

DAVID M. ROSENTHAL

**THE COLORS AND SHAPES
OF VISUAL EXPERIENCES**

INTRODUCTORY

When we see a tomato in standard circumstances, we see something red and round. According to common sense, the red, round thing we see is the tomato itself. When we have a hallucinatory vision of a tomato, however, there may be present to us no red and round physical object. Still, we use the words 'red' and 'round' to describe that situation as well, this time applying them to the visual experience itself. We say that we have a red, round visual image, or a visual experience of a red disk, or some such. Because we see physical objects far more often than we hallucinate, we apply terms for color and shape to physical objects far more often than to visual experiences. Moreover, different theories of perception explain in different ways the applications such terms have to physical objects and to visual experiences. But whatever their frequency and explanation, it seems clear that both sorts of application occur.

What is not so obvious is how these two applications of terms for color and shape are related. Most theories seek to reduce one application to the other. Thus Descartes maintained that terms for shape apply strictly speaking only to physical objects, and Locke insisted that color terms apply only to ideas. Berkeley sensibly argued that color and visual shape¹ are inseparable, and notoriously went on to ascribe both properties to mental reality. Even Aristotle, that master of homonymy, argued that the properties of experiences are the same as those of physical objects; the perceiving subject literally comes, he thought, to have the qualities of perceived physical objects. Most contemporary writers treat these properties and the corresponding predicates in a similarly reductivist spirit. Some, like Roderick M. Chisholm and Colin McGinn, seek to explain the colors of physical objects in terms of whatever it is about those objects that causes experiences of color. Others, such as J. J. C. Smart and D. M. Armstrong, insist that such experiences are nothing more than the typical effects in us of colored physical objects.²

Despite the differences among them, these discussions have in common an unspoken assumption. They all hold that the terms for colors and shapes mean the same thing whether applied to physical objects or to visual experiences, and hence that each term attributes some single property to whatever it applies to. The most decisive way to establish that these terms mean the same when applied both to physical objects and visual experiences is to show that one of the two uses can be reduced to, or explained in terms of, the other. The reduced use would then be in principle eliminable. But, though the assumption of univocality plainly enjoys widespread acceptance, it is seldom articulated, much less defended.

In what follows, I shall argue that this widespread tacit assumption of univocality is unfounded, and leads to important and insuperable difficulties. Terms for color and shape must therefore mean different things when applied to physical objects and to visual experiences, and attribute distinct properties in the two cases. A similar result holds for words that ascribe other perceptible properties. The reductive efforts basic to many theories are accordingly misguided and futile.

Because univocality commonly functions as a unspoken background assumption, discussions of perceptible qualities seldom help much in evaluating the arguments that might support it. Frank Jackson's admirable book, *Perception* (1977),³ is a rare, and welcome, exception. In it, Jackson explicitly relies on univocality thesis in defending his own theory of perception, and he is at pains to argue that the words for colors and shapes, despite our using them to talk both about physical objects and about visual experiences, have a single meaning. These arguments, moreover, are developed with impressive care, clarity, and force; it is likely that Jackson's treatment represents as strong a case for the thesis as can be made. In evaluating the univocality assumption, therefore, it will be useful to make frequent reference to Jackson's discussion. The representational theory of perception in support of which he deploys those arguments will not be relevant here.

Section I presents Jackson's arguments, and shows that both his arguments and the univocality thesis they are meant to establish face insurmountable objections, and section II develops a defensible alternative account of the double use of these terms. Sections III and IV, then, trace certain difficulties that result from univocality, which the double-meaning treatment avoids. Section III focuses on the ontological status of visual experiences, and section IV takes up some issues about their consciousness.

1. UNIVOCALITY

One reason to believe that 'red' occurs univocally in describing both physical objects and our experiences of them derives from certain idioms we use to describe experiences. We can describe a visual experience of a tomato as being red. But we can equally well describe it as being an experience *of* red, or an experience *of* a red physical object. In this last case, 'red' modifies the phrase 'physical object', and that suggests that 'red' may be used here just as it is when we say that the tomato itself is red, apart from any concern with visual experiences. Saying that a visual experience is red is, moreover, just shorthand for saying that it is an experience of a red physical object. So one might conclude that 'red' in both cases is used with the very same meaning it has when it is used to characterize physical objects.⁴

But this argument backfires. No doubt 'red', in the phrase 'of a red physical object', does mean just what 'red' means when we say that a physical object is red. And saying of an experience that it is red is plainly the same as saying that it is *of* a red physical object. But this does not show that 'red' in the phrase 'red experience' means the same as in the phrase 'experience of a red physical object'. The predicates we apply to the experience are 'red' and 'of a red physical object'; so 'red' in 'red experience' must mean the same as the entire predicate, 'of a red physical object'. Similarly when we describe the experience with the phrase 'of red'. That, too, must mean the same as the predicate 'of a red physical object'.

This conclusion is reinforced by noting that the idioms we use to describe visual experiences have no place in talking about physical objects. We describe visual experiences equivalently as being of red or being of a red physical object. But it makes no sense to describe physical objects as being *of* red, or *of* a red physical object. Since 'red', as applied to a visual experience, means the same as the phrases 'of red' or 'of a red physical object', as also applied to the experience, 'red' here cannot mean the same as 'red' as applied to physical objects. Our idioms for describing visual experiences undermine, rather than support, the univocality thesis.

A visual experience's being red is the same as its being *of* a red physical object even if no relevant red physical object exists. Describing a visual experience as being of a red physical object is not describing a relation the experience stands in to some physical object; rather, it is describing the kind of experience it is. It is classifying the experience by reference to the various qualitative properties we use to differentiate among and sort our visual experiences.

