

What the Senses Cannot ‘Say’

Jonathan Brink Morgan

[Forthcoming in *The Philosophical Quarterly*. Please cite the published version.]

Abstract: Some have claimed that there are laws of appearance *i.e.* in principle constraints on which types of sensory experiences are possible. Within a representationalist framework, these laws amount to restrictions on what a given experience can represent. I offer an in-depth defence of one such law and explain why prevalent externalist varieties of representationalism have trouble accommodating it. In light of this, I propose a variety of representationalism on which the spatial content of experience is determined by intrinsic features of conscious subjects. I conclude by considering an externalist-friendly reworking of my proposal, but suggest that the success of such a reworking is dubious.

Keywords: consciousness, laws of appearance, representationalism, externalism, internalism

1. Introduction

Owing to their capacity for echolocation, bats and dolphins likely experience sound and space in ways we cannot imagine. Most of us do not know, and will never know, what it is like to be either creature. Even so, the possibility of their experiences strikes us as coherent. And, more generally, we have no trouble understanding that there are sensory experiences radically different from our own.

However, some unimaginable experiences are not *merely* unimaginable; they are *prima facie* incoherent. It is not just that we cannot imagine what it is like to have them. Rather, their putative descriptions give the appearance of impossibility. Consider, for example, descriptions of experiences as of objects possessing certain mutually exclusive properties. If Ralph tells us that he has found a creature that has experiences as of round cubes, we will likely regard Ralph as mistaken. Perhaps the creature is having an experience as of something that is round and simultaneously having a distinct experience as of something cubical—perhaps one experience is visual and the other is tactile. But a single, unimodal experience as of a round cube seems incoherent.

On the face of it, this suggests that there are constraints on which types of sensory experiences are possible. In this case, the constraint is that if a subject experiences something as (completely) round in a given modality, then she does not experience that thing as (completely) cubical in that modality. These constraints—or ‘laws of appearance’, as others have called them—are interesting in their own right.¹ But they become puzzling within the context of *representational* theories of experience. For they impose certain in principle restrictions on what a given sensory experience can have as its representational content—constraints on what the experience can ‘say’ about the world. Focusing on the

¹ Adam Pautz (2016, 2017, 2020) offers in-depth discussion. Jeff Speaks (2017) has also addressed the issue. Related issues can be found in Colin McGinn (1983), David McNaughton (1984), and Mark Johnston (ms).

previous example, if a subject's experience represents something as round, then it cannot also represent it as cubical.

But why not? What explains this representational limit of experience? To answer this question, I suggest we need greater sensitivity to the intrinsic features of subjects that help to ground experiential representation. Motivating this proposal is a kind of explanatory failure of certain externalist varieties of representationalism.² Such theories are not well-positioned to explain—let alone accommodate—various representational limits of experience. In light of this, I argue that even if experiential representation is not fully determined by what's going on 'in the head', the representational limits of experience suggest that a significant portion of it *is*. Perhaps most strikingly, it is the very spatiality of experience that is grounded in intrinsic features of us as experiencing subjects.

2. Representationalism and the Laws of Appearance

2.1 Berkeley's Law

One of the more detailed discussions of laws of appearance comes from Adam Pautz (2020). He proposes a handful of such laws (ibid. 258). My focus here, however, will be on a single law of appearance.

² See Fred Dretske 1995, 2003; William Lycan 1996; and Michael Tye 1995, 2000, 2009.

Berkeley's Law: It is metaphysically necessary that for any experience e generated by perceptual systems similar to those in humans, if e is as of something coloured, then e is also as of something spatially extended.³

Informally, for creatures like ourselves, the experience of colour is necessarily linked to the experience of spatial extension. Why believe this? Because upon reflection, it seems that certain types of phenomenology are impossible. Berkeley is, to my knowledge, the first to have noticed this. In his *An Essay Towards a New Theory of Vision*, he claims that ‘as for figure and extension, I leave it to anyone that shall calmly attend to his own clear and distinct ideas to decide... whether he can conceive colour without visible extension... For my own part, I must confess I am not able to attain so great a nicety of abstraction’ (1709: 130). To see what Berkeley is getting at, I invite you to bring a red apple (or some suitable red item) before you. If lighting conditions are adequate and your visual system is working normally, you will have an experience as of a red, apple-shaped thing. Carefully attend to the reddish quality that you experience. When you attend to this quality, you will find that the quality seems to take up space—it seems spatially extended or spread out (or, at any rate, it seems to belong to something that is spatially extended). Now, ask yourself the following question: Would it be

³ See Morgan 2018: 71-89 and Pautz 2020 for further discussion of this law. It’s also worth noting that not much should be read into the language of ‘generated by perceptual systems similar to those in humans’. All I mean to do with this expression is block worries about Berkeley’s Law failing for creatures that are radically different from humans.

possible for a subject to have an experience as of something red and yet fail to have an experience as of something spatially extended? Intuitively, no. The experiences are bound together in a certain way. Specifically, an experience as of something red must also be an experience as of something spatially extended—at least if we restrict ourselves to creatures with perceptual systems like our own. The same seems true for all colour experiences. If you were to ‘subtract’ all the spatiality from a colour experience, there would be no colour experience left over.

Two brief clarifications should be noted. First, if it turns out that the qualities constitutive of phenomenal character are not the sensible qualities, then we may specify Berkeley’s Law using whatever the phenomenal counterparts of the sensible qualities turn out to be—that is, we could specify it in terms of *phenomenal* colour and *phenomenal* spatial extension, the phenomenal counterparts of colour and spatial extension. (See Thau 2002 and Papineau 2013 for views that might require specifying the Law in this way.) Second, notice that, though metaphysically necessary, Berkeley’s Law is restricted to creatures with perceptual systems relevantly like those of humans. In this respect, it differs from the laws discussed by Pautz (2020). Additionally, I think it may help to address Speaks’s (2017) worry about whether the laws of appearance are modality-specific. More discussion about this will come later (in Sect. 3).

The appeal of Berkeley’s Law is not plausibly due to a mere failure of imagination. Many unimaginable experiences strike us as *possible*. The appeal of Berkeley’s Law is due to the apparent impossibility of the experiences that would render it false. We know what it is like

to experience colour. We know what it is like to experience spatial extension. Yet, we cannot see how it would be possible to experience colour without experiencing spatial extension. In fact, an inability to imagine having such experiences is exactly what we would expect if Berkeley's Law were true. Accordingly, our inability to imagine having these experiences may weakly confirm Berkeley's Law. Moreover, the plausibility of Berkeley's Law is not threatened by creatures that don't experience any *determinate* shapes or boundaries and instead experience homogenous expanses of colour. Homogenous expanses of colour are still experienced as spatially extended in some way—they are, after all, expanses. Likewise, the experience of *point-like* coloured objects poses no threat to the law. Consider the experience of stars in the night sky or phosphenes darting across one's visual field. We clearly experience these things as coloured. Do we experience them as spatially extended? It would seem so. These point-like objects do not seem *entirely* unextended. If they seemed entirely unextended, I do not know how one could experience them as occluding other things in their visual field. Instead, it seems more appropriate to say that they just don't seem to be extended *very much*.

