

Locating Color: Further Thoughts

Peter W. Ross

Department of Philosophy, University of Wisconsin—Milwaukee, Milwaukee, Wisconsin 53201-0413
E-mail: pross@uwm.edu

The authors of the commentaries (this issue) have provided a very substantial set of thoughtful and enriching discussions, for which I am extremely grateful. In these replies, I do my best to restate, clarify, and expand on some claims and arguments in the target article.

The target article has three main parts: (1) a description of a scientifically motivated argument for subjectivism about color; (2) a presentation of an objection refuting subjectivism, from which I conclude that the scientifically motivated argument is unsound; and (3) a proposal of a diagnosis as to how the argument has gone wrong. I will organize my discussion (which includes some general background as well as replies) according to these three parts.

The Scientifically Motivated Subjectivist Argument

The scientifically motivated subjectivist argument, which I attribute to Hardin and McGilvray, is merely one example of a subjectivist argument. Other arguments have been advanced for subjectivism—even recently—which ignore findings from visual science (see, for example, Boghossian & Velleman, 1989, for an argument which ignores these findings). However, I focus on the scientifically motivated subjectivist argument because Hardin and McGilvray, as well as Hilbert and others, have shown that visual science provides important constraints on philosophical proposals about the constituting nature of color.

An Objection to Subjectivism

Although my focus is the scientifically motivated argument, I present an objection against subjectivism in general. Thus any subjectivist must contend with this objection, whether or not this theorist defends subjectivism on the basis of the scientifically motivated subjectivist argument (which I call simply the subjectivist argument for short).

My objection is that subjectivism cannot provide a plausible theory of perception. Of course, one may present alternative or additional objections to subjectivism. As Cohen points out, the most intuitive objection against subjectivism in favor of color realism (a broad category of views that hold that physical objects really are colored)

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Address correspondence and reprint requests to Peter W. Ross, Department of Philosophy, University of Wisconsin—Milwaukee, Curtin Hall, P.O. Box 413, Milwaukee, WI 53201-0413.



is just the claim that because colors appear to be properties of objects external to our minds, they are. After all, *how could* we be systematically mistaken in our claims that the ordinary physical objects we perceive—lemons, raspberries, and so on—are colored?

However, this realist intuition by itself is not decisive. For subjectivists counter that the appearance of externality is misleading, and, in perhaps compelling ways, seek to show us that in fact we are systematically mistaken in our claims that ordinary physical objects are colored.

Indeed, decisive argumentation for the realist intuition has proven to be elusive. To take an example, Turvey, Whitmyer, and Shockley argue against subjectivism as follows: Reasoning that is used to support subjectivism about color also leads us to subjectivism about weight; that is, the claim that “physical objects are weightless and that weight is a brain process.” Since we are unwilling to accept weight subjectivism, color subjectivism is shown to be unpalatable.

But their statement of the argument is misleading. For they claim that color subjectivism forces us to embrace subjectivism about *weight*, suggesting that color subjectivism leads us to hold, implausibly, that weight, like color, is *merely* a subjective property (for example, merely a neural process). However, color subjectivism does not force us to hold this implausible claim. At best, Turvey, Whitmyer, and Shockley show that the reasoning used to support color subjectivism leads us to subjectivism about *sensed weight*, a view not nearly as unpalatable as subjectivism about weight. In fact, since some color subjectivists—and in particular McGilvray—accept that sensed location is subjective, they may accept that sensed weight is subjective as well. But McGilvray is careful to point out that he does not claim that location is *merely* a subjective property. And he presumably would not claim that weight is either.

Due to the elusiveness of decisive support for the realist intuition, the central part of the target article is devoted to presenting an argument against subjectivism and in favor of the realist intuition. My argument rests on the following claim: A proposal about the constituting nature of color which cannot provide a plausible theory of color perception is not just counterintuitive, but also false. Thus the burden of my argument is to show that no version of subjectivism—which I divide into sense datum subjectivism, adverbialist subjectivism, and the virtual color proposal—can provide a plausible theory of color perception.

