction amounts to: there is blindness which results from some physiological damage to the sensory mechanisms (receptors, nerves, cortex, etc.) and a distinct kind of blindness which results simply from the inability to use sensorimotor knowledge, either from a lack of acquiring such knowledge or because one becomes disoriented through inverting lenses. If someone's eyes are damaged or perceptual nerves destroyed, they have blindness of the first kind. This individual has what we typically think of as blindness: they are simply unable to see.

Noë takes it that experiential blindness is evidence for the role of sensorimotor knowledge in *constituting* perceptual experience (Noë, 5). For example, patients who have cataracts removed still have difficulties in perceiving, even though all sensory mechanisms are presumably in fine working order (Noë, 5). Moreover, in the case of “inverting lenses,” which disrupt the typical spatial presentation of visual space, individuals become temporarily “experientially blind,” sensing basic elements of the perceptual field while experiencing a deficit in organizing experience (Noë, 6). In both the cases of cataracts and inverting lenses, sensory mechanisms remain intact, but the subject fails to apply the requisite sensorimotor knowledge required to perceive order in the otherwise disordered panoply of visual experience.

Experiential blindness, according to Noë, represents an inability to use sensorimotor knowledge in constituting perceptual experience. The individuals with removed congenital cataracts have sensory mechanisms in place which transmit information from retina to cortex, but because they have been previously unable to have visual perception, these individuals have failed to acquire sensorimotor knowledge. Without previous perception, these individuals have not been able to experience sensorimotor contingencies and hence they are unable to have any understanding of them. In the case of inverting lenses, these individuals have sensorimotor knowledge, but the inversion of light on the retina disrupts the normal, automatic application of sensorimotor knowledge to what is sensed. For both cataract patients and people with inverting lenses, the inability to apply sensorimotor knowledge leads to an inability to have ordered perceptual experience, or experiential blindness, despite the ordinary functioning of the sensory organs.

Bear in mind that Noë is not committed to the claim that experiential blindness represents an utter lack of perceptual experience. Experiential blindness is best understood as a “disruption or disorganization of content” (Noë, 2004, 91). In the case of inverting lenses, light information is still being processed by the retina, and some sensations are experienced as a result. What makes this a kind of “blindness,” in Noë's view, is the absence of the kind of ordered perceptual experience that individuals without inverting lenses or congenital cataracts have.

In the case of cataracts, the patients are not completely blind, which Aizawa thinks COH (the view that perceptual experience is in part constituted by sensorimotor knowledge) would require (2006a, 7). Aizawa interprets the relation between sensorimotor knowledge and perceptual experience as wholly constitutive: without sensorimotor knowledge, there can be no

perceptual experience. If there is any perceptual experience at all, even if it is disorganized, then sensorimotor knowledge can not be a constituent (2008, 164).

Aizawa seems to misconstrue what Noë intends by the constitutive relation obtaining between perceptual experience and sensorimotor knowledge (Noë, 2007). Clearly sensorimotor knowledge *on its own* can not constitute perceptual experience, and so it should be no surprise that experiential blindness in the case of cataracts *does not* mean a total absence of visual sensation.

The second conclusion Aizawa reaches about cataract patients is that the evidence can be equally well explained by CAH (the view that sensorimotor knowledge is a cause contributing to perception) instead of COH (the view that sensorimotor knowledge constitutes perception), and, it is implied, we should settle for the less radical (i.e. more accepted, more orthodox) interpretation (Aizawa, 2006a, 7).

Aizawa's comments on inverting lenses follow the same lines. He argues again that people with these lenses still sense some things and are therefore not totally blind. As I have already expressed, this attacks only a straw man of Noë's position because it overstates the nature of the constitutive relationship between perceptual experience and sensorimotor knowledge. Aizawa falsely believes that Noë is committed to the claim that without sensorimotor knowledge, there can be no experience at all. Aizawa concludes here, as in the case of cataracts, that CAH can just as easily explain the experiential blindness in this case and hence we should not endorse the interpretation of COH. But again, the appeal to CAH (the causal interpretation) over COH (the constitutive interpretation) is motivated by the general acceptability of CAH.

