Knowing What We Can Do

Knowing What We Can Do: Actions, Intentions, and the Construction of Phenomenal Experience*

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Abstract

How do questions concerning consciousness and phenomenal experience relate to, or interface with, questions concerning plans, knowledge and intentions? Visual perceptual experience, we shall argue, is fixed by an agent's direct unmediated knowledge concerning her poise (or apparent poise) over a currently enabled action space: a matrix of possibilities for pursuing and accomplishing one's intentional actions, goals and projects. If this is correct, the links between planning, intention and perceptual experience are tight, while (contrary to some recent accounts invoking the notion of 'sensorimotor expectations') the links between embodied activity and perceptual experience, though real, are indirect.

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1. Introduction: Fluent Action in a Topsy-Turvy World?

To understand perception, we need to understand its relations to action. Try to imagine a creature whose conscious experience presents it with an upside down world, but whose motor routines are so neatly tweaked and tuned that their physical engagements with the world always go off without a hitch. Imagine, moreover, that this creature is so familiar with its own motoric eloquence that it is never surprised that its actions work out. Imagine too that all its episodes of planning and imagination have come to be as well integrated with motoric action as our own, enabling it, for example, to plan and execute complex climbs on mountainsides and indoor training walls, and whatever else you would accept as proof of some proper inter–animation between conscious reason and successful action. Now ask yourself: *can you really imagine that this creature experiences its world as 'upside down'?*

Skill-based accounts of perception provide a powerful framework in which to press a negative response. At the heart of such approaches is the simple but compelling idea that in spatial perception (at least) the way we consciously perceive the world is intimately, rather than merely contingently, tied up with routines for (or behavioural dispositions towards) engaging the world by deed and action.

For example, Mandik (1999) argues for what he terms the 'behavioural constituency of perceptual space'. This is the idea that our egocentric experience of space is conceptually intertwined with our possession of various bodies of behavioural know–how. Similar intuitions are pumped in Evans (1985) and Grush (1998). For example, Grush claims of our perception of a sound as pulsating, that

> 'part of the normal content of pulsatingness, for us, is that it is something with which we can co–ordinate a number of sensorimotor skills'
>
> Grush (1998) para. 21

Suppose we hear the sound of a siren as pulsating. That perception, Grush argues, poises us to exercise a battery of skills. We might wave a hand, tap a finger, or nod our head in time with the pulses. The total failure of an embodied agent to be able to bring any such skills to bear is, Grush argues, incompatible with the idea that that agent actually perceives the sound as pulsating (though she may know it to be pulsating by some other means). Intrinsic to the perceptual auditory content then, is something that puts that content in touch with dispositions towards various kinds of embodied actions.

The idea is thus that there may be conceptual links between experience and acting, planning and intending that a theory of perception would do well to accommodate[2]. Contemporary work in active vision (Ballard (1991), Churchland, Ramachandran and Sejnowski (1994), Ballard et al (1997)) complements this idea, depicting vision as *essentially* active and exploratory, and visual experience as deeply geared to the control of various forms of world-engaging behaviour. The account we develop here aims to build on these proposals. Visual experience, we suggest, consists in practical knowledge of our own possibilities (real or apparent) for action. It involves 'knowing what we can do'. Direct awareness of such a currently enabled 'action space' explains, we shall argue, both the contents and the qualitative character of visual experience.

[2] See also Thompson, Varela and Rosch (1991), Hurley (1998), Thompson (2007), Schellenberg (2007).

2. Two Takes on Perception and Action

If constitutive links do obtain between perception and action, what more can we say about the nature of those links? One option is suggested by Noë's (2004) sensorimotor theory of perception. On such a view, the content and character of our visual experience is determined by our implicit knowledge of the systematic ways in which stimulation will change as a result of certain bodily movements. In this way:

> 'perceptual experience acquires content thanks to our possession of bodily skills. *What we perceive* is determined by *what we do* (or what we know how to do); it is determined by what we are *ready* to do…we enact our perceptual experience: we act it out'
>
> Noë (2004) p.1. Italics in original.

The quote offers several not obviously equivalent glosses on the sensorimotor model. In particular, the reference to 'what we know how to do' needs to be seen for what it is: a reference to the role of knowledge of counterfactuals concerning the ways sensation depends on movement, rather than a reference to the kinds of knowledge with which we shall later be concerned, viz knowledge concerning what we are poised to accomplish. For example, a line in front of the perceiver, on Noë's account, appears vertical to her just in case she implicitly knows that her sensations will remain largely the same if she nods her head up and down the line, but will differ in a predictable and regular way if she moves her head from side to side. A visually-presented tomato appears spherical (rather than appearing as a circular tomato-façade) if the perceiver possesses implicit knowledge of how her sensations would change were she to move around it. And the tomato is experienced as visually rather than tactually presented if the perceiver implicitly knows

that (for example) moving her head and eyes around will alter her visual sensations in characteristic ways, while leaving her tactile sensations unchanged. Perceiving, on Noë's account, is a matter of *knowing how what we can do affects what we can see.*