Jackson's argument for univocality, however, makes no appeal to these observations about our idioms for describing visual experiences. Rather, it proceeds more straightforwardly, by way of an inference to the best explanation. As Jackson rightly stresses, it is a "striking fact" that our words both for colors and for spatial properties such as shape apply both to visual hallucinations and to physical objects (73). The best explanation of that striking fact, he argues, is that these words are used univocally in the two cases. The only alternative to univocality, Jackson insists, is that the relevant terms are "radically ambiguous" (139). But then their dual use, present in many languages, would be "a linguistic accident, a fantastic fluke" (73). But plainly the double use of these terms is no mere accident. Jackson concludes that the terms are used univocally. Univocality, he believes, is the only way to explain this double use.

This argument fares no better, however, than the argument based on ordinary idioms. If the terms for color and for visual shape meant wholly unrelated things when applied to physical objects and to visual experiences, we would indeed be unable to explain why the same words are used for both. But univocality is not the only alternative to radical ambiguity; so Jackson's argument fails to establish univocality. A third possibility is that the terms for color and visual shape have distinct but related meanings in their two uses. And if so, the relationship between the two meanings might well explain why we use the same words for the two applications.⁵ Univocality fails if the two meanings are distinct, but radical ambiguity is avoided if they are related. Jackson's argument for univocality trades on a false dichotomy.

Jackson nowhere explicitly discusses this third possibility. But he does advance arguments that make clear his belief that it is not a live option. Given standard perceptual circumstances, red physical objects cause red visual experiences. But it is well-known that we cannot systematically spell out what these standard perceptual circumstances are. So we cannot actually translate statements about red physical objects into statements about red visual experiences, nor conversely. Jackson convincingly rehearses the familiar difficulties such attempts at translation inevitably encounter.

When two terms have distinct but related meanings, it will often seem that we can analyze the meaning of one in terms of that of the other. And Jackson maintains that such analyzability obtains in every case where two terms have distinct but related meanings (74, 76-7, 91-6, 109-12). If he is right, the hypothesis of distinct but related meanings must fail, since we cannot analyze the meanings proper to one application in terms of the meanings proper to the other without a precise specification of standard

perceptual circumstances.

Here again Jackson's argument fails to canvass all the alternatives. Even if it is sometimes possible to capture the semantic relations between terms by describing precise analytic connections among them, that is plainly not always possible. One conspicuous exception has to do with cases in which we use a term in an extended way relative to its original use. When our use of terms results from an analogical extension of the original use, the extended use is typically semantically related to the original use, but it also resists any precise analysis in terms of that original use.

Consider 'flat', as applied to surfaces and to musical pitches. There is an obvious and useful analogy between flattening a surface and flattening a pitch, but one should not expect to be able to give a semantic analysis of the meaning of one use in terms of the other. Nor is 'flat' radically ambiguous as between these two uses. Though it is of course not necessary that the one term should have both applications, that it does is hardly "a linguistic accident, a fantastic fluke." Nor is this kind of case a rarity.

Indeed, much the same thing evidently occurs with the terms we use to describe our bodily sensations. When we apply words such as 'sharp' and 'burning' to pains, we use those words in an extended way relative to their use in characterizing physical objects. Sharp pains are those which typically result from sharp physical objects. Only typically, of course; we cannot precisely specify when such pains do and do not so result, any more than we can delineate precisely what standard perceptual circumstances are. Still, the connection is sufficiently robust for it to be natural to borrow the term 'sharp' to characterize the relevant class of bodily sensations. Similarly for characterizing pains as 'dull', 'burning', and the like. Though we cannot analyze one meaning in terms of the other, a semantic connection between the two plainly obtains.

This picture is equally natural when we apply terms for color and shape to visual experiences. We primarily characterize physical objects as 'red' and 'round'. But we apply those terms in an extended sense to the experiences that typically result from the physical objects and processes that we call red in the original sense. The semantic connection between the two meanings means that this double use is no linguistic accident, even though the semantic relation that holds is not the right sort to sustain analyses of one in terms of the other.

2. THE DOUBLE-MEANING THEORY

If terms such as 'red' and 'round' mean distinct things when applied to physical objects and to visual experiences, they will ascribe distinct properties in the two cases. The property a visual experience has of being red is the same as its being *of* a red physical object; so that property must be different from the redness of physical objects. As argued earlier, a visual experience's being *of* a red physical object is not a matter of the experience's standing in some relation to a physical object, but of its being of a certain kind. And that must involve its having some distinctive type of mental property.

It will be convenient to call the property of being red that physical objects exhibit *physical red*, and the property that visual experiences exhibit *mental red*. And more generally I shall refer to the sensory qualities of perceptual and bodily sensations as mental properties, and reserve the term 'physical property' for the corresponding perceptible properties of physical objects and processes.

Red physical objects normally cause visual experiences of red, but their doing so depends on such things as the constitution of our perceptual apparatus.⁶ So mental red has only a contingent connection to physical red. But the advocate of univocality may urge that this shows that 'red' is, as Jackson insists, radically ambiguous. If we attribute properties that are only contingently connected when we call physical objects and visual experiences red, perhaps the meanings of 'red' in the two cases are wholly unrelated.

One way to avoid this conclusion is to deny that physical objects are strictly speaking ever red; the only color properties, then, would be mental color properties. And if physical objects exhibit no color properties, 'red' and other color terms have only one application, and cannot have two meanings. This view seems to receive support from the post-Galilean idea that all physical objects are fully describable in mathematical terms, since colors, at least as common sense conceives them, cannot be captured mathematically. And it is arguable that we think physical objects have color properties only because they cause us to have experiences that have various mental colors. But we need not describe physical objects as colored to explain our visual experiences, since there are mathematically describable properties of physical objects that are necessary and sufficient to explain how the various experiences of color are caused.⁷

The standard response to this argument is to identify the commonsense colors of physical objects with certain well-known reflectance properties -- the properties they have of reflecting and emitting light.⁸ Jackson argues

against this identification, but his argument presupposes the univocality that is at issue here. Afterimages, he points out, have colors but cannot reflect or emit light. But this precludes our identifying physical color with reflectance properties only if the property of being red that physical objects have is the same as the property of being red that afterimages have -- only, that is, if 'red' is univocal.