Gold describes the location problem for color subjectivism as being either a problem about relating subjective colors with physical properties of physical objects or a problem about property binding. However, neither of these descriptions captures the problem I have presented (although I think the property binding problem is relevant—more on this below). Color subjectivism claims that sensed colors are mental properties, processes, or events. Thus to give an account of color perception, subjectivism must indicate how mental colors are experienced as spatially located. But in this case, the question of the constituting nature of sensed locations becomes pressing. Therefore, I examine the subjectivist options for characterizing the constituting nature of sensed location.

Accordingly, I consider the following: are sensed locations physical locations of mental objects in physical space (as Jackson’s version of sense datum subjectivism

holds)? Or are they mental processes or events (as adverbialist subjectivism claims and as Maund's virtual color theory ends up holding as well)? The location problem for color subjectivism is that there are serious objections to each theory's answer and consequently that subjectivism cannot provide a plausible theory of color perception.

Savage briefly defends a version of sense datum subjectivism which holds, in contrast with Jackson's version of the theory, that sensed locations are locations of mental objects in a nonphysical mental space. He contends that there is no obvious objection to this claim and that it is unclear what problem there is with relating sense data with neural processes. However, if sense data exist in a mental space which is utterly different from the physical space in which neural processes exist, this mental space does seem to be mysterious, as Jackson claims (1977, p. 103). Moreover, if sense data and neural processes exist in utterly different kinds of space, the problem with relating sense data with neural processes is plain.

Savage also asserts that the virtual color proposal is a tenable theory. However, he ignores my argument against this proposal. The argument is, briefly: While the virtual color proposal must give a positive account of the qualitative aspect of color experience, it is not clear how it can do this without simply collapsing into adverbialism. Thus the virtual color proposal provides no new subjectivist alternative.

In fact, because Savage's commentary is primarily devoted to defending a version of physicalism, it is not clear how intent he is on defending sense datum subjectivism or the virtual color proposal in any case. I set these theories aside and focus on McGilvray's adverbialist subjectivism, which holds that sensed colors and locations are mental processes or events which are identified with neural processes or events, this view being the best subjectivist option available.

Adverbialist subjectivism. My objection to adverbialist subjectivism is that it cannot provide a solution to the many properties problem. To provide a solution, adverbialist subjectivism must give an account of visual field organization. And in the context of such an account, this theory must characterize parts of the visual field as either particulars or as repeatables. But I argue that there are problems for either choice.

The natural way of characterizing parts of the visual field is as particulars individuated in terms of particular sensed locations. But by assimilating sensed locations to sensed colors as repeatables, adverbialist subjectivism cannot offer this characterization. And it seems that this theory lacks the resources to individuate parts of the visual field in terms of any other particulars.

However, a proponent of this view may avoid characterizing the parts of the visual field as particulars. Thus, McGilvray seeks to "provide an autonomous science of sensory events without introducing particulars or essentially involving something like reference to things outside." In this case, adverbialist subjectivism identifies parts of the visual field with sensed locations—where these are characterized as repeatables—and holds that, as a matter of contingent fact, there is a distinct mental coding for each part of the visual field. Thus, in defending adverbialist subjectivism's characterization of sensed locations as repeatables, both McGilvray and Rosenthal hold that this theorist can characterize parts of the visual field in terms of an egocentric grid, described, as McGilvray states, in terms of altitude–azimuth–depth coordinates.

While this characterization seems to offer a solution to the many properties problem, it faces a further objection. If sensed location is a repeatable mental process or

event, identified with a neural process or event, then the same neural process or event (type) identified with a sensed location could recur in the visual field (at a point in time) just as the same neural process or event (type) identified with red could recur in the visual field (at a point in time). Thus it would be possible for there to be disorders where there is *not* a distinct mental coding for each part of the visual field—that is, where the same sensed location qualifies different parts of the visual field.¹

Recurrence of the same neural process or event (type) in the visual field would violate the altitude–azimuth–depth coordinates of an ordinary visual field. But this version of adverbialist subjectivism allows such a violation, for it holds that the coordinates of an ordinary visual field are merely derivative of neural processes or events which, as repeatables, can recur. Thus according to this version of adverbialist subjectivism, it would be possible for there to be disorders where the same sensed location qualifies different parts of the visual field. Since no such disorders have been identified, I conclude that adverbialist subjectivism cannot characterize parts of the visual field as repeatables and thus that this view cannot provide an account of visual field organization.