An alternative view of matters is suggested by Pettit's (2003) dispositional account of colour looks. For Pettit, for something to look a certain way is for it to empower certain abilities in the perceiver. For example, a tomato's looking red to a perceiver is a matter of its empowering her to, among other things, sort it with red and other similarly-coloured objects, sift it from differently-coloured objects, and track it across a range of different backgrounds and perceptual situations. Though Pettit restricts his treatment to colour looks, his account might be generalised to other aspects of perception. The tomato looks spherical to the perceiver if her perception of it disposes her to sort it with other spherical objects and sift it from differently shaped ones. The tomato is experienced as visually, rather than tactually presented just in case it empowers a suite of abilities in the perceiver that are characteristic of vision rather than touch (sifting and sorting it on the basis of its colour, rather than, say, its temperature to the touch). Perceiving, on Pettit's account, is a matter of *knowing how what we can see affects what we can do.*

What we have here are two contrasting ways of understanding the kind of tight relationship between action and perception argued for in section one. The camp occupied by Noë[3] thinks we must appeal to action in understanding perception since perception is constituted by our understanding of how possible perceptions depend on

[3] Other sensorimotor treatments include Hurley (1998), O'Regan and Noë (2001) and Myin and O'Regan (in press). We think that the criticisms of the sensorimotor account in the following sections apply to all these treatments with the possible exception of Hurley's. Hurley argues that perception and action are co-dependant, emphasizing dependencies both of possible perception on actions, and of possible actions on perception. We acknowledge that both dependencies obtain, but argue in what follows that the latter is of primary importance for understanding conscious perception. Hurley's emphasis on both directions of dependence makes the question of whether her view is compatible with the account we develop an open one, which we do not pursue here.

what we might do. The camp occupied by Pettit and, as we shall see, by the present authors,[4] thinks that in some way this story gets things in reverse, and that perceptual experience is constituted by our understanding of how possible actions depend on what we perceptually detect. To try to make this plausible, we next turn to a puzzle case.

3. Kohler's Coloured Goggles

Consider Kohler's (1964) experiments involving adaptation to colour-distorting goggles. In these experiments, subjects wore goggles with vertically-bisected lenses, each of which had a blue-tinted left half and a yellow-tinted right half. Upon initial donning of the goggles, subjects' colour experiences and their colour naming and categorising behaviours were predictably disrupted. A uniformly white wall would appear half blue and half yellow when the subject looked directly at it, or completely yellow or blue when looked at through the appropriate half of the goggles. However, after several weeks of wearing the goggles, subjects' experiences and colour categorisations returned to normal – the distorting effects of the goggles had somehow been compensated for.

What do these results tell us about the relationship between action and perception? Consider how a sensorimotor theory might account for these results. Hurley and Noë (2006) claim that:

> 'The sensorimotor expectancies characteristic of particular colours relate ultimately to the underlying invariant patterns of dependency of sensation on movement, and these do not change when the goggles are worn. But they are given new clothing, a transformed implementation, and as a result the perceiver's

[4] The views of Matthen (2005) also seem to belong in this camp.

> understanding of them is disrupted until his expectations have adjusted to this new implementation and related it to the underlying invariant patterns.'
>
> Hurley and Noë (2006), p9-10.

The idea is that the sameness of experience before the goggles are donned and after adaptation has occurred is explained by the subject's sensitivity to an underlying invariant dependence between sensation and movement. The goggles disrupt this sensitivity by giving this dependence a 'new implementation' which is filtered out, or compensated for, over the course of the adaptation. However, we suggest that sensorimotor theorists face a problem when attempting to specify exactly what the relevant sensorimotor invariant is.

To see this, first note that there is an ambiguity in the appeal to the dependency of perception on action as we have sketched it so far. Sensorimotor theorists appeal to the sensorimotor dependency of perception on action in order to explain the content and character of perception. But the 'perception' in this perception/action dependency admits of a personal-level and a subpersonal-level construal. For example, a sensorimotor theorist might construe the perceptions that vary according to our movement either as subpersonal activity (such as patterns of retinal stimulation, or at some higher level of visual processing) or personal level visual experience[5]. But as we shall now see, neither of these construals can provide the invariant sensorimotor dependence required for an explanation of Kohler's results.

Sensorimotor relations which obtain between perceptual *experience* and movement are not invariant, since these relations change when the goggles are donned (everything

[5] The appeal to action also admits of different construals. We might choose to emphasise the relations of the outputs of some subpersonal module to perception, in either of the above senses. Alternatively, we might emphasise the relations of personal-level, intentional actions to some sense of perception. Or we might think that appreciating the interrelations between some or all of these levels are key to understanding perception.

looks blue when the subject looks left, yellow when she looks right) and return to normal over the course of adaptation. Sensorimotor relations which obtain between *subpersonal stimulation* and movement are not invariant, since donning the goggles introduces a new dependency between eye-movements and systematic shifts in the wavelength of light hitting the retina. This new dependency continues to obtain after adaptation has occurred, but the subject's experience has reverted to the way it was when the normal set of dependencies was in place.