It has been argued, for example by C. L. Hardin (1988, 1990), that color science itself shows that colors cannot be properties of physical objects and processes. This is supposed to follow from the necessity of typing color properties by reference to the constitution and functioning of a particular creature's visual apparatus. Hardin vividly illustrates this dependence on perceivers by appeal to the interesting phenomenon of metamerism (1990, pp. 555-562; 1988, pp. 78-80). But the need to refer to something other than physical objects to type color properties hardly shows that colors are not properties of those objects.⁹

It is worth noting that, on Jackson's construal, 'red' is univocal by default. Statements such as 'The tomato is red' are not literally false on his view; it is just that, contrary to initial appearances, they do not ascribe to any physical object the property of being red. Rather, they attribute redness to the mental sense data that normally result from the physical object under consideration. Because 'red' attributes no property whatever to physical objects, it is univocal by default. We only appear to attribute redness to physical objects, much as some have maintained that we only appear to attribute truth to sentences, in virtue of their having suitable relations to statements or propositions.

There are more constraints, however, on the kind of account we can give of spatial terms, such as those which attribute size and shape. It is plain that physical objects have shape and size. So if terms for shape and size are univocal, either they do not literally apply to visual experiences at all or they mean the same for both physical objects and experiences.

Jackson opts for the latter alternative. Indeed, his view about spatial predicates is strikingly uncompromising. Not only does he hold that predicates for shape and size ascribe to visual experiences the very properties they ascribe to physical objects; Jackson insists that visual experiences also have spatial location in exactly the way physical objects do. If an afterimage appears to be three inches square and ten feet away, then according to Jackson it actually is three inches square and ten feet away, in just the way a physical object might be.

Univocality forces Jackson's hand here. We describe the redness of a

visual sensation in terms of the expanse that this mental color occupies, and this expanse must be specified in spatial terms. So if visual experiences are to have color properties at all, they must also have spatial properties of some sort. Moreover, we must be able to correlate visual experiences with the relevant physical objects; so the two must have properties that enable us to do so. On Jackson's view, colors cannot sustain these correlations, since physical objects have no color properties. So only spatial properties are available to do the job. If spatial terms are univocal, therefore, the spatial properties of visual experiences must be the same as those of physical objects.

As just noted, Jackson's view about spatial predicates is most extravagant in connection with the spatial location of visual experiences.¹⁰ Again, univocality is responsible. The spatial location of physical objects cannot be determined independently of their size and shape. So if afterimages have the very same properties of size and shape as those of physical objects those

mental shape exhibited by visual experiences. Indeed, such interconnections among properties are typically the basis for sorting them into families in the first place.

So we need not try to find correlations between the properties in two families singly, color by color or shape by shape. We need not look for similarities between each individual property in one family and its counterpart in the other. We can, instead, compare individual properties in two families by reference to the place they occupy in the rich interconnections that the members of those families exhibit. It may be that the entire family of properties correspond, by virtue of relations that hold among its members, to a distinct family of properties whose members are similarly related, each to the others.

This is so for the case of mental and physical color properties. The entire family of mental color properties corresponds, by virtue of relations among its members, to the entire family of physical color properties. And this wholesale correspondence between the families of mental and physical colors underlies our systematic double use of color terms.

Consider, for example, the relation between physical red and blue, and that between the mental red and blue. The similarities and differences between the pair of physical properties parallel the similarities and differences between the mental properties. So just as physical red is qualitatively closer to physical orange than either physical property is to physical blue, the same is true of the mental red, blue, and orange that characterize our visual experiences. A host of other such relations characterize both physical colors and the corresponding mental color properties. It is in terms of these sorts of relations that we can specify the character of both mental and physical colors.

Accordingly, we can avoid the extremes both of univocality and radical ambiguity. And given that univocality does not hold, it is open for us to identify physical colors with suitable light-reflecting and -emitting properties. Mental colors, then, are just the introspectible mental counterparts of those physical color properties.

These same considerations apply also to terms for spatial properties. The property of physical roundness itself has nothing in common with the property in virtue of which we describe visual experiences as round. But the relations mental roundness bears to other properties of mental shape parallel the relations physical roundness bears to other members of the family of physical shapes. The mental roundness and triangularity of visual sensations resemble and differ from each other in ways that are homomorphic to the relations that hold between the roundness and triangularity of physical objects. Similarly with the mental sizes exhibited by visual experiences, and their physical

counterparts. Moreover, these mental analogues of physical size and shape enable us to assign mental location to our visual sensations. And the relations among the mental locations enable us, in turn, to describe those sensations as belonging to a single visual field.

Distinguishing physical and mental spatial properties is just what we needed to avoid the extravagant conclusion about assigning physical location to visual experiences. Because the mental colors of visual experiences have spatial boundaries, such experiences must have spatial properties of some sort. Indeed, how could the mental colors of visual experiences be bounded except by properties that are the mental counterparts of physical size and shape? By attributing to visual experiences mental properties of size, shape, and location, we avoid the unintuitive results implied by univocality.

Similar remarks hold for the mental and physical properties that pertain to the other sensory modalities.¹¹ Indeed, homomorphisms between mental and physical properties holds not only in the case of the various perceptual sensations, but for the properties characteristic of bodily sensations as well. The properties pains have when they are dull, stabbing, burning, or sharp bear relations to one another that parallel the relations among the corresponding physical objects and processes. Dull, sharp, and stabbing pains resemble and differ from one another in ways that reflect the similarities and differences among dull, sharp, and stabbing physical objects. Thus piercing and stabbing pains are both species of sharp pains, and they typically result from piercing and stabbing physical objects or processes. Similarly, throbbing and pounding pains are species of dull pains.