For both cataracts and inverting lenses, it seems that Aizawa has two main arguments against Noë's interpretation of the evidence. The first, that experiential blindness is still associated with some experience, I have rejected in both the case of cataracts and inverting lenses because this overstates the constitutive relationship that Noë endorses. So what are we to make of Aizawa's more interesting argument that we should interpret the evidence as supporting CAH, the causal claim, as opposed to COH, the constitutive claim for both cases of experiential blindness? Adams and Aizawa write:

Noë concludes that the failure (experiential blindness) is due to the loss of a constituent of perception, namely, sensorimotor skills—no sensorimotor skills, no perceptual experience. . . . But the hypothesis that sensorimotor skills causally influence perception seems to offer just as good an explanation of the putative experiential blindness as does Noë's hypothesis. (2008, 162)

CAH, the causal interpretation of the evidence, does not threaten the orthodox view that Adams and Aizawa attempt to defend. If sensorimotor knowledge is only a contributory cause for perceptual experience, then the orthodox view can maintain its stance that a full theory of perception need not refer to extracranial facts. Despite the general acceptability of CAH over COH for orthodox cognitive psychology and neuroscience, CAH is not the best interpretation of the evidence. If Aizawa accepts the existence of cases of experiential blindness, as he claims to, only COH can explain the phenomenon.

Aizawa's two criteria for determining the constituents of perception are unsatisfactory and can not account for the important difference between typical and experiential blindness. Recall that the first claim is that cognition is marked by the presence of non-derived content, content which is not the result of some prior representation or intentional agent (2008). The second hypothesis is that the constituents of perception must obey principles which are unique to neural systems. Recall that Aizawa equates a discussion of perception with a discussion of

perceptual cognition, and hence his criteria should apply here. If he dislikes Noë's conclusion that sensorimotor knowledge is a constituent of perception, then he should be able to offer a viable alternative for the orthodoxy.

So what about the first criterion, that cognition is marked by the presence of non-derived content? Consider what it would mean to say, in general, that perceptual cognition is marked by acting upon some non-derived content. This is to say that the content of perceptual experience is not derived from any prior representation, but this becomes incredibly difficult to understand at the level of intracranial perception given the nature of the perceptual system. I will attempt to show that if we take the non-derived content hypothesis seriously, as Aizawa does, then it becomes very difficult to explain perceptual cognition.

The visual system comprises a number of pathways connecting various cortical and subcortical structures.¹⁵ So let us arbitrarily start with a part of the system: the pathways to the parietal and temporal cortices, i.e. the dorsal “where” and ventral “what” pathways. The spatial information processed in the parietal cortex, and the object identification processed in the temporal cortex, are only possible because of the information received from the primary visual cortex. Moreover, the representations at V1, the primary visual cortex, come from the projections from the retina through the optic chiasm. The content of the information processing at V1 depends upon the activation of retinal ganglion cells. But the information content carried by these retinal ganglion cells is derived by the activation of the horizontal and bipolar cells. The information transmitted by these groups depends upon the activation of photoreceptors.

If Aizawa takes non-derived content seriously, then it becomes very difficult to posit an initial *non-derived* representation at any level beyond the initial encoding of light information

15 I do not think it is necessary to go through this process in too much detail. It is enough to suggest merely that there are many levels of information processing in the visual system and that what is available to later steps in the process depends on the processing of earlier levels.

into neuronal action potentials. The content of my later processing in cortex, such as determining the objects present in the visual field, is *derived from* the processing at V1. If Aizawa takes an orthodox view of cognition as a kind of processing of non-derived content seriously, he must exclude these areas of the brain as constituents of perceptual cognition: they do not process non-derived content. It seems that Aizawa must posit a plurality of derived representations, ultimately bottoming out in the non-derived representations of the photoreceptors.

Aizawa could argue that photoreceptors thus become the constituents of perceptual cognition, and other perceptual subsystems, which have only derived content, are subsidiary in some way. This seems absurd: after all, some information is processed in the cortex, though the operative representations or content at each stage is derived from some earlier representation or content in the visual system. Adopting non-derived content as a standard for the constitutive elements of perceptual cognition seems to commit Aizawa to the view that the information processing that occurs in cortex is, in some sense, not a constituent of that cognition.

Aizawa might be willing to respond here that the perceptual system *as a whole* is able to trade in non-derived representations, and thus to be a cognitive system. This option, however, is rejected by Aizawa:

Air conditioning does not take place in every component of an air conditioning system and computing does not take place in every component of a computing system. We have proposed that cognitive processing involves specific forms of information processing operations on non-derived representations. By our lights, the only cognitive processes in these cognitive systems are those found in the brain. (Adams & Aizawa, 2008)

Non-derived content, by Adams and Aizawa's view, is the content of a single cognitive process and not a system. If they adopted this view, then they would have to admit that Clark's checkbook could be a constituent of memory, because the system as a whole, the person with the checkbook, could process some non-derived content. This would deflate the entire purpose of

their project in defending the orthodoxy. In the case of perception, I have suggested that this commits Aizawa to the view that only the photoreceptors, which initially encode some representation of light information, have non-derived content and thus only photoreceptors are the constituents of perceptual cognition.