Hoffman contends that it in fact is possible for the same sensed location to qualify different parts of the visual field, even without visual disorder. He supports this claim by demonstrating that we can perceive a transparent green square and a transparent red circle to share a sensed location. He describes how, by moving the square and circle past each other so that they overlap, it is possible that “the same sensed location qualifies a square moving to the right and a disk moving to the left” and concludes that “one sensed location qualif[ies] multiple parts of the visual field.”

Hoffman’s demonstration relies on overlapping the square and the circle and describing locations in the overlapping areas in terms of the larger figures of which they are parts—thus indicating that the locations in the overlapping areas are in different parts of the visual field (in both the square part and the circular part). I agree that this sort of case is unproblematic. However, this case does not exemplify what I have in mind as one where the same sensed location qualifies different parts of the visual field. Rather, the sort of case I have in mind is one where the same neural process or event (type) identified with a sensed location recurs in the visual field (at a point in time).

Against my objection to adverbialist subjectivism on the basis of the property binding problem, Gold and McGilvray claim that the property binding problem is irrelevant to the issue of the constituting nature of color. However, my objection on the basis of the property binding problem simply follows from that on the basis of the many properties problem. I contend that adverbialist subjectivism cannot solve the many properties problem and add that if a theory cannot solve the many properties problem then it cannot solve the property binding problem. Furthermore, this connection between these problems is especially clear for adverbialist subjectivism, which

¹ I was unclear in the target article about the *different parts* of the visual field amount to in this context, leading McGilvray and Rosenthal to take them to be different physical locations outside the head. However, consistently with McGilvray’s adverbialist subjectivism, I took different parts of the visual field to be different physical locations of neural processes or events in the head. (Since McGilvray’s adverbialist subjectivism identifies sensed locations with neural processes or events, it allows us to talk about the visual field both as an array of sensed locations and as group of neural processes or events which of course exist in physical space in the head.)

in effect reduces the many properties problem to the property binding problem. Thus, despite McGilvray's claim to the contrary, my discussion of the binding problem does not offer an independent objection to adverbialist subjectivism, but rather merely attempts to present this connection between these problems.

Other subjectivist options? My conclusion that no version of subjectivism can provide a plausible theory of color perception relies on the claim that sense datum subjectivism, the virtual color proposal, and adverbialist subjectivism are exhaustive of the subjectivist options. However, Revonsuo maintains that I have overlooked an option which succeeds where the others have failed.

Revonsuo's alternative holds that objects in the visual field are bundles of properties such as colors and shapes. His alternative is a version of a theory, called the *bundle theory*, advanced by Bertrand Russell and others *not* as a theory of perception, but in order to deal with the metaphysical problem of relating particulars and properties. The bundle theory addresses this problem by proposing that in fact there are no particulars—it holds that particulars are *merely* bundles of properties. Revonsuo's version of the bundle theory seems to apply to only sensed objects, for example, objects in the visual field. As a result, his version of the bundle theory is much like McGilvray's adverbialist subjectivism. Like McGilvray's adverbialist subjectivism, it claims that the visual field is devoid of particulars, objects in the visual field being mere bundles of repeatables.

In fact, Revonsuo does not sufficiently differentiate the bundle theory from McGilvray's adverbialist subjectivism. Thus, despite Revonsuo's contrary assertion, it is not clear how the bundle theory avoids the objections I present for this view. Specifically, Revonsuo's claim that the bundle theory is consistent with Anne Treisman's feature integration theory of binding does nothing to address these objections. Moreover, while Treisman's theory primarily focuses on the issue of property binding, she says nothing to indicate that the visual field is devoid of particulars. Thus in any case it is best to infer that her theory is neutral with regard to the metaphysics of the visual field.