Paul A. Boghossian and J. David Velleman have argued that, because the kind of account just sketched implies that knowing what each color is requires knowing that color's relations to all the other colors, it "get[s] the epistemology of color wrong" (1991, p. 104). Thus they maintain that "someone who has seen both red and orange still does not have the experiences of either color that, by themselves, would ground knowledge about the other" (1991, 104, n. 37). But knowing what an individual color is requires more than just experiencing it; it requires experiencing it as distinct from the other colors. And this cannot happen without one's taking note, however tacitly, of the relations between them. What matters is not just seeing each color, but seeing it as distinct with respect to the other. Similarly for the colors in general.

Boghossian and Velleman also argue (1991, 104, n. 37) that this kind of account does not allow for the possibility of discovering that distinct colors are related in their characteristic ways within color space. But, as is often the case, such discoveries do not, for the most part, represent knowledge

that is new to the subject. Rather, they consist in making conscious and systematic various relations among the colors that one already knew, but had not explicitly and consciously taken note of.¹²

Jackson seeks to mute the unintuitive character of the view about the spatial location of visual experiences by reference to the way we locate pains. We do not hesitate to locate a pain spatially as being, for example, in somebody's foot (77-81), and we even locate pains in phantom limbs, wholly outside the body. If mental objects such as pains can be spatially located in physical space, why not mental objects such as afterimages? (103) But when we locate pains in the foot, the properties we attribute to the pain is mental location, not physical location. We describe the pain as being of a certain sort; it is more similar, in respect of location, to pains that we describe as being in the ankle than to those we describe as being in the arm. So pains in phantom limbs pose no problem; they are simply pains that feel a certain way in respect of location. Only adherence to the univocality thesis would lead one to think otherwise.

At the end of section I, I noted that words like 'burning' have distinct but related meanings as applied to pains and physical objects. Surprisingly, Jackson concedes this. But, despite his accepting the analogy between the spatial properties of pains and visual experiences, he denies that color words follow the model of words like 'burning'. "[O]ne does not know," he claims, "what is meant if someone says something is burning unless one knows whether the something is mental or physical." By contrast, "I know precisely what I mean by saying that I am seeing a bright yellow flash, even [if] I do not know whether the flash is a light flash or a hallucination" (76). But what I mean here hinges on what I believe. If I think there is a physical flash, I may mean to say that it is yellow; if I am unsure, I will mean to describe as yellow only my visual sensation. If you do not know which I believe, you may not know what I mean. Jackson's argument that color words behave differently from words such as 'sharp' and 'stabbing' trades not on some fact about our use of color words, but on the familiar epistemological asymmetry between first- and third-person ascriptions.

3. ONTOLOGICAL CONSIDERATIONS

The mental items to which the various mental properties belong are bodily and perceptual sensations. Traditionally there are two ways to conceive of such items: as mental states or as mental objects. The phrase 'mental state'

has come to dominate discussion in the contemporary literature, but there are those who still favor a mental-object conception. Indeed, some see it as the only alternative to the so-called adverbial theory, on which a person's having a red sensation consists in that person's sensing in a distinctive way.

What is the difference between these two conceptions? To conceive of sensations as mental objects is, intuitively, to suppose that they exist independently in a way that mental states do not. Mental states depend for their existence on the objects of which they are states, presumably sentient beings. By contrast, mental objects, for example, mental sense data, are thought to exist independently of sentient beings. If sensations are mental objects, they literally stand in some relation to certain sentient beings, whereas if they are mental states, they are instead just states of those beings.

It matters which way we construe visual experiences because univocality is far more plausible, both intuitively and theoretically, if sensations are mental objects than if they are mental states. Mental states plainly cannot have the very same properties of being red and round that physical objects have. Physical objects have color, size, and shape by virtue of having physical surfaces and volume. But states of things do not have physical surfaces. So it is antecedently implausible that they could have the very same properties of color, size, and shape as those of physical objects. And this is independent of whether the states are mental states; not even bodily states are the sorts of things that could have physical color, size, and shape.

But this difficulty does not arise if we construe sensations as mental objects. On that conception, sensations are a certain kind of object. So they are on a par ontologically with sentient beings and other independently existing objects. So it seems open that sensations might have the very same properties that other objects exhibit, including the properties of physical objects. And if it is open for sensations to have the very same properties as physical objects, perhaps they share with them the properties of color, size, and shape. Univocality has far more credibility if the terms for color and shape apply to mental objects of some sort, rather than mental states.

This point can be put more abstractly. If mental objects exist, then whatever their nature they doubtless differ in important ways from physical objects. But mental states must differ in at least one additional way. States are ways that objects are. Objects can bear relations to other objects, and they can be *in* various states; but they cannot be *in* other objects the way they are in states. Since objects are characterized in part by the states they are in, states are ontologically on a par with properties of objects. So mental states are the wrong type of thing to share properties with physical objects, at least

nontrivial properties -- properties other than being self-identical and the like. No such difficulty arises with mental objects.

Jackson himself never takes note of these differences between construing sensations as mental objects and construing them as mental states, nor of the advantage that construing them as mental objects has for defending univocality. Indeed, though he heatedly argues for a theory cast in terms of mental objects, he also sometimes claims that the distinction between mental states and objects is idle (e.g., 57; but see 73-4).

There is an interesting difference in usage between the way we describe afterimages and the way we describe other sorts of visual experience. Whereas we describe afterimages by saying straight-out that they are red and round, we tend not to describe other visual experiences that way; rather, we describe them as being *of* something red and round, or *of* a red disk. The advocate of univocality might insist that this shows that afterimages, at least, are mental objects. Perhaps, then, when we describe other visual experiences as being *of* something red and round, we are simply saying they bear a relation to some such mental object.

But we describe afterimages differently from other visual experiences not because afterimages are mental objects, but because they are obvious cases of hallucinations. When we have an afterimage, we know full well it is not a case of our seeing some physical object. So we describe it using the terms we would have applied to the physical object, for example, by saying it is red and round. On the other hand, when we take a visual experience to be the result of a corresponding physical object, or we think that it may be, we signal our belief that some red, round physical object may be involved by saying, instead, that our experience is *of* something red and round. The 'of' in such locutions does indeed pertain to an object. But the object it pertains to is not a mental object, but a physical object. In the cases of afterimages, when we want to direct attention to the intrinsic quality of the experience rather than the presumed character of the physical object, we revert to describing the experience straightout as being red and round.