2.2 Empirical Concerns About Berkeley's Law

Setting preliminary concerns aside, one might worry that atypical human perceptual experiences present a threat to Berkeley's Law. I think these worries can be answered, however.

First, one might worry that there are actual, but atypical experiences had by humans that are counterexamples to Berkeley's Law *i.e.* experiences of colour that are not experiences of spatial extension. Consider *chromesthesia*, a specific kind of synaesthesia. When discussing chromaesthesia loosely, we often say things to the effect that chromaesthetic subjects 'hear colours'. That might suggest that they experience colour but do not experience it as spatially extended, for perhaps they are having *auditory* experiences of colour. However, there are two things to say in reply. First, there is something slightly misleading about describing these individuals as hearing colour. A more careful description of synaesthesia is that 'a stimulus presented in one modality triggers imagery in another modality' (Baron-Cohen *et al.* 1987: 761). If anything, this suggests that, in the case of chromaesthesia, subjects are not having an auditory experience of colour. Rather, an auditory stimulus triggers an ordinary experience of colour *i.e.* one that we would readily call visual. Moreover, to my knowledge, no subject with chromaesthesia reports *not* experiencing colours as spatially extended. Quite the opposite. According to their reports, 'colored shapes are said to appear, scintillate, and move around, then fade away only to be replaced by a kaleidoscopic montage of colored photisms so long as the varying sound stimulus continues' (Cytowic and Eagleman 2009: 39). This is clearly a description of a spatial experience.

Other experiences that might present a problem for Berkeley's Law involve patients with Balint's syndrome. It is sometimes said that a subject with Balint's syndrome 'lacks... conscious spatial perception' (Campbell 2012: 169). The reason for thinking this has to do with subjects of Balint's syndrome being incapable of behaviour typically subserved by

conscious spatial perception. RM, a well-known subject with Balint's syndrome, is described as follows:

Single objects popped in and out of view in RM's everyday life... an object continued to be perceptually present for a while and then was replaced by another object or part of an object without warning. However, the spatial location of the object or part he perceived at any given moment was unknown to him. (Robertson 2004: 158)

It is tempting to think that the explanation of this is that RM does not (visually) experience spatial location or, for that matter, spatial extension. Nonetheless, RM experiences colour. According to Robertson,

we asked [RM] to tell us what letter he saw on each trial and its color as it appeared to him... When probed about his perceptual experience while performing the task, RM told us that he was reporting the letters as he saw them. He commented with statements like "When I first look at it [the letter], it looks green and it changes real quick to red", the letters on that trial being red and green, or "I see both colors coming together." (ibid: 201)

Putting this all together: it might seem that RM has experiences of colour that are not experiences of spatial extension. However, this description of RM is questionable. As French (2018: 239) has recently argued, we need to distinguish between the claim that RM does not experience space and the claim that he only has a *severely limited* experience of space. For, upon careful consideration, the empirical evidence about RM might not decide between

these claims. That being said, there is some evidence for the latter claim. RM reports his experiences using spatial terms. In one instance, when tested in search for a Q among Os he said, 'I can see the line and how it comes up and fits in' (Robertson *et al.* 1997: 310). This is clearly the description of a spatial experience and, more specifically, an experience as of a spatially extended object (namely, a line).

A different sort of empirically-based worry, however, does not seek counterexamples to Berkeley's Law. Instead, the worry aims to undermine our justification for accepting *any* law of appearance by pointing to the alleged existence of bizarre experiences—experiences that we might have once been inclined to regard as impossible. The worry proceeds as follows. Experiences of colour that are not experiences of spatial extension seem impossible—their modal appearance is that of impossibility. And, in the absence of sufficiently strong defeaters, this gives us some degree of justification for believing they are impossible (Huemer, 2007). But one might allege, for example, that bizarre experiences are had in dreams and that these experiences initially *seem* impossible even though they are not. And if one can come up with a sufficiently large stock of examples of this sort, then there is some reason to think that modal appearances cannot be trusted in the case of experience.

There are at least two places at which this worry might break down. The first involves asking whether the subjects described genuinely have apparently impossible experiences or merely *judge* that they have such experiences. In fact, some have taken precisely the latter stance on putatively bizarre dream experiences. In a different context (ironically, a context in which our general introspective powers are in question), Eric Schwitzgebel writes that

in dreams we make baldly incoherent judgments, or at least very stupid ones. I think I can protrude my tongue without its coming out; I think I see red carpet that's not red; I see a seal as my sister without noticing any difficulty about that. In dream delirium, these judgments may seem quite ordinary or even insightful... [I]t seems to me not entirely preposterous to suppose that... our judgments about the colors of dream objects are on par with the seal-sister judgment, purely creative fiction unsupported by any distinctive phenomenology. If so, the corresponding judgments about the coloration of our *experiences* of those dream objects will be equally unsupported. (2008: 253 citation)

Notice the moral that Schwitzgebel draws here. It is not that in dreams we have seemingly impossible experiences. Rather, it is that we judge that we have seemingly impossible experiences, and these judgments are false. Schwitzgebel worries that these considerations might apply to experiential judgments broadly. But, of course, we are typically epistemically compromised in dreams, making decisions and rendering judgments that no clear-minded, waking person would make. And, likewise, various kinds of perceptual disorders (like those mentioned above), although they may not involve epistemically compromised subjects, nonetheless face a question about whether an apparently possible experience has occurred or whether it has merely been judged (and then reported) to have occurred.

However, suppose for the sake of argument that some experiences that initially seem impossible are possible. The second way that the worry about modal appearances might

break down involves asking a question: At what point do *some* misleading modal appearances undermine *all* modal appearances? It should be clear from various projects of undermining other sorts of appearances that the bar here is fairly high. For example, perceptual appearances can mislead—illusion and hallucination are well-known staples of any epistemology of perception. But the fact that perceptual appearances are sometimes untrustworthy does not yet licence inferring that they are always or even typically untrustworthy. For that, stronger arguments are needed. Likewise, if we are to generally distrust the modal appearances of experiences, then we will need more than a few suggestive examples of seemingly impossible experiences that are nonetheless possible.