On both the personal and the subpersonal-level construals of sensorimotor dependence, sensorimotor relations differ over different stages of the experiment. To specify an invariant, then, the sensorimotor theorist must appeal to some higher-level commonality between the sets of relations. But whatever these sets of relations have in common, it is not dependence between either perceptual experience and movement, or subpersonal stimulation and movement. It is therefore opaque to us how the relevant invariant is to be motivated or captured in sensorimotor terms.

The account we shall develop suggests that what is disrupted and restored over the course of the goggle experiment is the *space of actions* enabled for the perceiver by coloured objects. Before the goggles are donned and after adaptation occurs, an identical space of colour discriminations, categorisations and judgements are enabled by the subject's perceptual exposure to a coloured object. The invariance that allows the subject to adapt to the disruption of these abilities caused by the goggles is, on our account, the fact that coloured objects are objectively apt to be sifted, sorted, tracked and otherwise categorised on the basis of their colour by the perceiver in the same way throughout the stages of the experiment. The goggles disrupt the perceiver's sensitivity to this fact by introducing a new set of sensorimotor dynamics. Adaptation consists in compensating for these altered dynamics to bring the perceiver's range of colour-related dispositions

and intentions – the space of actions elicited from the subject by exposure to a coloured object – back into line with the way in which colour properties are actually distributed.

The correct moral to draw from Kohler's results is that knowledge of sensorimotor relations is of only instrumental importance in explaining the content and character of visual experience. Implicit knowledge of sensorimotor relations might be part of what is involved when we come to know the nature of our own poise over an action-space (a kind of knowing that, we will argue, is constitutive of experience). But Kohler's results imply that a range of very different sensorimotor backdrops are consistent with such poise obtaining. Kohler's results thus suggest that the character of experience is fixed by the space of enabled (or apparently enabled) actions, not by our familiarity with whatever sensorimotor dependencies such enabling may involve. The way things look to perceivers over the stages of Kohler's experiment reflects what they take themselves to be poised to do on the basis of their perception, not what they know they could perceive as a result of their actions.

4. The Dual Visual Systems Hypothesis

The 'dual visual systems' hypothesis (DVS) (Milner and Goodale (1995), Clark (2001), Jacob and Jeannerod (2003), Jeannerod and Jacob (2005)) lends further empirical support to this view of the relationship between action and perception. According to the DVS model, the contents of conscious perceptual experience are determined by the activation of a distinctive body of internal representations operating quasi-autonomously from a perceiver's direct motor engagement with her environment. These representations are perceptual but are geared towards (and optimized for) the specific needs of reasoning and planning rather than those of fluent physical engagement. These representations are

conditioned by a stream of inputs that do indeed originate at the sensors, but this stream proceeds in large part in parallel to the processing stream dedicated to the fluid control of online, fine-tuned, sensorimotor engagement, and is systematically insensitive to much of the lower-level detail.

The most dramatic versions of the dual-stream story are due to Milner and Goodale (1995) and Goodale and Milner (2005) who suggest that conscious visual awareness reflects information-processing activity in a specific visual processing stream geared towards enduring object properties, explicit recognition, and semantic recall. This stream - the ventral stream - is also in charge whenever real-world objects are unavailable, and governs our attempts to mime actions on imagined or recalled objects. Actual object-based motor engagements, by contrast, are depicted as the province of a semi-autonomous processing stream - the dorsal stream - that guides fluent motor action in the here and now. Milner and Goodale thus contrast capacities of visually-guided action and capacities of conscious visual perception, suggesting that these come apart in a variety of unexpected and revealing ways.

In support of this hypothesis Milner and Goodale invoke a rich body of data concerning both normal agents and subjects with damage to areas in either the dorsal or (as in the famous case of DF, the visual form agnosic studied extensively by Milner and Goodale) the ventral visual stream (for extensive discussion, see Clark (2001) (2007), Jacob and Jeannerod (2003), Jeannerod and Jacob (2005)). For present purposes, we shall simply assume that something like a nuanced version[6] of the dual visual systems account is true for at least some dimensions of human visual experience.

[6] For the nuances, see Jeannerod and Jacob (2005), Clark (2007). Nothing in what follows is affected by these (important) nuances, so we shall assume (for simplicity) the fairly strong version outlined by Goodale and Milner (2005).

The interactions between the dual systems are, however, important. For rather obviously, conscious visual perception and the control of world-engaging action work closely together in the service of reasoned worldly response. To capture the flavour of this co-operation, Goodale and Milner (2005) elaborate a 'tele-assistance' model of the interactions between the two streams. In a typical tele-assistance set-up, a human operator and a semi-intelligent distal robot combine forces so as to perform actions in some environment. A familiar example might be a Mars rover, where the human operator reviews images on a screen in Texas, flagging items of interest (such as a strangely shaped rock in the top left of the screen). The operator commands the robot to retrieve the flagged item, perhaps adding commands that specify the use of one of several retrieval modes (according to estimated weight, fragility, etc). The robot rover then does the rest, locomoting to the spot and calculating the local commands needed to deploy the robot body and gripper so as to achieve the goal. Such approaches should be contrasted with *tele-operation* solutions, in which the human operator controls all the spatial and temporal aspects of the robots movements (perhaps via a joystick or a set of sensors that allow the operators own arm and hand movements to be relayed to the robot).