As noted in section I, this does not mean that describing a visual experience as *of* something red and round means that we are attributing to it physical color and shape. Even though 'red' and 'round' have their physical meaning in the phrase 'experience of something red and round', that phrase as a whole ascribes not those physical properties, but the corresponding mental properties. We are not, in this case, applying the predicates 'red' and 'round' to the experience, but the predicate 'of something red and round'.

Construing visual sensations as mental objects is far more hospitable to

the univocality thesis than construing them as mental states. But mental objects face an important difficulty that a construal in terms of mental states avoids. The nature of visual experiences depends in large part on the nature of the visual apparatus of the relevant perceiver. Creatures that are differently constituted have correspondingly different sorts of experiences.¹³ This is the theoretical basis for construing visual experiences as dependent on perceivers. Visual experiences can exist only as the experiences of particular perceivers.

Theories that proceed in terms of mental states reflect this important dependence, since the existence and nature of states are dependent on the existence and nature of the things that are in those states. Mental objects, by contrast, lack this dependence on creatures.¹⁴ Any theory of perception must somehow explain how and why the nature of perceptual experiences varies with the nature of the perceiver. That variation is central to the way the various types of physical object cause the types of visual experience they do, and thus to any satisfactory correlation of our experiences of physical objects with the objects themselves. So a theory that construes sensations as ontologically independent mental objects increases the difficulty in giving a satisfying explanation of why those correlations should hold.

This difficulty about mental objects parallels that noted earlier about univocality itself. If color terms apply both to physical objects and visual experiences, they cannot attribute the same properties to both. So if color terms are univocal, it must be that they do not apply to both physical objects and visual experiences. So if color terms are univocal, we must appeal to spatial properties to correlate visual experiences with physical objects, and spatial terms must accordingly apply to both. But, if spatial terms are also univocal, they ascribe to visual experiences the very same spatial properties that physical objects have. Visual experiences will not only be extended in three spatial dimensions, but will often have physical locations outside the perceivers.

Mental objects are independent of perceivers. So, if visual sensations are mental objects, assigning physical location to them will seem less bizarre than if they are mental states. But this independence of perceivers incurs a heavy intuitive and theoretical price. And there is little reason, if any, to construe perceptions as mental objects apart from the attempt to sustain the thesis of univocality.¹⁵

What temptation there may be to think that the contents of our visual field exhibit physical spatial relations, there is none to locate the entire field itself in physical space. Indeed, so locating it seems manifestly impossible. And if we cannot attribute physical properties to the visual field itself, we

can accommodate the use of spatial predicates to describe the contents of that field only if those predicates ascribe mental analogues of physical spatial properties, rather than the physical properties themselves. It is incoherent to posit physical spatial relations within a perceptual field that cannot itself be assigned such properties. Indeed, it is just such a mysterious phenomenal space which writers as diverse as Jackson and Daniel C. Dennett rightly ridicule.¹⁶

Univocality may seem inviting as a way to explain not only why we use spatial and color terms to characterize both physical objects and visual experiences, but also how we can correlate visual experiences with corresponding physical objects. But univocality can help only if physical objects have the same color properties as visual experiences, or visual experiences have the same spatial properties as physical objects. Both are strikingly implausible. Moreover, an account based on univocality, by treating color and shape differently, sacrifices uniformity suggested by correlations between the colors and shapes of visual experiences.

And univocality is unnecessary. We can rely instead on the structural homomorphisms that hold between families of properties of physical objects and families of properties of visual experiences. The distinguishing properties of visual sensations will then have ranges of properties that resemble and differ from one another in ways homomorphic to the resemblances and differences among the color and spatial properties of physical objects. We will associate a sensation with a particular type of physical object just in case the mental properties of the sensation vary with the corresponding properties of the physical object. This is just what is needed to explain how the nature of sensory qualities varies with the character of a creature's perceptual apparatus. And relinquishing univocality allows a uniform treatment of the two families of properties.

An advocate of univocality might urge that seeing the properties of mental states are mere analogues of their physical counterparts results in a problem about how we can come to know about physical reality. But that concern is unfounded. Whether the properties of our sensory experiences are the same as those of physical objects or just analogues of them, we come to know about physical reality by inferring to the best explanation of our sensory experiences.¹⁷

The univocality theorist might also object that, absent a detailed explanation of mental properties, no serious account other than univocality is available. But there is no reason to doubt that a fuller account of such properties will be forthcoming. By contrast, the difficulties facing univocality seem

insurmountable. Ascribing to visual experiences the very same spatial properties that physical objects exhibit results in the puzzling extravagances of mental objects. And the univocality of spatial predicates fails to achieve the very explanatory goals that motivated it. Univocality is the unexamined dogma of modern perceptual theory.

4. CONSCIOUSNESS AND MENTAL PROPERTIES

Just as perception tells us what perceptible properties physical objects have, so consciousness informs us about the mental properties of our sensations. We come to know, in the first instance, what mental qualities our sensations have coming to know what it's like to have those sensations. And there being something it's like to have a sensation is the same as that sensation's being conscious.¹⁸

The way we come to know what properties something has is often not a reliable guide to the nature of those properties. Although perception, for example, tells us what colors things have, it does not tell what the nature is of those physical colors. Physics is plainly far more accurate about the nature of those properties.

It is tempting, however, to think that consciousness is an exception to this rule. It seems to many that consciousness is not only our best source of knowledge about what mental properties are present, but also about what the nature of those properties is. Knowing what a visual experience is like seems not to be just one way to tell whether that experience has the mental quality of red or blue, but the only way to tell. If so, perhaps our sole grasp of the nature of such mental properties must come from our knowing what it is like to have sensations that exhibit those properties.