2.3 Berkeley's Law and Representationalism

Berkeley's Law prohibits having an experience as of something coloured that is not also an experience as of something spatially extended. How are we to understand this in representationalist terms? To a first approximation, representationalism is the thesis that *what it is like* to undergo a sensory experience is one and the same as the way the experience represents the world to be. In slogan form:

Representationalism: The phenomenal character of an experience is identical with its representational content.

To give a rough example, when you view a bright red tomato in sunlight, the representationalist will typically say that the phenomenal character of your experience—*i.e.* what it is like for you to have the experience—is one and the same as a representational

content to the effect that *that thing is red and round*. Say that an experience *phenomenally represents* a content iff that content is at least partly identical with the phenomenal character of the experience. Hence, experiences phenomenally represent contents iff some version of representationalism is true.

I assume that phenomenally represented contents include properties. Moreover, I assume that these properties are sometimes complex. An example of a complex property might be the property of *being red & round*. Necessarily, something instantiates this property iff it has a (proper or improper) part that is red and a (proper or improper) part that is round. I take this (or something like it) to be a relatively common assumption (Bealer 1982, Dretske 1995: 73, Foster 2000, Johnston 2004, Forrest 2005, Pautz 2007 and Tye 2014). Plausibly, this is also the view of Dretske (1995), for he says ‘I continue to identify qualia with phenomenal properties—those properties that...an object is sensuously represented...as having’ (1995: 73). As a convenient shorthand, I will say that an experience is *as of something F* just when F-ness is at least partly identical with the phenomenal character of that experience. So, for example, an experience is as of something red just when redness is at least partly identical with the phenomenal character of that experience. Thus, if representationalism is true, an experience is as of an F just when the experience phenomenally represents F.

How then are we to understand Berkeley’s Law if representationalism is true? To illustrate, focus again on the experience as of something red. If representationalism is true, then what it is to have an experience as of something red is, roughly, to have an experience that phenomenally represents something like the following property:

(1) *being red.*

Similarly, to have an experience as of something spatially extended is to have an experience that phenomenally represents something like:

(2) *being spatially extended*

or some determinate thereof. Accordingly, if Berkeley's Law is true, then it is impossible for a subject to phenomenally represent the property denoted by (2) in isolation.⁴ Any subject that phenomenally represents (1) would also have to phenomenally represent (2) or some determinate of (2).

Allow me to briefly summarise the discussion thus far. I have argued that there are certain limits of phenomenal representation that derive from laws of appearance. More specifically, I have tried to render one such law (Berkeley's Law) plausible, defend it from preliminary concerns, and show how it yields constraints on phenomenal representation. I now turn to the explanatory challenge that this law poses for representationalism.

3. The Explanatory Challenge to Externalist Representationalism

3.1 Introducing the challenge

It is possible to cognitively represent colour but not spatial extension. I can, for instance, believe that something is red without thereby believing anything about the spatial features of

⁴ I will sometimes speak of a subject as phenomenally representing a content. I use this as a convenient shorthand. What I mean to say is that the subject has an experience that phenomenally represents that content.

that something. So why is it impossible to *phenomenally* represent colour but not spatial extension? Whatever the answer, it must reside in a story about how internal states of subjects manage to phenomenally represent anything in the first place. That is, the explanation must reside in the psychosemantics of phenomenal representation.

The reason for this is straightforward. A psychosemantic account of phenomenal representation will give a general explanation of how and why a given internal state of a subject phenomenally represents some content, as opposed to some other content, or no content at all. And given this, it is natural to suppose that the explanation of the limits of phenomenal representation must derive from an explanation of phenomenal representation in general.

Pautz (2020) explores different varieties of explanation—ones that assume the laws of appearance are in some way contingent, and ones that do not. His focus is (understandably) on breadth. My focus here will be on depth, and hence my target will be more narrow. However, it will be informed by the most common psychosemantic story for phenomenal representation: *tracking representationalism* (Dretske 1995, Lycan 1996, Tye 1995, 2000, 2009). The overarching point I wish to make: tracking representationalism is not well-suited to explain Berkeley's Law—let alone other laws of appearance. It is not even consistent with this law. The outline of the argument I will give is this:

P1. It is impossible for a relevantly humanlike subject to have an experience that phenomenally represents colour but does not phenomenally represent spatial extension.

P2. If tracking representationalism is true, then it is possible for a relevantly humanlike subject to have an experience that phenomenally represents colour but does not phenomenally represent spatial extension.

C. So, tracking representationalism is false.

P1 follows from Berkeley's Law and representationalism. P2 will be defended by considering a group of possible subjects that I call *Treeples*. What the argument suggests, ultimately, is that the tracking representationalist offers, at most, only a *partial* explanation of phenomenal representation (but more on this in Sect. 4).

3.2 Tracking representationalism

In broad strokes, tracking representationalists take phenomenal representation to be explained in terms of physical relations between subjects and their environment.⁵ The physical relations are *wide* in the sense that whether they obtain does not supervene on a

⁵ It is often added that phenomenal representation is *nonconceptual*. A mental representation of *x* (where 'x' ranges over things of any ontological category) in a creature *c* is nonconceptual just in case having that representation does not require that *c* possess a concept of *x*. This detail is not directly relevant to the issues discussed here, so it is omitted for simplicity.

subject's intrinsic features with metaphysical necessity. Hence, tracking representationalism is a version of phenomenal *externalism*—it embraces the thesis that it is possible for intrinsic duplicates to differ in sensory phenomenology.

There are several varieties of tracking representationalism, but the differences between them are slight. Accordingly, for concreteness, I work with what I take to be the most plausible version of tracking representationalism—one belonging to Fred Dretske. I will occasionally refer to this version simply as 'tracking representationalism'.

Dretske's tracking representationalism says that what an experience phenomenally represents is what it has the biological function of indicating. *Indication* is meant to be a familiar notion that we can get a grip on through examples. To use some of Dretske's favourites: the presence of smoke indicates fire; rolling storm clouds indicate rain; and the rings on a tree indicate its age. *Biological functions* 'derive from evolutionary history' (Dretske 1995: 4). The biological function of an organ, for example, derives from the explanation of why natural selection has favoured that organ. My heart has the function of pumping blood precisely because the heart's pumping blood explains the fitness of my relatively recent evolutionary ancestors. From the perspective of natural selection, it was better to have a heart that pumped blood than one that did not. To be clear, I am assuming, as is Dretske (1995: 169n4), that we can fill out his theory via something like Godfrey-Smith's 1994 *modern history theory* of biological function. Put roughly, the modern history theory of biological function has it that the biological functions of x are determined by the features/facts in virtue of which (recent) selection pressures favoured creatures with x . Specifically, x has G as

a biological function in virtue of the fact that, in recent history, x 's exhibiting G (under certain conditions) partially explains the fitness of organisms with x .