The tele-assistance analogy identifies the conscious human operator with the ventral stream (working with stored memory and various 'executive control' systems). The task of this coalition, the analogy suggests is to identify objects and to select types of action that are appropriate given the agent's current goals, background knowledge, and currently attended perceptual input. The task of the dorsal stream (and associated structures) is then to turn these high-level specifications into metrically accurate, egocentrically specified forms of world-engaging action.

This view of matters tells against the sensorimotor theorist's view of the relations between action and perception[7]. As noted, sensorimotor theorists appeal to implicit knowledge of the ways in which movement affects perception. But DVS invites us to conclude that what is distinctive about the perceptual representations underlying *conscious* perception is the way in which they are apt to be put to use in reasoning, planning, imagining and intention-formation. On such a picture, the relevant relation between perception and action is the way in which perceptual input enables these abilities to plan and select actions and goals, with these actions and goals understood in a relatively coarse-grained way, independently of the fine details of the bodily movements needed to implement and execute them.

Again, it seems to us that the correct moral to draw here is that sensorimotor relations should play, at best, an indirect role in our understanding of conscious visual experience. A sensorimotor theorist might argue that implicit knowledge of effects of movement on perception is required for the ventrally-mediated abilities emphasised by DVS. But further argument is needed to demonstrate this. And even if such arguments were provided, assuming we take the results of DVS seriously we should conclude that sensorimotor relations are only relevant to our visual experience *insofar* as they play a role in enabling the distinctive ventral-dominated abilities of planning, reasoning, and recognition. The DVS results suggest that it is those abilities, however enabled, that we should emphasise in our understanding of conscious visual experience.

[7] It's worth emphasising that, unlike some commentators (Block (2005), Jacob (2006)) we do not think that the sensorimotor theory is incompatible with the DVS results. For this to be so, sensorimotor theory would have to claim that perceptual experience was somehow constituted by the use it was put to in the sorts of guidance of movement which is the province of the dorsal stream. But the sensorimotor theorist emphasises the way perception depends on movement, not the way that movement depends on perception.

5. The Action-Space Model

The considerations of the previous two sections suggest that in order to understand visual perception we must attend to the relations between a subject's perceptual sensitivity to their environment and the actions enabled for them on the basis of that sensitivity. To this end, we propose an 'action space' model of conscious visual perception. According to such a model, what counts for (what both explains and suffices for) visual perceptual experience is an agent's direct unmediated knowledge concerning the ways in which she is currently poised (or, more accurately, the way she implicitly takes herself to be poised) over an 'action space'. An action space, in this specific sense, is to be understood not as a fine-grained matrix of possibilities for bodily movement, but as a matrix of possibilities for pursuing and accomplishing one's intentional actions, goals and projects. The links between embodied activity and perceptual experience, we are thus suggesting, are real but somewhat indirect. What matters is not bodily activity itself, but our knowledge, which need not be verbalized or in any way explicit, of our own possibilities for action.

Consider the case, mentioned briefly above, of DF. DF lacks visual experience of shape and orientation (she retains experience of texture and colour). She can, if prompted, post a card through an oriented slot with amazing fluency, all the while insisting that she cannot see the orientation that appears to guide her action. By now, after many years of testing and prompting, she is even indirectly aware of her own capacities, and has developed ways to self-prompt her own actions (see Goodale and Milner (2005)). But what she still lacks, we suggest, is direct appraisal of the shape of her own space of currently enabled actions. Thus suppose we ask her some new question such as 'can you place one finger on each side of the slot?' or 'can you post the letter

half-way through the slot and then withdraw it?' She must answer (unless these are things she has tried before) that she doesn't know, that she would have to try it to see. This is quite unlike our normal condition, where we simply know, with reasonable accuracy[8], what kinds of goals and projects our current visual contact with the world enables us to carry out[9].

The same model appears to provide a plausible diagnosis of blindsight cases. Blindsight subjects exhibit perceptual sensitivity to shape, motion, and even colour, but claim to make these discriminations in the absence of any attendant conscious experience. However, these discriminations can only be made as a result of prompting by the experimenter – blindsight patients have no insight into when these discriminatory abilities are enabled for them independently of this prompting. We suggest that the discriminatory abilities of such subjects differ from our own in that they lack the capacity to automatically integrate their own enabled abilities with ongoing planning, reasoning and intention-formation. Normal perceivers do not have to be prompted in order to know that their current perceptual sensitivity to their environment enables them to make a certain range of discriminations. Unlike DF and blindsight subjects, normal conscious perceivers have direct unmediated knowledge of the space of actions that their current visual coupling to the environment makes available.