Seeing consciousness as our sole source of knowledge about the nature of these mental qualities encourages the idea that those qualities cannot occur except consciously. Why else would we be unable to learn about mental properties except by way of consciousness? This idea may seem tempting independently of how we know about sensory quality. For it may seem utterly mysterious what a mental state's having sensory character could amount to if one is not conscious of that quality. Perhaps, indeed, the very notion of a nonconscious qualitative state, if not an outright contradiction is nonetheless incoherent in some way. Consciousness is like a mental light, in the absence of which sensory qualities cannot exist.¹⁹ In the sensory realm, to be is to be conscious; here, if nowhere else, *esse is percipi*.

Sensory qualities are often regarded as by far the most difficult mental phenomenon to explain. This is not simply because such properties seem recalcitrant to physicalist explanation. Regardless of whether physicalism is so, it seems difficult to give any informative account of just what kind of property sensory quality is.

But much of this apparent mystery about the nature of sensory qualities is due to the idea that consciousness is essential to them. What seems intractable about sensory quality is the face it presents to consciousness -- what the sensation is like for somebody who has it. And if the only way to understand mental quality is by way of what it is like for somebody to experience it, this sense of mystery about sensory qualities may be impossible to dispel.

I have argued elsewhere that an informative explanation of consciousness is possible only if the property of a state's being conscious is independent of its characteristic intentional or sensory properties.²⁰ The same holds for sensory quality. Only if a sensation's being conscious and its having sensory quality are independent properties can we explain what it is for a state to have sensory quality.

The idea that consciousness is intrinsic to sensory quality, and the attendant mystery about sensory quality, are often both seen as being too obvious to need supporting argument and too basic to allow for any. But it has not been noted that the plausibility of these ideas depends on the assumption that our words for colors, shapes, and other perceptible properties are univocal.

Take color. If 'red' is univocal, it must apply primarily to a mental property of visual sensations or to a perceptible property of physical objects. It will apply to the other only derivatively. Thus, if 'red' applied primarily to a mental property, it would apply only to physical objects that are correlated, in some independent way, with red visual experiences. And if it applied primarily to physical objects, it would apply obliquely to sensory states that are independently correlated with red physical objects.

Both alternatives greatly constrain our ability to give any useful account of what a visual experience's being red amounts to. It is unlikely that, if 'red' applied directly to physical objects and is applied to visual experiences only insofar as those experiences are independently correlated with red physical objects, we can arrive at any robust understanding of what property, if any, those visual experiences have in common.²¹

For this reason, most theorists who hold the univocality thesis join Jackson in opting for the first alternative. But this is scarcely better. If 'red' is univocal and applies primarily to sensations, we will understand what it is for physical

objects to be red solely in terms of their having causal connections with red sensations. A tomato's being red will just be a matter of its having a certain causal tie to mental red. But then we will be unable to learn about the nature of mental red from any connections it has to anything nonmental. Any knowledge we have about the nature and character of mental colors will come solely from their connections to each other, and to other mental phenomena.

But we have mental access to mental properties only from knowing what it is like to have sensations that have those properties. And this depends on the sensations' being conscious. Since consciousness alone could reveal the nature of mental qualities, it is tempting to infer that those qualities never occur unless the relevant mental states are conscious. The mystery about the nature of mental quality is then unavoidable.

Once we reject univocality, however, this picture is no longer motivated. We will then construe the characteristic mental properties of visual sensations as belonging to families of properties that pertain to color, visual shape, sound, and so forth. The mental qualities of sensations exhibit characteristic relations that are homomorphic to the relations that hold among corresponding perceptible properties of physical objects, and we will use these homomorphisms to understand the nature of the mental qualities. In this way we can know such things as that mental red resembles the mental orange more than either resembles the mental green or blue.

Similar remarks hold for the qualities special to other perceptual modalities, and the mental qualities of pains and other bodily sensations. For each mental quality there will be a host of relations to other qualities that are characteristic of it, and thus tell us about its nature. And, since knowing what it's like to have an experience is not the only way to understand the nature and character of its mental qualities, the mystery that seems to surround such qualities is dispelled.

Our knowledge of mental colors will not depend solely on our introspectively knowing what it's like to experience them. We can, in addition, appeal to the ways the various pigments and colored lights behave, which help determine the commonsense space of physical colors. Again, the situation is similar for the other sensory modalities. The interactions among the properties of the physical objects and processes we perceive by each modality tell us about the relations among the corresponding properties of our perceptual experiences.

Nor is the understanding of mental qualities we get from these homomorphisms restricted to the relational properties of those qualities. The set of similarities and differences that hold among the qualities that belong to

a particular sensory modality serve to characterize that modality. And within each modality, the similarity and difference relations characteristic of each mental quality fix what is distinctive of that quality. These relations provide an understanding of the nature of the various individual qualities.²²

We come to know about both the physical colors of physical objects and the mental red and green of our sensations by having those sensations. But having the sensations figures in different ways in our coming to have the two kinds of knowledge. We come to know about physical red and green because our sensations lead to beliefs about colored objects, whereas we come to know about mental red and green by becoming conscious of the sensations themselves.

Knowledge of the sensations largely duplicates our knowledge of physical colors, but not completely. They diverge, for example, in color constancy effects. When we see an object that we take to be uniformly colored, we see a single, uniform color, even when a shadow is cast over part of the object. But if we use a reduction screen, such as a rolled-up piece of paper, to view a small area of the object that includes both direct illumination and shadow, we immediately become aware of a difference in color. We can explain this by supposing that in the first case we are aware of the color of the object itself, which we take to be uniform. The reduction screen, by concealing all but a small area of color, makes us focus instead on our visual experience itself, with its distinct color qualities.²³

Rejecting univocality not only relieves us from thinking that we must rely on consciousness to learn about the nature of mental quality; it also helps show that mental states need not be conscious to have sensory quality. Sensory qualities are those properties in virtue of which we distinguish among our sensations -- the properties in virtue of which sensory states resemble and differ from one another in respect of sensory content. We can accurately capture these differences on the basis of the homomorphisms sketched above, with no reference to whether or not the sensory states are conscious.