Another option for using non-derived content as a criterion for determining the constituents of perceptual cognition might be to presuppose that there is only one non-derived representation, that which is the result of all of the subpersonal information processing in the visual system. This view, however, would lead to the conclusion that the experienced representation is not derived from any of the processing of the light information from the retina, the activation of the edge detectors in V1, or any other elements of the system that processes visual information. In other words, if we endorse the claim that the final product is non-derived, then we deny that anything which led to that final product had any content at all. Such a view would mean that the resulting non-derived representation does not result in any way from the effects of the environment on the perceiver's receptor cells or visual cortex, all of which are separately processing some content or representations from earlier components of the visual system (with the exception, of course, of the photoreceptors). This seems to be a fairly incoherent picture of perception. The content of our visual perceptual experience surely has something to do with the information encoded by our cortex and retina, which results from the content of the light information in our environment.

More to the point, even if we were to grant that non-derived content is a useful way of determining the elements of perceptual cognition, such a view would be utterly unable to account for experiential blindness. I have suggested that only one subsystem of the visual system processes non-derived content. In the cases of congenital cataracts and inverting lenses, this

subsystem shows no impairment whatsoever: there is no damage to the photoreceptors.¹⁶ The photoreceptors continue encoding light information into some representations for use by the visual system and individuals who are experientially blind *process this information in the same way as those who are not*. Aizawa suggests that we interpret experiential blindness as suggesting the thesis that CAH: perception is caused in part by sensorimotor knowledge. But by setting non-derived content as the standard by which we determine what constitutes perception as a cognitive process, we seem to have no clear way of speaking about how sensorimotor knowledge has any impact on this process of perceptual cognition because no matter how we speak of sensorimotor knowledge, there is no clear way that it could impact the processing of light information by the photoreceptors. This system is wholly isolated from the effects of any knowledge on the part of the perceiver.¹⁷

Aizawa's second criterion for being a constituent of a cognitive process, acting on intracranial principles, similarly fails to offer a workable alternative to Noë's claims about the constitutive elements of perception. Our understanding of all neural systems constituting perceptual experience is possible only in light of understanding the environment of the perceiver. Take a common example: the edge detectors in V1, the primary visual cortex. By Adams and Aizawa's constitutive theory, this system obeys certain neural principles which mark it as a cognitive system. To understand the principles on which this system operates, however, we must make reference to the edges in the perceiver's environment. The behavior of the system, and the observed principles from a neuroscientific perspective, is only meaningful because of what the

16 In the case of congenital cataracts, there are some abnormalities in the primary visual cortex (Adams & Aizawa, 2008, 160). The cortex, however, is processing derived content projected from the earlier systems, so by Aizawa's view, this is damage to an area that affects, but does not constitute, perceptual cognition.

17 The content processed by the photoreceptors does depend upon the movements of the perceiver. Noë's theory however does not understand sensorimotor knowledge as requiring any actual movement, a point clarified in the upcoming discussion of paralysis.

system does with input from the environment. If our theory is that V1 is a constituent of perceptual experience because it obeys principles, as Adams and Aizawa suggest, we must necessarily smuggle in certain extra-cranial facts about the relationship between the environment and intracranial systems. It is not possible to describe, observe, or offer theoretical evidence for how an edge-detection system constitutes perceptual experience without first realizing that the system's activation is contingent upon certain relations between the environment of the perceiver and the sensory organs which receive information about that environment.

Attempting to use intracranial principles as a heuristic for determining the constituents of perception also fails to account for experiential blindness. Experiential blindness does not represent a failure at the level of intracranial processing: the photoreceptors, retinal ganglion cells, and all of the relevant perceptual subsystems of the brain are fully functioning. In terms of intracranial principles, there is no distinction to be made between normal perception and experiential blindness: all of the perceptual systems are processing information correctly.