Putting all this together, let us say that an internal state S of a subject x has the biological function of indicating F just when S's indicating F, under environmentally normal conditions, partially explains the fitness of x 's recent ancestors.

It is worth noting that, according to Dretske, the biological functions that feature in tracking representationalism are *systemic*. That is, they are biological functions possessed by certain internal states that derive from the biological functions of the sensory systems that generate those states (Dretske 1995: 15). In some detail, the idea is this. A sensory system first comes to have the biological function of indicating some *determinable* property. It has this function because its indicating that property, by generating various internal states, is adaptive. Internal states generated by that system thereby derivatively come to have the biological function of indicating *determinates* of that property. Though I acknowledge this systemic aspect of Dretske's view, I largely omit it for simplicity. Instead, I will simply speak of specific internal states acquiring indicator functions and leave the systemic nature of these functions in the background.

There is one other important component of tracking representationalism. What turns internal states with indicator functions into *experiences*, according to Dretske, is that they play a certain functional role. The role is, roughly, that of being disposed to *feed* information into the cognitive system so as to influence thought and behaviour (Dretske 1995: 19-20). Call this *the feeder role*. Roughly put: if a state plays the feeder role, then what it has the biological

function of indicating becomes phenomenally represented. This allows one to construct an official statement of tracking representationalism.

Tracking Representationalism: For any token o of internal state S , o phenomenally represents $F =$ (a) o plays the feeder role and (b) has the biological function of indicating F .

Informally, the idea is that the property *phenomenally representing F* is identical with the property *playing the feeder role & having the biological function of indicating F* . Thus, if tracking representationalism is true, a state's phenomenally representing a property is nothing over and above that state's playing the feeder role and having the biological function of indicating that property.

3.3 *The problem of Treeple*

The problem is that despite tracking representationalism's plausibility, it fails to explain the laws of appearance. In fact, if Berkeley's Law is true, then tracking representationalism is simply false.

Consider an Earth-like planet in a world much like our own. On this planet, there is an intelligent, human-like species that we may call *Treeple*. Like us, Treeple have an interesting collection of intentional states, they reason, they exhibit complex behaviour, they have families and social groups, *etc.* But unlike us, they are mostly immobile, and grow out of the ground. When mature, they reach staggering heights and develop leaf-like appendages on

their branch-like arms. Now, Treeple have excellent auditory and olfactory systems. However, there are silent, odourless, red predators that occasionally appear and eat Treeple leaves. As a result, many Treeple gained the ability to token state R. Under normal conditions, when red light strikes their leaves, Treeple enter into state R—a state tokened in something that is intrinsically like the visual areas of human brains. Tokens of R thereby came to indicate redness in environmentally normal conditions. And in virtue of this, Treeple with the ability to token R were more evolutionarily fit than Treeple that lacked this ability. As a result, tokens of R came to have the biological function of indicating:

(1) *being red.*

Crucially, tokens of R play the feeder role in Treeple. When tokened, R typically causes Treeple to raise their arms high into the air, camouflage themselves, and consider various options for how to alert members of their communities. Thus, R phenomenally represents (1).

Despite all this, R does not have the function of indicating spatial extension. There was no evolutionary need for R to indicate even the approximate shape of the red predators (since they're all the same size). Hence, tokens of R do not have the function of indicating the following property or any determinate thereof:

(2) *being spatially extended.*

Suppose now that a Tree-person tokens R. In this instance, conditions (a) and (b) of tracking representationalism are clearly satisfied for (1). However, condition (b) is not satisfied for (2) or any of its determinates. Hence, this Tree-person phenomenally represents (1) without phenomenally representing (2) or any of its determinates. In other words, if tracking representationalism is true, this creature has an experience as of something red, but does not have an experience as of something spatially extended. But this is, by Berkeley's Law, impossible. Any experience of colour must also be an experience of spatial extension, provided it is generated by mechanisms sufficiently similar to the perceptual mechanisms of humans. And since the Treeple do have perceptual mechanisms sufficiently similar to those of humans, they too are subject to this law. Thus, tracking representationalism is false. Or, more carefully, tracking representationalism is false insofar as it is intended to be a complete theory of phenomenal representation.⁶

How might the tracking representationalist respond? She might choose to dig in her heels. Berkeley's Law is not psychologically irresistible. Nor is it compulsory. It is, instead, an extremely plausible constraint on how certain types of experiences are related to one another. Yet, a committed tracking representationalist could, I suppose, simply say that her own view is more plausible than Berkeley's Law. The case of the Treeple thus shows that Berkeley's Law is false rather than showing that tracking representationalism is false. Though I grant that this is a possible move, it is not one that I myself find attractive. The plausibility

⁶ An option I do not pursue here is that it might suggest giving up representationalism about spatial properties entirely. See Masrour 2016: 588 for discussion.

of Berkeley's Law strikes me as far greater than the plausibility of tracking representationalism or, indeed, any controversial theory of conscious experience. And if the tracking representationalist must give up this Law, then I take that to be a cost for her view.

However, she might supplement this reply with a weakened version of Berkeley's Law that is restricted to visual experiences. Perhaps she could suggest that Treple *do* phenomenally represent colour but not spatial extension. It is just that they have non-visual experiences of colour. But this restriction might not help the tracking representationalist much. There is reason for thinking that Berkeley's Law is already *close enough* to being restricted to visual experiences. Suppose that an experience is visual if it is generated by the exercise of a visual system. What makes a perceptual system *visual*?⁷ Plausibly, a sufficient condition for a system's being visual is that the system is sufficiently similar to the perceptual system that we call 'visual' in humans. But if so, then Berkeley's Law is (more or less) restricted to visual experiences, for the law is restricted to experiences generated by perceptual systems like those in humans. And given that the relevant (and, I think, impossible) Treple-experiences are generated by perceptual systems that are very similar to the visual systems of humans (for example, the relevant areas of their brains are intrinsically

⁷ In a way, I am not sure that this is the right sort of question to be asking. In my view, MacPherson (2011: 37) is right in claiming that '[r]ather than try to pigeonhole all of the senses into a small number of discrete categories we should simply note what each sense is like with regard to... criteria proposed by philosophers'.

similar to the visual areas of human brains), we have good reason to classify those experiences as visual.

Alternatively, if the tracking representationalist wishes to retain her view as a complete theory of phenomenal representation and hold onto Berkeley's Law, she might attempt to challenge the description of Treeple. A plausible strategy proceeds as follows.⁸ As described, Treeple have internal states that track the colour of predators, but not the way in which those predators are spatially extended. However, one might think that it is plausible that what the Treeple track is not the colour of red predators but simply *the presence of a predator*. And, if so, then we do not have an example of phenomenally representing colour but not spatial extension, and so no violation of Berkeley's Law.