Consciousness is therefore irrelevant for an informative account of sensory quality. The distinguishing sensory properties of sensations resemble and differ from one another in just the same ways, whether or not the sensations are conscious. It is just that when the sensations are not conscious, we have no characteristically first-person access to them or to their distinguishing properties. There is, in those cases, nothing it's like for us to have those sensations. Only by treating the sensory qualities of sensations as independent of consciousness can we develop an informative account of those qualities.

Similarity and difference relations cannot, of course, tell us what it is like

to experience a particular quality. There being something it's like to experience a quality depends on the relevant sensation's being conscious. And its being conscious is something over and above its having the mental quality characterized by such relations. So a blind person cannot understand what it's like to experience visual mental qualities. But even though these relations cannot tell us what it is *like* to experience a mental quality, they tell us much about what it *is* for a state to have such qualities. Thus we understand what it is for sensory states to be mentally red by knowing the relations between mental red and the other mental color properties.

Our grasp of the similarities and differences among physical color properties is cast in terms of our commonsense conception of such properties. Similarly with other perceptible properties of physical objects. So the parallels between mental and physical color properties and the properties special to other sensory modalities will rely, in the first instance, on physical properties as conceived by common sense. To this extent, we are taking commonsense perceptible properties at face value. This should not be surprising, since we have no conception of mental qualities except in commonsense terms.

This does not, of course, preclude our coming to understand physical color properties in terms of physical science, and mental colors in terms of neuropsychology. We can readily identify physical colors, conceived in commonsense terms, with the tendency of physical objects to emit photons in particular ratios of wavelengths, and identify mental colors with suitably described neural functioning. And we can describe a wavelength-mixture space that corresponds to the space of physical colors, as conceived by common sense. Some distortion of the space may be necessary; as Austen Clark notes (1993, p. 126), “[t]o map wavelength mixture space into the psychological colour solid, some segments need to be lengthened or shortened.” With other sensory modalities, homomorphisms may no longer hold at all between the commonsense space of mental qualities and the space of physical properties described in scientific terms. We can expect things to be even worse when we substitute neural properties for commonsense mental qualities. Still, as long as homomorphisms hold between families of commonsense mental and physical properties, they will enable us to develop informative accounts of both.

In conclusion, a theory that relies on these homomorphisms gives us the resources we need for a satisfactory theory of sensory and perceptible properties. It also resolves troubling issues about mental objects and mental states. And by helping to break the tie between sensory quality and consciousness, it dispels the sense of mystery surrounding the nature of

mental qualities. It is reasonable to assume, therefore, that progress toward an acceptable theory of the mental properties involved in perception will build on this understanding of the relation between the families of mental and physical properties.²⁴

David M. Rosenthal

Philosophy and Cognitive Science

City University of New York, Graduate School

NOTES

¹ I.e., shape as it is seen, rather than as sensed by some other sensory modality, e.g., touch.

² Descartes (1941), Meditation VI; Locke (1700, III, iv, 16); Berkeley (1713, I, 10) (cf. Hume [1739, I, iv, 4]); Aristotle (1907), B5, 417b2-418a6 and r2, 425b-19-25; Chisholm (1957, ch. 4); McGinn (1983, esp. chs. 2 and 8); Smart (1963, chs. 4 and 5); Armstrong (1980, ch. 3, p. 28 and chs. 7, 8, and 9).

³ When not otherwise indicated, parenthesized references are to this book.

⁴ Thus John R. Searle insists that “[r]edness is not part of my visual experience . . . ; the experience is *of* something red, but is not itself a red experience” (1983, p. 131).

⁵ This kind of possibility has been usefully explored by Wilfrid Sellars (1960) and (1963), and Christopher Peacocke (1983) and (1984).

⁶ For useful remarks on the connection between the two types of property for various sensory modalities, see Austen Clark (1993, pp. 124-130).

⁷ It has not been noted that this type of reasoning is an important part of what underlies the inviting idea that sensory states cannot occur without being conscious. On this picture, sensory qualities are in effect relocated versions of the commonsense qualities we *consciously* perceive physical objects as having. So on this relocation story, consciousness is actually built into the very way we conceive of sensory qualities. Indeed, the familiar metaphor of consciousness as a mental light without which our sensory qualities would not exist makes little sense unless we conceive of them this way. For more on this conception and its avoidability, see David M. Rosenthal (forthcoming).

⁸ See, e.g., Smart (1963, chs. 4 and 5); Armstrong (1980, chs. 7, 8, and 9).

This is not to say that our commonsense concept of physical color is the concept of a light-reflecting property, any more than our commonsense concept of heat, e.g., is the concept of mean molecular kinetic energy. Rather, in both cases we identify the properties to which our commonsense concept applies with suitable properties described in terms of physics.

⁹ Cf. Evan Thompson (1995, pp. 242-243), who points out that such perceiver-relativity fails to preclude a view on which color is a relational property of physical objects. Hardin also urges that the organization of colors into “an opponent unitary-binary

structure . . . that [has] no counterpart in the world of color-relevant extradermal physical processes” shows that color properties cannot be properties of physical objects and processes (1991, p. 61); see also (1990, pp. 563-564) and (1988, ch. 2). But the opponent structure Hardin appeals to is less well-established scientifically than Hardin claims, and also less obvious phenomenologically (see, e.g., Davida Y. Teller [1991, pp. 51-53]).

For an excellent account of metamerism, see Clark (1993, pp. 38ff.). For arguments similar to Hardin’s, see James A. McGilvray (1994).

¹⁰ And commentators have focused on this. See, e.g., A. Olding (1980, pp. 158-162).