To sum up, I disagree with Aizawa's suggestion that we should interpret the evidence of experiential blindness as supporting CAH. Aizawa fails to offer a theory of the constitutive elements of perception such that he can exclude sensorimotor knowledge as one of those elements. For both 1) non-derived content and 2) intracranial principles, Aizawa fails to account for experiential blindness, and more importantly fails to give a compelling analysis of the constituents of perception in the first place.¹⁸

Noë's theory, on the other hand, can speak of experiential blindness in a more compelling way. By positing sensorimotor knowledge as an important constituent of perception, Noë can maintain that the absence of this component leads to the kinds of deficits observed in the cases

18 Some might be willing to bite the bullet and accept the view that only the photoreceptors constitute perceptual cognition. I disagree on the basis that this excludes the great deal of cortical processing of incoming light information.

mentioned. Without the ability to apply sensorimotor knowledge, perceivers have disorganized perceptual content, a kind of blindness in Noë's view.

In his discussion of experiential blindness, it seems that Aizawa 1) misinterprets Noë's project and 2) fails to offer an alternative that would allow us to adopt CAH over COH. Noë clearly does not argue for the thesis that perceptual experience is constituted solely by sensorimotor knowledge, which makes Aizawa's initial arguments against Noë misguided. Aizawa's views of what constitutes perception can not make sense of either experiential blindness and seem problematic with respect to perception generally. Of the two alternatives, it seems that only Noë has the resources to explain the phenomenon of experiential blindness.

3.2.2 Paralysis and the Enactive Account of Perception

Aizawa also attacks Noë's heterodox theory of perception on the grounds that paralyzed individuals are not rendered blind (2006b). Given that paralyzed individuals aren't rendered blind in some way, Aizawa claims that Noë has *only two* possible responses: either Noë must admit that sensorimotor knowledge is a kind of "theoretical knowledge," something Noë rejects, or he must come to the conclusion that perception is still possible because of the limited mobility these individuals have. Aizawa believes that, by establishing that individuals with no mobility at all are still able to perceive, the only option available to Noë is to admit that he was wrong about sensorimotor knowledge. Aizawa attempts to trap Noë in a dilemma, but I will argue that one of the horns of the dilemma, the first, quickly collapses.

To explain the argument more thoroughly, let us consider the problem as Aizawa poses it. Paralyzed individuals are not rendered blind, and Aizawa takes this as a problem for Noë's theory. According to Aizawa, Noë has two options available to him. First, Noë might contend that the sensorimotor knowledge at work in perceptual experience is only some kind of

theoretical knowledge. Aizawa rejects the possibility that Noë would endorse this view on the grounds that it “abandons the more interesting conceptions of the embodiment of perception” (2006b, 6). Noë’s second possible response, according to Aizawa, would be to maintain that paralysis is never complete and so some sensorimotor know-how may still be deployed in the case of paralysis (2006b). But this, maintains Aizawa, is disproven by a number of cases in which individuals who are entirely anesthetized are still capable of perceiving (2006b, 9).

To begin, I think it is fairly obvious that Noë would not adopt the second horn of the dilemma, arguing that paralyzed individuals still use some more limited sensorimotor knowledge in their perception. Noë writes (and Aizawa cites this very passage):

Paralysis is certainly not a form of blindness. But isn't that precisely what the enactive view requires, that the paralyzed be experientially blind? No. The enactive view requires that perceivers possess a range of pertinent sensorimotor skills. It seems clear that quadriplegics have the pertinent skills. Quadriplegics can move their eyes and head, and to some extent, at least with help from technology, they can move their bodies with respect to the environment (e.g. by using a wheelchair). (Noë, 2004, 12)

I interpret Noë as not endorsing the view that quadriplegics can still see because they can still enact sensorimotor skills (such as moving themselves) required for perception. After all, we can see even if we don't move at all. Noë rejects the claim that actual sensorimotor behavior is required to have perceptual experience informed by sensorimotor knowledge, so long as the individual acquires an understanding of sensorimotor contingencies (Noë, 2007). Noë’s point here, I take it, is only to argue that quadriplegics have the requisite sensorimotor capabilities required to have sensorimotor knowledge because of the mobility that they either had in the past or currently have.

Another way of getting at the same point would be to ask what would be required to acquire sensorimotor knowledge. Acquiring an awareness of p-properties and virtual content requires only the capability to experience sensorimotor contingencies, i.e. the relations between

movement and changes in the perceptual field. The ability to experience sensorimotor contingencies is a precondition on acquiring sensorimotor knowledge, but this does not mean that one needs to be mobile at present to have and use sensorimotor knowledge. If I were to become paralyzed right now, my prior history of navigating an environment and understanding sensorimotor contingencies would allow me to have perceptual experience with virtual content and p-properties. In short, sensorimotor knowledge only requires that an individual has been able to navigate an environment at one point.