Now, I grant that there is a possible case in which Treeple only track the presence of and not the colour of the predator. However, I do not think the case offered is one of these cases. Moreover, we can modify the original case such that it is more plausible that the Treeple are tracking the colour of red predators. Suppose that there are two types of predators in the Treeple's environment: red and blue. Red predators eat Treeples' leaves whereas blue predators eat their fruits. The presence of each predator makes different sorts of avoidance behaviour adaptive. Red predators require the folding up of leaves whereas blue predators require the raising of branches to make the fruit unreachable. As before, under normal conditions, red light striking Treeple's leaves causes them to token state R, whereas blue light striking their leaves cause them to token state B. In this scenario, under

⁸ Thanks to an anonymous referee for suggesting it.

environmentally normal conditions: R indicates the presence of a red predator and B indicates the presence of a blue predator. Since the ability to token these states made certain Treeple more evolutionarily fit, each state came to have the function of indicating a predator of a certain colour. In this story, the indication of colour is crucial to the evolutionary success of the Treeple—they require the distinction in order to appropriately adjust their behaviour. Merely tracking the presence of a predator would not be enough. And, for this reason, we should think that R and B track colour.

What the case of the Treeple suggests, I think, is that the laws of appearance are unlikely to be explained in purely *externalist* representational terms. The relevant explanation will be *internalist*. That is, there is some intrinsic feature of us as subjects that explains why we cannot phenomenally represent colour without phenomenally representing spatial extension. The explanation will, as I go on to suggest, still be a psychosemantic explanation. However, the psychosemantic explanation will go beyond those offered by tracking representationalists. I now turn to motivating and filling in this explanation.

4. Spatial Representation as Internally-Determined

4.1. *Outlining an explanation*

An internalist explanation of Berkeley's Law begins with the following thought: Perhaps phenomenal representation is in some sense *pictorial*. Pictorial representation is limited in many of the ways that phenomenal representation is. In particular, it is impossible to pictorially represent colour properties without pictorially representing spatial properties.

And, if so, whatever the reasons are for this limit of pictorial representation, similar reasons could be used to explain the limits of phenomenal representation.

There are some disanalogies between experiences and pictures, however.⁹ Pictures cannot represent colour without representing spatial extension because they represent colour in a partially ‘Lagadonian’ fashion (Lewis 1986: 145). That is, in pictures, colour is represented by colour and spatial extension by spatial extension. And since nothing can *be* coloured without being spatially extended (Cutter 2016), no picture could represent colour without representing spatial extension. But this story does not apply to experiences. Perhaps experiences are literally coloured and spatially extended. Yet even if they are, they do not represent colour and spatial extension by *being* coloured and spatially extended.

There is also a circularity worry. Tim Crane puts his finger on the source of the worry when he writes

the comparison between pictures and experiences is... apt because one of the things a painter, for example, is doing when painting a (realistic) picture is portraying *how things look*. The point... is not that visual perception is essentially pictorial; it is rather that picturing is essentially visual. (2009: 462)

⁹ It is also worth noting that there is a tendency among philosophers of mind to speak as if there is just *one* kind of pictorial representation. But there are many kinds of pictorial representation just as there are many kinds of linguistic representation. These kinds are individuated, roughly, by the systems of representation that govern them (Greenberg 2013). For present purposes, we can harmlessly assume that we are speaking of ordinary, photorealistic pictorial representation.

This concedes that the connection between pictorial representation and phenomenal representation is explanatory, not coincidental. But it suggests that the proposal under consideration might have the order of explanation backwards. What explains the fact that x pictorially represents something as having a property F is that, were x to be viewed by a subject under normal conditions, it would cause that subject to have an experience in which something looks F (Gregory 2010).¹⁰ The expression ‘looks F’ in this context is intended to pick out a distinctively phenomenal (as opposed to evidential or doxastic) sense of ‘looks’. And if representationalism is true, what it is for something to look F to a subject in this sense is for that subject to have an experience that phenomenally represents F. But this means if we were to explain the limits of phenomenal representation in terms of the limits of pictorial representation, our explanation would be mistaken—or at best circular. Pictorial representation has the limits it does because it is a sort of quasi-phenomenal representation. Not the other way around.

At any rate, the preceding worries can be met by the pictorialist proposal. Interpreted charitably, the proposal concerns the *structure* of phenomenal representation’s vehicles. The vehicles of pictorial representation have a structure that somehow prevents them from representing colour without representing spatial extension. Analogously, the vehicles of

¹⁰ Gregory, interestingly, goes on to show how this account can serve to explain certain representational limits of depiction by *deriving them from the representational limits of experience* (2010: 26). He does not, of course, frame the matter in quite these terms.

phenomenal representation—or ‘experiences’—have a structure that prevents them from phenomenally representing colour without phenomenally representing spatial extension.

This strategy is plausible, for representational limits are often explained by features of the vehicles of representation. Consider a remark made by Dretske: ‘I can say that A and B are of different size without saying how much they differ in size or which is larger, but I cannot picture A and B as being of different size without picturing one of them as larger and indicating, roughly, how much larger it is’ (1981: 137). The differences here are due to the vehicles of each sort of representation. Due to its structure and the representational properties of its parts, the sentence ‘A and B differ in size’ represents a size difference without representing a specific size difference. But a picture representing that 2D objects A and B differ in size would do so by means of two (say) splotches of paint that are *literally* different in size. That is, the difference in size between A and B would be represented by means of differently size splotches A* and B*. Now, A* and B* must exhibit specific size differences—one must be larger than the other. And given how 2D objects’ sizes are represented in a pictorial format, this will result in the picture representing A and B themselves as differing in size in some specific way. In short, the difference in representational limits is explained by a difference in the structure of representational vehicles.

The idea, then, is that what explains Berkeley’s Law and other limits of phenomenal representation is partly how the vehicles of phenomenal representation are structured. More carefully, the idea is that phenomenal representation is realised by structurally complex,

partially non-discursive vehicles and the structure of these vehicles plays a large role in determining which spatial properties our experiences represent. The psychosemantics of phenomenal representation depends not just on what features of the external world that mental representations track, but also the structure of the representations themselves.