¹¹ The ideas that animate double-meaning theory have useful historical antecedents. Berkeley (1710, §158), e.g., wrote that at least some of our words for sensible qualities are ambiguous. Thus, he held, ‘plane’ and ‘solid’ apply primarily to the immediate objects of touch, and only derivatively to the objects of sight. Berkeley sometimes seems even to claim that such terms are radically ambiguous. Thus he writes that the visual and tactile objects to which we apply these terms are “of a nature intirly different.” But he also insisted that planes and solids are both “equally suggested by the immediate objects of sight, [and] accordingly are themselves denominated plains and solids.” (I am grateful to Robert Schwartz for this reference).

Reid (1785, II, xvi, p. 243) too claimed that, when I smell a rose, “the sensation I feel, and the quality in the rose which I perceive, are both called by the same name . . .; so that this name has two meanings.” And “[a]ll the names we have for smells, tastes, sounds, and for the various degrees of heat and cold, have a like ambiguity They signify both a sensation, and a quality [in physical objects] perceived by means of that sensation” (1785, p. 244).

And G. E. Moore insisted that all words for sensible qualities are “each used in two very different senses” to refer to perceptible properties of physical objects and to the qualities of sensory experiences (1942, p. 657); see also (1942, pp. 655-8).

¹² If the mental colors and shapes of visual experiences are relational properties, we would be introspectively aware only of the intentional and relational properties those experiences have. Gilbert Harman (1990) also argues, as part of a defense of functionalism, that we are introspectively aware of no properties of experiences except their intentional and relational properties. Harman concludes that we are never aware of qualities of our sensations, but only the qualities of perceived physical objects. But he does not consider the possibility that the qualities of our experiences are relational properties.

¹³ So *pace* Thomas Nagel (1974) and others, we can develop a pretty good idea of what the sensory qualities experienced even by somewhat distant species are probably like.

¹⁴ Consider mental sense data, which are paradigms of mental objects. Because they are data, that is, given to the senses, their nature is perforce independent of the perceiver.

¹⁵ As noted earlier, Jackson himself remarks on the apparent equivalence of adverbial and state theories (63). See also George Pitcher (1969, p. 204), who rightly notes the

difficulty of isolating an issue that divides act-object theorists from so-called adverbial theorists, whose accounts proceed in terms of mental states. Pitcher's hypothesis about the difference is that act-object theorists allow experiences to exist unperceived, whereas adverbial theorists find this impossible. This squares with Jackson's adoption of the mental-object model, since he does permit visual experiences that we are unaware of (1969, pp. 24-26). But it is unclear why mental-state and adverbial theorists would not have the same sorts of reasons to do so as well, and many do. See, e.g., Rosenthal (1986, 1996).

Robert Audi convincingly and elegantly demonstrates that adverbial theories can do justice to a range of considerations that, according to some, support the existence of mental objects (1978, pp. 348-61). And Robert Kraut develops a formalism designed to show that a single account can capture the crucial components of both act-object and adverbial theories (1982, pp. 277-293). Pitcher, Audi, and Kraut do not, however, consider the central role of the univocality issue.

More recently, Michael Tye has defended a variant of the adverbial theory that he calls the "operator theory" (Tye [1989], esp. chs. 3-5). Tye quickly dismisses mental objects, largely on the ground that color words would then have to apply univocally to visual experiences and physical objects, and words such as 'stabbing' and 'burning' univocally to pains and physical processes (56-57).

¹⁶ See Jackson (103) on locating mental objects in a special, "mysterious space," and Dennett (1978, p. 186 and *passim*) on phenomenal space as "Mental Image Heaven."

¹⁷ See, e.g., Harman (1973).

Tacit recognition of the role of such inference to the best explanation may also underlie the suggestive force of a remark of Wittgenstein's:

Let us imagine the following: The surfaces of the things around us (stones, plants, etc.) have patches and regions which produce pain in our skin when we touch them. . . . In this case we should speak of pain patches on the leaf of a particular plant just as at present we speak of red patches. I am supposing that it is useful to us to notice these patches and their shapes; that we can infer important properties of the objects from them (1968, Part I, §312).

¹⁸ On the connection between consciousness and what it's like to have an experience, see Nagel (1974) and Rosenthal (1986, §3).

¹⁹ On the mental-light metaphor, see fn. 7.

²⁰ Rosenthal (1986), (1993), and (1996). The explanation I advance construes a mental state's being conscious as the extrinsic property of that state's being accompanied by a certain type of thought: A mental state is conscious just in case one has a higher-order thought that one is in that state. But for present purposes it is irrelevant what specific explanation one adopts as long as it construes a state's being conscious as some extrinsic property of the state.

²¹ No problem would arise if experiences were simply intentional states, as Armstrong (1980, chs. 7, 8, and 9) holds; experiences of red would then all be intentional states that are about physical red. But if, as most theorists assume, sensory experiences have characteristic nonintentional properties, it is unclear how knowing what physical

red is could help us come to know what nonintentional mental property all experiences of red have in common.

²² See, in this connection, Clark's discussion of multidimensional scaling (1993, pp. 100ff., 117ff.).

²³ So introspective access to our experiences cannot be simply an extrapolation from the information we get about physical objects to the states that represent them, as Fred Dretske (1994/95, and 1995, ch. 2) has urged.

²⁴ This is a much revised version of a paper written during a research year at the Center for Interdisciplinary Research (ZiF), University of Bielefeld, Germany, issued as ZiF Report No. 28/1990. I am greatly indebted to the Center for its generous support, and for the exceptionally congenial and stimulating environment provided there. I am grateful also to A. H. C. van der Heijden for helpful reactions to an earlier version of the paper, especially to the material that became §IV, and to Peter Ross for useful comments, also especially on §IV. Portions of this paper also derive from Rosenthal (1984, §V) and (1985).

CONSCIOUSNESS AND INTENTIONALITY: MODELS AND MODALITIES OF ATTRIBUTION

Edited by

DENIS FISETTE

*Université du Québec à Montréal,
Montréal, Canada*



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