In the light of all this, we suggest a rather strong claim. To be directly apprised (in a non-phenomenal sense: see section 6 following) of one's poise over a perceptually-

[8] We are, of course, far from infallible about this. For example, human subjects routinely overestimate what is within reach from a fixed position. This is probably because when we are not in a fixed position we make whole trunk movements that bring much more into range.

[9] The notion of an enabled action here is, roughly, the notion of something you might try to do. Thus you might try to raise the beer glass, or to raise it level with a certain mark, or to raise it using a fancy grip. All these acts are, however, to be understood as coarse-grained in that they can be carried out in many ways that differ in fine sensorimotor detail.

detected action space just is, in our view, to enjoy perceptual experience. The upshot of this view is that any partially constitutive story obtains not between conscious perception and real-world action, or even between conscious perception and (what might be called) first-order dispositions to action. Instead, it obtains between conscious perception and *planning for action*. Planning for action constitutes what we shall dub a 'second order disposition towards action': that is, a disposition to generate, if all is functioning properly, a specification of a first-order routine (one that really would move the body as required in space): a routine that (once again, if all is working properly) would indeed result in successful world-engaging action.

The notion of planning that is at issue here is, to be sure, a relatively weak one. The kind of practical grasp of the shape of a space of possible actions to which we are appealing does not require that the agent be able to engage in reflective thought, or to bring the enabled actions under concepts. In addition, an agent's grasp of the actions that her current perceptual situation actually supports will always be partial, because limited by her states of attention and by her active or longstanding plans and projects. Neither the appreciation of currently enabled actions nor the integration of that appreciation with planning and reasoning requires full-fledged, context-neutral conceptual abilities[10]. Thus, the kind of knowledge of poise over an action space we emphasise does not single out language or concept-using agents, Non-linguistic and non-concept-using agents capable of planning and reasoning by (directly and non-

[10] For example, the way in which a perceiver entertains the possibility of an action, the satisfaction of a goal, or the relations between those actions and goals and the perceiver's higher-level plans and projects, might fail to meet Evans' generality constraint (Evans (1982)). An agent's perceptual sensitivity to a visually presented fruit might enable them to grasp that the fruit affords eating, whilst being unable to grasp that other objects to which they are perceptually sensitive do or do not afford eating, or that the satisfaction of other of their goals is or is not afforded by the fruit. For a discussion of such context-bound and nonconceptual abilities, see Hurley (2006).

inferentially) identifying the actions afforded by a current perceptually-specified situation are, on this account, already denizens of experiential space.

6. Feeling the Poise

It has often been noted that there is something it's like to be a conscious perceiver – conscious perception *feels* a certain way. Since the action space model is being proposed as a theory of conscious visual perception, it is under an obligation to provide reasons why an implicit knowledge of enabled abilities should feel like anything to the perceiver. According to the action-space account, the fact that some space of actions appears to be afforded to a perceiver is something the perceiver is directly, non-inferentially apprised of at the personal-level. Direct personal-level appraisal cannot here mean anything like 'appraisal via the intrinsic properties of experience', on pain of the action-space account's begging the question as a theory of conscious perception. Instead, the enabling to which the account appeals is enabling in a way that is simply known to the agent. But why suppose that such enabling must feel like anything to the perceiver in question?

For the beginnings of an answer, consider how the action-space account relates to a proposal made by Clark (2000). Clark argues that certain patterns of access-consciousness (the availability of mental contents for use in reasoning, report and control (Block (1995))) actually entail phenomenal consciousness. Imagine[11] a creature who can reliably make a range of perceptual discriminations – say it can identify and distinguish objects based on their olfactory, visual, and tactile properties. It seems conceivable that a

[11] What follows is a greatly reduced version of the argument presented in Clark (2000). For the fleshed-out version, with replies to a range of obvious worries and objections, we refer the reader to that treatment.

creature could exercise these discriminatory abilities without any attendant perceptual experience. But now suppose we endow this creature with limited non-inferential access to some of the facts about *how* it makes these discriminations – for example, it automatically knows when it has made a discrimination by sight, rather than by smell or touch, but cannot say more about the differences between these ways of sensing, due to the limits of its access to whatever features make the difference. If the creature had *no* access to the features in virtue of which the ways of sensing differed, then it will not claim that there is any difference between (for example) perceiving the size of an object by sight and by touch. If the creature had *complete* access to the features in virtue of which the ways of sensing differed, then it is plausible that differences between sensory modalities will only be differences in the content and extent of the information gleaned in perception, and we need not suppose that such a difference in content need *feel* like anything to our creature. But if the creature has the kind of limited, but direct and non-inferential access suggested above, there will be a salient difference, registered by the creature, between the discriminations it makes by sight and those it makes by touch – a difference that the creature can report and reflect upon, but (due to its real-but-limited access) can give us no further information about. Such a creature, Clark (2000) argues, must, when pressed, report that the two situations simply *look different*. Such creatures are said to occupy a necessarily zombie-free zone: a zone where the pattern of real-but-limited access to their own processing forces them to judge (if they are creatures capable of so doing) that they are loci of somewhat ineffable 'qualitative experiences'.