Now, the proposed explanation relies on the idea that at least some sensory representations are non-discursive or not language-like and are instead quasi-pictorial or -iconic (Dretske 1981: 135-168 and 2000: 150; Tye 1991; Carey 2009: 8; Burge 2014a: 574 and 2014b: 488; Block 2014: 560; Quilty-Dunn 2020). Hypotheses as to what the precise non-discursive structure is are hostage to empirical results, of course. But a reasonable proposal, and one that we can focus on for concreteness, is that sensory representations have a *feature map* structure (Kosselyn 1983; Tye 1991). Think of a feature map as a

very large matrix drawn on a sheet of paper, some of whose cells contain written symbols. The symbols represent at least some of the following local features: presence of a tiny patch of surface, orientation of the patch of surface, determinate shade of colour, texture, and so on. (Tye 1995: 261)

Feature maps get their contents as follows. First, symbols in the cells achieve their representational properties (in whatever ways we see fit). These might include properties of representing colour, texture, and so on. Moreover, it could be that they achieve these properties in a standard externalist fashion. But the representation of spatial extension is, in a sense, secondary. It is determined by the representational properties and arrangement of

these symbols in the feature map. To illustrate, consider the following example. Let the matrix in Fig. 1 represent some state s that plays the E-role.

Fig. 1

	1	2	3
A	r		
B		r	
C			r

State s has symbol r in cells A1, B2, and C3. Suppose this symbol represents a determinate shade of red. Because r is in A1, and r represents a determinate shade of red, state s represents that some extended region of space is red. The same holds for B2 and C3. Moreover, in virtue of these facts and the fact that r is located in A1, B2, and C3, s phenomenally represents (say) a red diagonal line. Any state that is set up in precisely this way would also phenomenally represent a red diagonal line. Relatedly, if you changed the symbol to b , a symbol that represents blue, then s would phenomenally represent a blue diagonal line. In short, whether the state itself phenomenally represents spatial extension *is a function of the representational properties and location of the symbols in the feature map*. The representation of spatial extension is, in this sense, determined by the structure of the state itself.

This enables a compelling explanation of Berkeley's Law. If in creatures like us phenomenal representation is essentially realised in a feature map format, then the very fact that it is realised in this format *guarantees* representation of spatial extension. To illustrate, focus again on the previous example in Fig. 1. This feature map phenomenally represents a red diagonal line. Why? Because of the map's structure. That is, it is precisely because r is located in cells A1, B2, and C3 that a red diagonal line is phenomenally represented as occupying a certain region of space. In fact, r being located in A1 guarantees that the state phenomenally represents red as occupying some extended region of space. In other words, if symbol r has certain representational properties and occupies the right place in the feature map, then this ensures that a certain spatial feature is phenomenally represented. The basic idea, then, is that phenomenal representation is realised in a format that guarantees representation of spatial extension. Phenomenal representation is, in this sense, *essentially spatial*. That is what explains Berkeley's law.

Before proceeding further, it is worth noting that Pautz (2020) considers something like this explanation. He raises three worries, but each can be overcome. First, Pautz thinks there may be empirical reasons against thinking that 'the subpersonal medium of experiential representation *is* completely iconic' (260). This is neither here nor there, for it is not essential to the present explanation that phenomenal representation is realised in a *completely* iconic format. After all, the cells of the matrix may be filled out with non-iconic representations. But if the worry is merely that the proposal is hostage to empirical results, I grant this and,

frankly, see no way out of the hostage situation. In fact, I consider it a *feature* of the view that empirical results bear on its truth. (Call this a benign Stockholm syndrome, if you like.)

Second, he argues that ‘even if iconicity is true for humans, it is implausible that it applies to *all possible* experiencers. In that case, iconicity cannot explain the *metaphysical necessity* of the laws of appearance’ (ibid.). If this is right, it is important to remember that unlike Pautz, I hold that the laws of appearance, even though necessarily true, must be restricted to creatures with perceptual systems like those of humans. At any rate, even without this restriction, it might be that what the laws of appearance reveal is that there are constraints on the vehicles of phenomenal representation for all possible experiencers. That is, they might reveal that there are necessary truths about the format in which phenomenal representation is realised.

Third, Pautz worries that we know that the laws of appearance hold ‘on the basis of *a priori* reflection on experience. This is hard to square with the idea that [they depend] on a speculative empirical claim about the subpersonal realizers of experience’ (ibid.). The basic worry here, I take it, is that it is odd that something knowable via reflection on experience is explained by or depends on something not knowable via reflection on experience. But the alleged oddity is not clear. It is plausible that there are at least some facts about experience knowable upon reflection. Some of these facts are even necessarily true (*e.g.* that experiences have phenomenal characters). And it is equally plausible that conscious experience systematically depends (in some way) on physical goings-on in the brain. These physical goings-on are *not*, however, knowable upon reflection. So it should be uncontroversial that at

least some facts about experience that are knowable upon reflection depend on facts that are not knowable via such reflection.

4.2 *Why this suggests internalism*

Setting Pautz's concerns aside, there are still aspects of the feature map proposal that require explanation. In particular, it would be helpful to have at least a preliminary understanding of what *exactly* the structure of a feature map is supposed to be. For although one might be tempted to say that a feature map has a spatial structure, *literal* spatial structure likely isn't the right candidate. Feature maps, at least in creatures like us, are realised by states of the brain. Though some of the spatial structure of perceived objects is preserved via literal spatial structure of sensory representations in the brain, not *all* spatial structure is. There are occasionally spatially discontinuous parts of the brain that represent spatially continuous parts of the environment (Wandell & Winawer 2011).¹¹ At any rate, literal spatial structure was never supposed to be the structure of a feature map. As Stephen Kosselyn points out when discussing how feature maps are realised in computers,

there is no physical matrix... inside a computer on which pictures are displayed; rather, cells in a hypothetical matrix are represented as entries in the machine's memory. The computer identifies these elements in a way that

¹¹ For early work on whether the spatial structure of perceived objects is retained via the structure of retinotopic maps in the brain, see Henschen (1893) and Inouye (1909).

results in their functioning as if they were arranged in a visual array. (1983:

23)

The rough idea is that feature maps have a sort of *as-if* spatial structure—a structure that functions as if it were spatially arranged in a certain way. The relevant structure is thus *functional*.

There are different possible ways of understanding this functional structure of such a map. But, arguably, in saying that a feature map functions as if it has a spatial structure, what we mean to say is that the system in which it is tokened *treats it as if* it has the relevant spatial structure. Here are two plausible (but oversimple) ways in which a system might do this:

- (a) The structure of a feature map is given by a function from ordered n -tuples of cells to processing times.
- (b) The structure of a feature map is given by a function from ordered n -tuples of cells to processing steps.