Consequently, I conclude that Revonsuo has not adequately supported his claim that I have overlooked a subjectivist theory of perception which succeeds where the other theories have failed.

A Diagnosis of the Subjectivist Argument

Having refuted subjectivism, I conclude that the subjectivist argument is unsound and give a diagnosis of its mistake. My diagnosis is that premise 2 (which I call the corresponding category constraint) is false, and I use this diagnosis in support of a proposal about the constituting nature of sensed color called disjunctive physicalism.

Realist commentators, of course, are united in rejecting the subjectivist argument. However, they offer alternative diagnoses in support of proposals about the constituting nature of sensed color other than disjunctive physicalism. These alternative diagnoses divide into two groups. According to those in the first group, the subjectivist argument is invalid because it fails to consider proposals other than subjectivism and physicalism. Those in the second group object to premise 1a (which holds that our ordinary color categories in no way correspond with, and are not explained by, *physical* categories) rather than premise 2 (the corresponding category constraint).

I first consider these alternative diagnoses presented by realist commentators and then take up a number of other objections to disjunctive physicalism.

Alternatives to subjectivism and physicalism. Rosenthal and Cohen reject both physicalism and subjectivism in favor of other proposals about the constituting nature of sensed color. They claim that the subjectivist argument presents a false dichotomy and so is invalid.

They are clearly correct to point out that decisive support for any positive proposal about the constituting nature of sensed color would have to consider and reject all the alternatives. As I note, Hardin (1993, Sect. II) does present an argument against dispositionalism (the proposal that colors are dispositions of physical objects to produce perceptual responses in perceivers) independently of what I have called the subjectivist argument. And presumably he has reasons to consider other realist alternatives to be mistaken as well.

Of course in the present discussion, Rosenthal's and Cohen's points are aimed at my positive proposal of disjunctive physicalism. However, while I seek to provide decisive argumentation for *color realism* (a category of views that hold that physical objects really are colored), I do not attempt to provide such argumentation for disjunctive physicalism, a version of realism (but see Ross, 1999a and 2000, for arguments against a number of other realist proposals). Rather, I reject the corresponding category constraint merely in an effort to clear the way for what I think to be a promising positive proposal about the constituting nature of sensed color.

Furthermore, the disjunctive physicalist can accept a distinction between two kinds of color, namely sensory qualities and sensed colors; consequently, it is not clear how far my positive proposal diverges from Rosenthal's double-property theory. The target article examines the question of the constituting nature of *sensed color*, which—*whatever* it's constituting nature—I take to be the qualitative aspect of color experience. My positive proposal is that sensed colors are disjunctive physical properties. This leaves open the possibility that visual experiences have sensory qualities, namely neural processes which explain our ordinary color categories, which are *not* identified with the qualitative aspect of color experience. Thus my argument is not against sensory qualities as such, but against the distinctively subjectivist claim that the sensed colors are sensory qualities—that the qualitative aspect of color experience is a mental process or event.

Of course, if sensory qualities are not identified with the qualitative aspect of color experience, then they are qualities in a somewhat technical sense. They are qualities in that they explain our ordinary color categories, not by virtue of being the colors that we sense, but by providing perceptual access to the colors that we sense. Because I hold that sensory qualities are qualities in this somewhat technical sense, my usage may be misleading. So, for example, Thomas takes my acceptance of sensory qualities to indicate that I hold that the qualitative aspect of color experience is mental. But, to the contrary, I hold a view in line with Thomas's: I hold that the qualitative aspect of color experience is a physical property of physical objects and so is outside of the head.²

² It is worth noting that what Thomas calls the representative theory of perception is a version of indirect realism. However, there are theories of perception which hold that visual experiences are repre-

While I do not object to Rosenthal's claim that there are two kinds of colors, physical colors and sensory qualities, we disagree about how to characterize physical colors; he holds that physical colors are certain ratios of reflectance properties, whereas I claim that they are disjunctive physical properties. Indeed, my characterization of physical colors as disjunctive physical properties is the most contested claim of the target article.