It seems, in short, that if such patterns of real-but-limited access are in place, then this will result in our creature claiming, when we interrogate it, that there is *something-it's-like* to make a discrimination by sight, and that it simply *feels different* to make discriminations by (e.g.) smell and by touch. We can see the action-space account as an empirically-motivated way of further fleshing out this proposal. In the original article

Clark suggests that the appeal to direct non-inferential access might be cashed out in the following way:

> '…what we have access to when we have access to the modality involved in the act of detection is the specific battery of skills that we could have deployed. Insofar as the sets of skills differ according to the modality involved […] access to the sets of skills which could have been deployed would constitute direct non-inferential access to the modality in use…'
>
> Clark (2000), p.35

The action-space account likewise suggests that conscious perception essentially involves access to a range of perceptual skills. For such access to be in place, the perceiver must be able to factor the enabling of the relevant skills into her ongoing planning, reasoning and intention-forming behaviour. And access to those skills is limited in the manner demanded by Clark's proposal, since the perceiver's grasp of the enabled skills is practical and implicit.

It might be objected that Clark's proposal merely explains propensities to judge or report the presence of phenomenal states, rather than the existence of those states themselves (see Chalmers' objection in Clark (2000), p.32)). But this objection stems from a mistaken conception of experience that the action-space account can show us how to resist. To see this, note that we can gloss the action-space theory of consciousness as a form of *action-oriented representationalism*. Chalmers (2004) divides recent approaches to the relationship between consciousness and intentionality into two camps. One camp, whose exemplars include Rosenthal (1997), Carruthers (2000), Tye (1995), Dretske (1995) and Lycan (1996), attempts to ground consciousness in intentionality, and to do so 'without remainder': that is, they argue that there is no more to various states of

conscious experience than the obtaining of various intentional and content-bearing representational states. The other camp, whose exemplars include Searle (1990), Horgan and Tienson (2002) and (with some caveats) Chalmers (2004), attempt to ground intentionality in consciousness (usually in some way that fails to constitute a fully-fledged reduction of the intentional to the conscious). The action-space account belongs firmly in the first of these two camps. It depicts visual experience as constituted, without remainder, by various complexes of content-bearing mental states. But the relevant states are now construed not as passive representations of internal or external states of affairs. Rather, they present the world as an arena for *intentional action* (including those intentional actions that Matthen (2005, pp229-232) highlights as 'epistemic actions': ones that (as also emphasized by Pettit (2003)) group, sort and track objects and states of affairs). We can view a perceiver's being poised over an action space as that perceiver's occupying an action-oriented representational state, where the content of that state is given in terms of the abilities that state empowers.

This allows the action-space account to capitalise on representationalist insights about experience. Following Jackson (2003), viewing experience as representational in this way gives us a choice as to how we think about the phenomenal properties of an experience. We can see them either as *instantiated* properties, properties that our experience instantiates, and a theory of consciousness must explain. Or we can see them as *intentional* properties, properties of how that experience represents the world as being. My having an experience of red is a matter of my being in a state that represents things as being a certain way. But my representing things in this way need not entail that I stand in a relation to some existent object with the represented property. The representationalist diagnoses the temptation to think this is so as stemming from the confusion of an intentional property with an instantiated one.

To illustrate the relevance of these remarks to our conception of experience, consider how they bear on what we might say about Mary, the brilliant colour scientist who has spent her life incarcerated in a black-and-white room (Jackson (1986)), upon her release. Jackson's (2003) point is that drawing an anti-physicalist conclusion from the fact that Mary has a new experience when she leaves the room relies on a certain conception of experience. The anti-physicalist suggests that when Mary sees her first red object, she learns about a new property of experience (phenomenal redness) that the physical information she assimilated in her black-and-white room did not tell her about. But viewing matters from a representationalist perspective allows us to question this conception of experience. The above remarks showed us that we need not think of Mary's experience of red as involving her standing in a relation to some instantiated experiential property that physicalism does not tell us about. Rather, we can understand her as being in a new kind of representational state, one that her previous black-and-white environment rendered off-limits. The intuitive line of resistance to this idea is that merely saying that Mary represents things in a new way leaves out the fact that she learns something new, of the form 'red things look like *this*'. But whilst it is true that this is something Mary might say upon entering her new representational state, moving from that fact to the falsity of physicalism requires interpreting the above '*this*' as picking out some instantiated property of experience that is new to Mary, precisely the characterisation that the representationalist rejects[12].