On both proposals, spatial distance is replaced by *functional* or *computational distance*. On proposal (a), the idea is that the ‘distance’ between (say) two cells is given by the amount of time that the system needs to process information from those two cells. For example, suppose a system operates on a given feature map such that the time it takes (or would take) to process the information contained in cells A1 and D39 is greater than the time it takes (or would take) to process information in cells A1 and A2. If so, A1 is ‘closer’ to A2 than it is to D39 in the relevant feature map. If we repeated these procedures for every n -tuple of cells in

the feature map (that is, if we had the domain and range of the relevant function) we would know the full structure of the map. (The same remarks hold *mutatis mutandis* for proposal (b).)

Though they are toy examples, something like proposal (a) or (b) provides a plausible explanation of the functional structure of a feature map. And, if so, what this means is that the structure of a feature map is in some way given by the computational power of the system in which the map is tokened. For this reason, the structure of the map is given by features that are *intrinsic* to the system—or, in our case, the intrinsic, computational power of the brain.

But this yields a striking result, namely, a version of *internalism about spatial experience*. In more detail: On the current proposal, the structure of the relevant feature maps determines which spatial properties our experiences phenomenally represent. And this structure is given by the amount of time or number of computational steps it would take the system in which they are tokened to process the information they encode. Hence, it is the computational power of the relevant system that determines the spatial properties that our experiences represent. By extension, it is the computational power of our brains—the systems in which the relevant feature maps are tokened in us—that determines which spatial properties our experiences phenomenally represent. This computational power is an intrinsic feature of our brains and does not constitutively depend on anything external to them. If right, then an experience's phenomenally representing spatial extension is not grounded in relations to

spatial properties out there in the external world. Instead, *it is grounded in an intrinsic feature of the subject of experience*, namely, the computational power of her brain.

This explanation is not one that a thoroughgoing tracking representationalist or phenomenal externalist can accept. For, on her view, which spatial properties are phenomenally represented by an experience is determined by relations that the experience bears to the environment. Yet, on the current proposal, they are determined by intrinsic features of the experiencing subject. And, to be clear, this is still a psychosemantic explanation of Berkeley's Law. I claim that the vehicles of phenomenal representation are structured, their structure is determined by intrinsic features of experiencing subjects, and this structure has a role to play in determining phenomenally-represented content. The way that the structure helps to determine the content is what explains Berkeley's Law. The story I give is thus a psychosemantic story *i.e.* a story about how a mental state gets its content. (Compare: If you ask why the sentence 'Doug is tall' represents that Doug is tall, part of the semantic story of how this sentence gets its content appeals to structural features (specifically syntactic features) of the sentence itself.)

4.3 Conclusion

A brief recap is in order. I started by noting that some experiences are not merely unimaginable but apparently impossible. This, in turn, suggests that there are laws of appearance *i.e.* in principle constraints on what experiences are possible for creatures like ourselves. I motivated and defended one such law—Berkeley's Law—that says it is

impossible for creatures like ourselves to experience colour without experiencing spatial extension. If representationalism is true, this means that creatures like ourselves cannot have experiences that phenomenally represent colour but not spatial extension. After addressing some potential worries, I described the case of Treeple to show that externalist varieties of representationalism have trouble accommodating Berkeley's Law. As a remedy, I suggested a different explanation on which the phenomenal representation of spatial extension is determined in part by the functional structure of the vehicles of phenomenal representation. Since this functional structure is determined by intrinsic features of subjects, it yields a modest version of internalism about the spatial content of experience.

I want to end by considering a way that an externalist (like the tracking representationalist) might try to interpret the feature map proposal so as to be consistent with her view. I have claimed that the functional structure of a feature map is determined by features intrinsic to the subject in which that map is tokened. But why not instead hold that the functional structure is determined by *extrinsic* features of a subject? For example, one might say that the functional location of a cell in a feature map is determined by the perceiver-relative location in the environment whose condition the cell has the function of indicating.¹² The view then proceeds by grounding representation of spatial extension in the location and content of symbols in the feature map. The structure of the map thereby plays a role in grounding the content of the map. However, this structure is itself externally-determined. No version of internalism follows.

¹² Thanks to an anonymous referee for this suggestion.

As someone with strong externalist leanings, I would like for such reinterpretation to work. However, there are *prima facie* difficulties. First, the view does not seem well-positioned to explain Berkeley's Law. It is not hard to construct a possible case similar to that of the Treple where all cells in a feature map tokened by a subject individually fail to have the biological function of indicating the condition of a location—they might merely have the function of indicating the *presence* of some feature, for instance. And if this is so, then the problem for tracking representationalism has not been solved. It has only been relocated.

Second, and I think more importantly, the sense in which a feature map has a functional spatial structure is that *the system in which it is tokened treats the map as if it has the relevant spatial structure*. It is hard to read the italicised phrase in an externalist-friendly way. Plausibly, how a system treats the representations it tokens consists in patterns of actual and counterfactual behaviour that are grounded in intrinsic features of the system itself. Thus, systems that are intrinsic duplicates of one another will also be duplicates with respect to how they treat token representations. And, from this, it will follow that the functional structure of a feature map is determined by intrinsic features of the brain, subject, or however it is that we choose to label the system in which the feature map is tokened.

As I said, I would welcome a variety of full-blooded tracking representationalism that accommodates Berkeley's Law. But until such a view can be fleshed out, my recommendation is that the representationalist should be cautious and, furthermore, flexible.

She must be willing to compromise on the externalism that has come to be so closely associated with her view.¹³

Works Cited

1. Baron-Cohen, S., MA Wyke, and C. Binnie (1987) 'Hearing Words and Seeing Colours: an Experimental Investigation of a Case of Synesthesia', *Perception*, 16/6: 761-7
2. Bealer, G. (1982) *Quality and Concept*, Oxford: Clarendon Press.
3. Berkeley, G. (1709) *An Essay Towards a New Theory of Vision*
<<https://www.maths.tcd.ie/~dwilkins/Berkeley/Vision/1709A/Vision.pdf>>
accessed 28 May 2022.
4. Block, N. (2014) 'Seeing-as in the Light of Vision Science', *Philosophy and Phenomenological Research*, 89/3: 560–72.
5. Burge, T. (2014a) 'Reply to Rescorla and Peacocke: Perceptual Content in Light of Perceptual Constancies and Biological Constraints', *Philosophy and Phenomenological Research*, 88/2: 485–501

¹³ Thanks to Lance Balthazar, Bryce Dalbey, Chelsey Deisher, Michelle Montague, Adam Pautz, Ian Proops, Brad Saad, Mark Sainsbury, and Michael Tye for feedback that shaped this paper and distant ancestors of this paper. Thanks also to three anonymous referees for generous comments.