Ordinary color categories and physical categories. Most realist commentators reject the subjectivist argument by objecting to premise 1a, and accepting premise 2, namely the corresponding category constraint. According to this diagnosis, our ordinary color categories do correspond with, and are explained by, physical categories.

In the context of the subjectivist argument, Hardin takes physical categories to mean physical kinds—classifications distinctive to physics. According to this usage, reflectance properties are physical categories, while neural processes are not. (However, by opposing physical properties and neural processes in this way, Hardin does not mean to indicate that neural processes are not *in some sense* physical; instead, neural processes are in some sense physical since they are constituted by things that can be classified by physical categories in his restrictive sense.)

Most realist commentators claim that we must reject Hardin's restrictive notion of physical category and allow that physical categories are perceiver relative—in particular, that physical categories are categories of physical properties characterized relative to perceivers' perceptual responses; call these *perceiver-relative* physical categories. By weakening what we mean by physical categories in this way, we can reject premise 1a.

So, for example, Turvey, Whitmyer, and Shockley present a characterization of sensed weight as a perceiver-relative physical category and suggest that a similar characterization of sensed color is possible. And both Matthen and Rosenthal go some distance in filling out such a characterization of sensed color.

Matthen, focusing on cases of colored lights, describes different determinate sensed colors in terms of different combinations of wavelengths of light from the short, middle, and long wavebands of the visible spectrum.³ Rosenthal, considering surface colors, describes different determinate sensed colors as different ratios of reflectance properties that produce different ratios of activation of the short, middle, and longwave cones. In both cases, colors are identified with physical properties—

sentational, but which are better classified as versions of direct realism (see, for example, Dretske's theory [1995].)

³ Matthen makes the point that metamerism should be defined in terms of the colors objects *are*, not the colors they *look*. I think that Matthen and I talk past each other on this point. I use the term "look" in what may be called a phenomenal sense; in this sense, two objects look the same color just in case they can be described in terms of the same point in the color space. Matthen, by contrast, assumes an epistemic sense of the term "look" which takes into account the veridicality of our attribution of determinate shades to objects.

I avoided this issue of veridical color in the target article; however, as Hardin (1993, Part II) and Clark (2000, Chapter 6) have pointed out, it presents problems for physicalism. But see my article (2000) for a disjunctive physicalist characterization of veridical color. According to this characterization, visual effects such as certain simultaneous contrast effects—to which Hoffman refers—involve abnormal perceptual access, in particular, abnormal viewing conditions, and thus present illusory colors.

certain wavelengths of light and reflectance properties. But—as Matthen and Rosenthal admit—in both cases, our ordinary color categories are categories of physical properties which are characterized relative to perceivers' perceptual responses. For the very division among short, middle, and long wavebands comes from the receptivity of our three types of cones; indeed talk of the visible spectrum is perceiver relative.

However, neither Matthen nor Rosenthal adequately address a subjectivist objection to perceiver-relative physical categories. This objection is that such perceiver relativity indicates perceiver dependence and that perceiver dependence supports the subjectivist conclusion that sensed colors are mental—for example, that sensed colors are mental processes or events which are identified with neural processes or events.

For my part, I avoid this subjectivist objection by drawing a sharp distinction between our perceptual access to color and sensed color itself—basically the distinction between the epistemology and metaphysics of sensed color. Thus I hold that while neural processes are involved in providing perceptual access to color, they are not part of the constituting nature of sensed color. As Rosenthal notes, “whether some property is disjunctive often depends on the level of analysis from which we approach it.” A consequence of approaching the metaphysics of color from the standpoint of the sharp distinction between the epistemology and metaphysics of color is that we take physical kinds as basic and thus that colors are disjunctive. For any determinate shade characterized independently of perceptual access is a disjunction of physical properties, namely those physical properties (of surfaces, light, water, and glass) which produce a particular ratio of cone activation.⁴

Next, I take up a number of other objections to disjunctive physicalism, many of which can be answered from the standpoint of my claim that neural processes are an aspect of our perceptual access to color.