According to the action-space account, the objection lodged against Clark's 'access implies qualia' proposal, above, relies on just such a mistaken conception of

[12] Of course, this view of matters is not incompatible with representationalism if the new property picked out is understood to be Mary's property of being in a state with a certain representational content. But so long as representationalism is consistent with physicalism, this can't be the sort of acquaintance with a new property the advocate of the knowledge argument has in mind if the argument is to work against physicalism.

experience. The objector presses the intuition that the account leaves out our acquaintance in experience with some property that stands behind our reports, judgements and enabled abilities. But appreciating the representationalist point above allows us to reject this intuition as misleading. In sum, viewing representationalism in the light of Clark's proposal helps us see why a representational state should feel like anything to a perceiver in that state. And viewing Clark's proposal in representationalist terms allows us to see that the natural objections to that proposal rest on a distortive or question-begging conception of experience.

The action-space account thus combines a representationalist focus on world-representing contentful states with a kind of 'enactivist'[13] focus on world-directed action. Like the sensorimotor theorist, we believe that there obtain deep (indeed, fully constitutive) relations between visual experience and our knowledge of possibilities for active, world-engaging response. But we do not unpack that knowledge in terms of sensorimotor expectations, but rather in terms of knowledge concerning the space of apparently-enabled intentional actions. The account thus occupies the (to our knowledge) unexplored middle ground between standard forms of representationalism and strong sensorimotor models.

7. Illusions, Hallucinations, and Sleepwalking

The action-space story claims that conscious experience is constituted by the way a perceiver takes herself to be poised to act in and on her environment. One sort of counterexample to our account would be a case where conscious experience arises, but an agent does not take herself to be poised to act in the manner we have outlined.

Visual hallucinations and some visual illusions look like plausible cases of this

[13] 'Enactivist' because perceptual experience, on such accounts, is said to be *enacted* (Varela, Thompson and Rosch (1991)) via skilled worldly activity.

sort. During a visual hallucination, for instance, there is no physical object present for the agent to act upon, either by physical engagement or via more 'epistemic' actions such as tracking, comparison or classification. When a subject stares at a Hermann grid and perceives illusory grey dots at the intersections of the white lines, there are no such objects for her to interact with. Additionally, if she is familiar with the illusion, it seems that she will not take herself to be enabled in any ways relating to identifying, tracking or otherwise engaging with grey dots, for she knows that there are none present. In what sense, then, is it the case that such experiences involve grasp of the empowerment of suites of actions, as required by the action-space approach?

According to the action-space account, such instances of illusion and hallucination (and, indeed, ordinary cases of dreaming) are standard cases of misrepresentation. For an agent to be poised over an action-space, and hence for her to undergo a conscious experience (be it veridical or otherwise) is for her to occupy a representational state whose content specifies possibilities for action, and where this content is apt for integration into her higher-level capacities of action-planning and practical reasoning. Perceptual error occurs, on this story, when some or all of these represented possibilities fail to obtain; where the world doesn't satisfy the agent's implicit expectations. When a suitably informed agent perceives the illusory dots in the Hermann grid, we claim that she implicitly takes herself to be empowered to act in ways that conflict with her explicit judgement that there are no such dots to be acted upon. For example, she takes the illusory dots to be roughly occupying such-and-such a set of points in her egocentric space, and to be discriminable in shade from both the white of the lines and the black of the squares that surround them. Illusions and hallucinations, then, are simply cases in which the agent takes herself to be empowered in ways that she in fact is not. As a result, it is not quite true to say that experiences are constituted by the exercise of *knowledge* of what one can do, for knowledge is factive. Instead it is

appropriate to speak in the more neutral way that we have preferred, of the perceiving agent as unreflectively *taking herself* to be poised over an action-space in experience, where such taking can sometimes go awry.

Recall from section 5, above, that a subject's taking herself to be poised over an action-space in the sense we wish to emphasise does not require that she judges herself to be so poised, nor that she places the actions she takes to be afforded, or the objects she takes to afford them, under concepts. This opens up the possibility that the space of actions which an agent implicitly takes to be enabled can come apart from her explicit conceptual judgements about what actions her environment affords. This is how, when our informed perceiver experiences the grey dots at the intersections of the Hermann grid, she can implicitly take herself to be able to sift, sort, track and compare (see Pettit (2003)) the dots in a certain way whilst explicitly judging that there are no objects present that are appropriate for such actions.

Another type of counterexample to our account would be a case where an agent takes herself to be poised to act on the environment, and can factor this into her reasoning, planning and intention-forming, but apparently without conscious experience arising. It might be thought that sleepwalkers constitute such cases[14]. Sleepwalkers are capable of navigating their way through an environment and even, in some cases, of performing relatively complex tasks such as driving cars or attempting to carry out mechanical repairs (Cartwright (2004), p.1152). Intuitively, these are examples of agents acting on the basis of their perceptual sensitivity to the actions afforded by the environment, selecting action types and targets appropriately, and apparently acting in a goal-directed manner. If it is correct to describe sleepwalkers as perceptually sensitive to the affordances of their environments and able to put this sensitivity to use in achieving a

[14] This problem for action-oriented theories of consciousness has been noted by Bermudez & Macpherson (1998), para. 32.

goal, do they constitute a counterexample to the action-space account?