This navigation can also be fairly limited. Even quadraplegics with limited mobility can still navigate an environment and experience sensorimotor contingencies, as Noë suggests in the passage. If someone were limited to a wheelchair for their entire life, they would still be able to move around objects in such a way as to experience sensorimotor contingencies, to develop an implicit understanding of them, and hence to have sensorimotor knowledge.

So what should we make of Aizawa's dilemma? According to Aizawa, Noë either has to admit that sensorimotor knowledge is a kind of “theoretical knowledge” or say that paralyzed individuals aren't rendered blind because of the limited mobility that they have (2006b, 2008). The first horn of Aizawa's dilemma I take to be simply false. Aizawa offers the conditional: if Noë claims that the sensorimotor knowledge that partially constitutes perceptual experience is “theoretical,” then Noë loses some important facet of the embodiment of perception (2006b). But what does Aizawa mean by “theoretical?” Aizawa makes a distinction between sensorimotor skills and theoretical sensorimotor knowledge (2006b, 2). Skills are meant to be “capacities to perform in a certain way” whereas theoretical knowledge is said to be something like propositional knowledge. Aizawa distinguishes between sensorimotor skill at having a “poker

face” and theoretical knowledge about what a “poker face” is and how it is used (Aizawa, 2006b, 2). I take it that Aizawa is making a distinction between knowing-how and knowing-that.

But I reject Aizawa's conditional on the grounds that the knowledge at work may be a knowledge-how, even if paralyzed individuals can still perceive. Consider the developmental evidence. Evidence suggests that children as young as two- and four-months old can detect objects as unified wholes when they are partially occluded and rotated around their vertical axis (Johnson et al., 2001). However, the ability to use shading as an a cue for detecting the three-dimensional features of an object has not been demonstrated until a later age, namely seven months (a finding in Granrud, Yonas, Opland, 1985, cited in Johnson et al., 2001; see also Yonas, Alieff, Arterberry, 2002).¹⁹ Sensorimotor knowledge, the knowledge of how to track sensorimotor contingencies, is acquired piecemeal.

This mastery of sensorimotor contingencies is still available to a paralyzed individual. Recall that Noë likens sensorimotor knowledge to the ability to dance: it can be described in terms of propositions, but it is non-propositional for the person with the knowledge of how to perform the skill. Paralyzed individuals, once they acquire sensorimotor knowledge, have the ability to perceive the world with virtual content and track p-properties. We can describe what they know in terms of conditionals: they experience objects in such a way that if they were to move, then some of the occluded portions of the object would be made occurrent. But this description as a conditional does not mean that their sensorimotor knowledge is theoretical, in the sense of being a knowledge-that.

Aizawa, or another philosopher defending the orthodoxy, might rebut that this view of sensorimotor knowledge eliminates the need for referring to extra-cranial facts. If we make

¹⁹ To be perfectly clear, Yonas, Alieff, & Arterberry found that the sensorimotor knowledge required to use shading as a cue for depth develops somewhere between five- and seven-months (2002).

sensorimotor knowledge a knowledge-how in this sense, then could we just say that sensorimotor knowledge is another step in the brain's processing of visual information? We might be able to describe how sensorimotor knowledge is applied to perception through neuroscience, assuming some neural basis for sensorimotor can be identified. Perhaps someday a neuroscientist will establish some region of cortex that just happens to affect perceptual information in the brain precisely how Noë claims sensorimotor knowledge does. Even if such a mechanism were established, it would only have an effect insofar as the perceiver has had the motility and environmental interactions required for this system to develop. As suggested, sensorimotor knowledge is a skill-set acquired in development and any explanation of this development must reference extra-cranial facts.

I take it that Noë would endorse this refutation of Aizawa's argument. It seems that, once again, Aizawa presents the enactive theory of perception too strongly. By seeing the relation between sensorimotor knowledge and perceptual experience as wholly constitutive (i.e. perceptual experience is based solely on sensorimotor knowledge), Aizawa misconstrues Noë's project. I take it that my argument against the first horn is consistent with Noë's responses to his objectors which have emphasized the extent to which sensorimotor knowledge is an implicit understanding of the relations between possible movements and possible perceptions (Noë, 2007).

3.3 The Orthodoxy Lacks the Resources to Refute Noë's Theory

To sum up, I hope to have shown in this chapter that one of the orthodoxy's more vocal defenders lacks the resources for rejecting Noë's heterodox theory of perception. I began by suggesting Aizawa's reasons for defending the orthodoxy, based on what he and Adams see as the two essential features of cognition: 1) non-derived content and 2) intracranial principles.