6. ——— (2014b) 'Reply to Block: Adaptation and the Upper Border of Perception', *Philosophy and Phenomenological Research*, 89/3: 573–83.
7. Campbell, J. (2012) 'Is Spatial Awareness Required for Object Perception?', in R. Baiasu, G. Bird & A. W. Moore (eds.) *Contemporary Kantian Metaphysics: New Essays on Space and Time*, 67-80. London: Palgrave Macmillan.
8. Carey, S. (2009) *The Origin of Concepts*, Oxford: Oxford University Press.
9. Crane, T. (2009) 'Is Perception a Propositional Attitude?', *The Philosophical Quarterly*, 59/236: 452-69.
10. Cutter, B. (2016) 'Color and Shape: a Plea for Equal Treatment', *Philosophers' Imprint*, 16/8: 1-11.
11. Cyotowic, R.E. and D.M. Eagleman. (2009) *Wednesday is Indigo Blue: Discovering the Brain of Synesthesia*, Cambridge: The MIT Press.
12. Lewis, D. (1986) *On the Plurality of Worlds*, Oxford: Blackwell Publishers.
13. Dretske, F. (1981) *Knowledge and the Flow of Information* Cambridge: The MIT Press.
14. ——— (1995) *Naturalizing the Mind*. Cambridge: The MIT Press.
15. ——— (2000) 'Differences That Make No Difference' in Perception, Knowledge, and Belief: Selected Essays: 138-177, Cambridge: Cambridge University Press.
16. ——— (2003) 'Experience as Representation', *Philosophical Issues*, 13: 67-82.
17. Forrest, P. (2005) 'Universals as Sense Data', *Philosophy and Phenomenological Research*, 71/3: 622-31.

18. Foster, J. (2000) *The Nature of Perception*, Oxford: Oxford University Press.
19. French, C. (2018) 'Balint's Syndrome, Object-Seeing, and Spatial Perception', *Mind & Language*, 33/3: 221-41.
20. Godfrey-Smith, P. (1994) 'A Modern History Theory of Functions', *Noûs*, 28/3: 344-62.
21. Greenberg, G. (2013) 'Beyond Resemblance', *Philosophical Review*, 122: 215-287.
22. Gregory, D. (2010) 'Pictures, Pictorial Contents and Vision', *The British Journal of Aesthetics*, 50/1: 15-32.
23. Henschen S.E. (1893) 'On the Visual Path and Centre', *Brain*, 16/1-2: 170–80.
24. Huemer, M. (2007) 'Compassionate Phenomenal Conservatism'. *Philosophy and Phenomenological Research*, 74/1: 30-55.
25. Inouye, T. (1909) *Die Sehstroungen bei Schussverietzungen der kortikalen Sehsphare*, Leipzig, Germany.
26. Johnston, M. (2004) 'The Obscure Object of Hallucination', *Philosophical Studies*, 120: 113-83.
27. ——— ms. *The Manifest*.
<http://www.nyu.edu/gsas/dept/philo/courses/consciousness97/papers/johnston/chap7.html>> accessed 28 May 2022.

28. Kosselyn, S. (1983). *Ghosts in the Mind's Machine: Creating and Using Images in the Brain*. New York: Norton.
29. Lycan, W. (1996) *Consciousness and Experience*, Cambridge: The MIT Press.
30. Macpherson, F. (2011) 'Individuating the Senses' in Fiona Macpherson (ed.) *The Senses: Classic and Contemporary Philosophical Perspectives*, 3-43. Oxford: Oxford University Press.
31. Masrour, F. (2016) 'Space Perception, Visual Dissonance and the Fate of Standard Representationalism', *Noûs*, 51/3: 565-93.
32. McGinn, C. (1983) *The Subjective View: Secondary Qualities and Indexical Thoughts*. Oxford: Oxford University Press.
33. McNaughton, D. (1984) 'McGinn on Experience of Primary and Secondary Qualities', *Analysis*, 44: 78-80.
34. Morgan, J.B. (2018) *Three Essays on the Nature of Consciousness*. Doctoral Dissertation, The University of Texas at Austin.
<https://repositories.lib.utexas.edu/bitstream/handle/2152/67978/MORGAN-DISSERTATION-2018.pdf?sequence=1> accessed 28 May 2022.
35. Papineau, D. (2013) Against Representationalism. *Proceedings of the Aristotelian Society* vol. CXIV. 1. 1-30.
36. Pautz, A. (2007) 'Intentionalism and Perceptual Presence', *Philosophical Perspectives*, 21/1: 495-541.

37. ———(2016) ‘Experiences are Representations: an Empirical Argument’ in Bence Nanay (ed.) *Current Controversies in the Philosophy of Perception*, 23-42. New York: Routledge.
38. ——— (2017) ‘The Perceptual Representation of Objects and Natural Kinds: comments on Speaks’, *Philosophy and Phenomenological Research*, 95/ 2: 470-7.
39. ———(2020) ‘The Puzzle of the Laws of Appearance’, *Philosophical Issues*, 30/1: 257-72.
40. Quilty-Dunn, J. (2020) ‘Perceptual Pluralism’, *Noûs*, 54/4: 807-38.
41. Robertson, L.C. (2004) *Space, Objects, Minds and Brains*. East Sussex: Psychology Press.
42. Robertson, L., A. Treisman, S. Friedman-Hill, & M. Grabowecky (1997). ‘The Interaction of Spatial and Object Pathways: Evidence from Balint's syndrome’, *The Journal of Cognitive Neuroscience* 9/3: 295–317.
43. Schwitzgebel, E. (2008) ‘The Unreliability of Naive Introspection’, *Philosophical Review*, 117: 245-273.
44. Speaks, J. (2017) ‘Reply to Critics’, *Philosophy and Phenomenological Research*, 95/2: 492–506.
45. Thau, M. (2002) *Consciousness and Cognition*, Oxford: Oxford University Press.
46. Tye, M. (1991) *The Imagery Debate*, Cambridge, MA: MIT Press.

47. ———(1995) *Ten Problems of Consciousness: a Representational Theory of the Phenomenal Mind*, Cambridge: The MIT Press.
48. ———(2000) *Consciousness, Color, and Content*, Cambridge: The MIT Press.
49. ——— (2002) 'Representationalism and the Transparency of Experience', *Noûs*, 36/1: 137-151.
50. ———(2009) *Consciousness Revisited: Materialism without Phenomenal Concepts*, Cambridge: The MIT Press.
51. ———(2014) 'What is the Content of Hallucinatory Experience?' in Berit Brogaard (ed.) *Does Perception have Content?*, 291-308 Oxford: Oxford University press.
52. Wandell, B.A. & J. Winawer (2011) 'Imaging Retinotopic Maps in the Human Brain', *Vision Res.* 51/7: 718–37.