One option for the action-space theorist is to claim that the sleepwalker does in fact undergo a conscious experience, but is unable to recall that she has done so (Crisp et al (1990) defend such a view). The sleepwalker implicitly understands herself to be poised over a (probably more limited than usual) space of actions, and puts this understanding to use in achieving some goal, thus satisfying the requirements for conscious experience. But due to some inhibition of the systems on which recall and report depend neither she nor we can know about this experience afterwards. Evidence that suggests sleepwalkers are amnesic for a short period after being woken (Cartwright (2004), p.1157) might be taken to support this hypothesis by suggesting that the sleepwalker may have conscious experiences when asleep just as they do shortly after being awoken, but that each such period of conscious experience is unavailable to report and recall.

A second option is to deny both that the sleepwalker has a conscious experience, and that her perceptual situation meets the conditions required by the action-space account. The view that sleepwalkers lack conscious experience perhaps accords best with the popular conception of sleepwalking. It also seems significant that the most commonly cited sleepwalking behaviours such as wandering around, performing a menial household task, and even driving, appear to be behaviours that waking subjects can perform with minimal conscious awareness. The action-space account could perhaps be squared with a denial that sleepwalkers have conscious experience by pointing to discrepancies between the ways in which the perceptual sensitivities of sleepwalkers and normal perceivers to their environments inform their behaviours. The most significant such discrepancy, for our purposes, is that sleepwalking behaviour seems to be inflexibly geared towards the achievement of a single goal, rather than open to the complex and shifting matrix of goals and projects active during waking behaviour. For example, a

sleepwalker engaged in cleaning kitchen surfaces might exhibit no sensitivity to the fact that the kitchen is dark, that the surfaces are already clean, that a valuable and long-lost ring is visible on the tabletop, or that a concerned family member is asking them what they are doing. This suggests that they are either perceptually insensitive to these facts, or that they are not able to modify their behaviour in the light of such sensitivity, each of which contrasts with the way a conscious perceiver, on the action space model, must be empowered to act by her environment.

In fact, we think that the most plausible account of the sleepwalking case lies somewhere between these options. Sleepwalkers present difficult cases for any theory of consciousness, since they manifest some apparent hallmarks of conscious experience (such as using perceptual sensitivity to their environment to inform a goal-directed behaviour) whilst lacking others (such as the abilities to recall and report, and to respond flexibly and intelligently to their environment). As a result, both intuition and empirical studies leave it unclear what we should conclude about the conscious state of the sleepwalker. We think that the evidence from both these sources precludes placing sleepwalkers at either end of a conscious/non-conscious continuum. It seems natural to describe sleepwalkers as in a state somewhere between sleep and wakefulness – perhaps we should assume on this basis that their conscious experience has a similarly intermediate status. It seems to us that this is the most natural diagnosis of the sleepwalker's situation, and one that the action-space account rather easily affords. For the sleepwalker may be located somewhere on a continuum between the full and flexible integration of perceptual sensitivity with goals and plans that characterises the normal conscious perceiver, and the kinds of rigid and reflexive responsiveness to the environment that can occur without conscious experience at all. The action-space account thus suggests that the sleepwalker enjoys conscious perceptual experience in proportion to the extent to which her sensitivity to the affordances of the environment

can be integrated with her ongoing and long-term goals, wants and plans. Such sensitivity and integrability are both markedly impoverished with respect to normal conscious perceivers, but present to a very limited extent. We think that such a conclusion provides the best fit to the available data and that sleepwalking, far from being a puzzle case, neatly illustrates the claim that conscious experience is knowing poise over a space of perceptually-enabled actions.

8. Conclusions: Linking Experience and Action

Perceptual experience, we have argued, arises when an agent enjoys a certain kind of epistemic contact with her own currently enabled skills and capacities. In particular, it arises when an agent is directly apprised of the nature (or seeming nature) of her own current poise over an action space. An action space, as it figures in this account, is a matrix of possibilities for goal-directed undertakings. To be apprised of one's poise over an action space is to *know what one can do*. Blindsight, and certain other pathologies of conscious experience, thus emerge as failures of knowledge and representation, rather than as failures to be acquainted with mysterious 'qualia'. Agents thus impaired are unaware (or only indirectly aware) of the space of actions that their current sensory contact with the world might otherwise enable.

If this kind of story is on track, then the existence of the various empirically suggested links between experience, reason, and planning is both predicted and explained. For experience depends on knowing what you can do, and to know what you can do just is, in the right circumstances, to be able to put sensory information in contact with open-ended forms of deliberation and intentional action. If this is correct, then strong sensorimotor models err by positing direct constitutive links between perceptual

experience and world-engaging behaviour. Such links, we suggest, obtain rather between perceptual experience, reason, and planning. If we are right, the links with action emerge as intimate but indirect. Knowing what you can do is knowing how you can act: but it is the knowing, not the acting (far less the moving), that bears the explanatory weight.

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