Then I considered Aizawa's arguments that experiential blindness could be understood in terms of a causal relationship between sensorimotor knowledge and experience, as opposed to the constitutive relationship that Noë endorses. I argued that Aizawa's reasons for endorsing the causal claim are insufficient because he lacks a good criterion for excluding sensorimotor knowledge as a constituent of perceptual experience. Finally, I considered the relationship between sensorimotor knowledge and paralyzed individuals. Unlike Aizawa, I hold the view that Noë has sufficient resources for attributing equally rich perceptual experience to quadriplegics.

More importantly, I have attempted to show that an orthodox view, i.e. intracranial view, of perception falls short in a number of important ways. First, an orthodox theory of what constitutes perceptual experience leads one to the view that only the first representations, those in the retina, constitute perceptual cognition. Neither of Aizawa's two criteria for excluding sensorimotor knowledge as a constituent of perceptual experience are successful, as neither is satisfactory for accounting for how perception occurs within a human perceiver. Moreover, Aizawa's attempts to refute Noë by appealing to a causal interpretation of the role of sensorimotor knowledge in perceptual experience fail by lacking the resources to describe how experiential blindness is possible.

I would like to turn, in the final section, to some considerations regarding this orthodox/heterodox schism in the perception literature. I will consider the advantages that the heterodoxy has over the orthodoxy and close with some suggestions for ultimately moving past the split.

CHAPTER 4

CONCLUSION

So where do these remarks leave us, with respect to the orthodox/heterodoxy split between theories of perception? What should we take from the conclusion that Aizawa fails to defend the orthodoxy in his attacks against Noë? Finally, if Noë is correct in his theory of perception, where does that leave the decades of research under the orthodox view?

As far as the results of this thesis, one might be inclined to leave them as fairly modest. Noë's theory of perception remains unrefuted by one of its harshest critics. This is only to say that one of the most recent heterodox views remains unrefuted by the orthodoxy. To put it another way, it is only to suggest that the heterodoxy currently has the advantage with respect to the philosophical literature.

But one could also take a stronger interpretation of this case study and argue that *the orthodoxy ultimately lacks the resources to refute the heterodoxy*. I do not think this thesis presents enough evidence to strongly support this claim, but I think Aizawa's argumentative strategies are telling. First, Aizawa attempts to use a lack of fit with current cognitive psychology as a motivation for rejecting Noë's theory (see chapter 3, section A on experiential blindness). This fairly obviously begs the question, and more importantly *Aizawa's orthodox views are insufficient for explaining the phenomenon of experiential blindness*. Secondly, Aizawa attempts to catch Noë in a reductio (see chapter 3, section B on paralyzed individuals), but misunderstands the non-propositional nature of sensorimotor knowledge.

So finally, it is worth considering what a rejection of the orthodoxy might mean for the decades of scientific research that have assumed the orthodox view, i.e. that perception can be understood solely by the neuroscience of perception. First, I take it that nobody in the

heterodoxy would deny that perception research through neuroscience has been interesting in some way. Clearly no matter how much a heterodox philosopher wants to expand the sphere of facts relevant for understanding perception, it is ultimately a human perceiver engaging in the act of perception and this human perceiver is ultimately a biological organism.

Return to Noë as an example of the heterodoxy. No matter what Noë adds to his theory of perceptual experience, e.g. sensorimotor knowledge, it is always a theory of a human perceiver. So even if our theory of what constitutes perception includes elements which are not readily available to a neuroscientific (i.e. orthodox) account of perception, this does not render orthodox science pointless. Such orthodox views may be incomplete, certainly, but very much still a part of the picture.

If Noë is correct, and I have tried to give reasons for thinking that he is (or minimally that he is not obviously wrong), then where does that leave orthodox research on perception? Noë suggests at the end of his book (2005, 227) that genuine neurobiology must be sympathetic to the ways in which “brain, body, and world work together to make consciousness” (Noë, 2005, 227). What orthodox research on perception does, and does well, is to study one third of that important triad.

Ideally, someone can someday do the work required to bridge the findings of orthodox perception research with a more complete scientific picture, which includes the other two aspects of the triad. The rise of situated cognition research and other heterodox theories will hopefully catch up our theorizing about body and world. The unified picture, which takes into account all of the relevant factors contributing to perception, is a goal made possible and motivated by the rise of the heterodoxy.

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