Other objections to disjunctive physicalism. To illustrate what I have in mind by our perceptual access to a color, consider: Intuitively, lighting conditions are an aspect of our perceptual access to the colors of opaque surfaces. For, intuitively, these surfaces are colored in the dark.

Of course, the intuitiveness of this point merely derives from what I have called the realist intuition—that because colors appear to be properties of objects external to our minds, they are—and subjectivism seeks to throw out this intuition. However, having supported the realist intuition with a rejection of subjectivism, we have vindicated the intuitive distinction between our perceptual access to colors and the sensed colors themselves. My proposal is simply that we extend this intuitive notion of perceptual access to the neural processes which explain our ordinary color categories (I discuss this claim in much greater detail in Ross, 2000).

A number of commentators hold that we must accept the corresponding category constraint in order to explain our ordinary color categories. However, this objection ignores my proposal that we explain our ordinary color categories in terms of neural processes, considered as an aspect of our perceptual access to color.

Thus while Hoffman argues that physicalism must accept the corresponding category constraint in order to explain our ordinary color categories, he ignores this pro-

⁴ Thus the difference between my characterization of physical colors as disjunctive and others' characterization of them as perceiver-relative physical categories is much subtler than Savage suggests.

posal. To the contrary, a disjunctive physicalist can explain our ordinary color categories, not in terms of the constituting nature of color but rather in terms of neural processes considered as an aspect of our perceptual access to color. Similarly, Rosenthal holds that the corresponding category constraint “is best seen as a regulative goal that guides scientific identifications, not a substantive assumption, philosophical or otherwise.” But this claim seems to rule out the possibility that our ordinary color categories can be explained in terms of an aspect of the epistemology rather than the metaphysics of color.

Also, it seems that Cohen’s claim that I must identify ordinary color categories and colors merely assumes the corresponding category constraint. In my usage, the term “ordinary color categories” is just shorthand for the relations of qualitative identity, difference, and similarity among colors—namely the relations which are represented in the psychological color space. These categories are neutral with regard to whether colors are physical, mental, or some other sort of property or process. Furthermore, since the basic issue is to show that some proposal about the constituting nature of color, for example, subjectivism or physicalism, is the correct one, we must be allowed to refer to these categories in this metaphysically neutral way.

Thus we can draw the following distinction between the ordinary color category red and the color red: While the ordinary color category red is merely a region of the psychological color space, the color red is some property such as a disjunctive physical property (or a functional property or some other property).⁵ This distinction is important because the question remains how we explain our ordinary color categories. The disjunctive physicalist rejects the corresponding category constraint and so does not provide such an explanation in terms of the constituting nature of sensed color itself. However, Cohen’s argument that disjunctive physicalists cannot hold the truism that red is a color overlooks this point. For his argument rests on the claim that we must simply identify ordinary color categories and colors and thus that we must explain our ordinary color categories in terms of the constituting nature of sensed color.

Jakab contends that disjunctive physicalism, like subjectivism, must hold that the qualitative aspect of color experience is mental. But his argument for this claim seems to assume that sensed colors are identified with whatever explains our ordinary color categories, and thus that if mental processes do this explanatory work, sensed colors are identified with mental processes. Again, the disjunctive physicalist rejects this assumption.

According to Revonsuo, the claim that colors are physical properties confuses the nonchromatic causes with the chromatic effects of color experience. However, rather than confuse the causes with the effects of perception, this claim merely states that an effect of perception is that we have access to physical colors. Moreover, Revonsuo’s inference from the fact that damage to perceptual systems produce perceptual deficiencies to the claim that sensed properties are properties of our perceptual systems is invalid. For the possibility remains that such damage produces perceptual deficiencies

⁵ I do not deny that we may use the term “the color red” to refer to a region in the color space. The point is that color red, unlike the ordinary color category red, is also a property such as a distinctive physical property.

because perceptual systems are necessary for perceptual access to properties of external physical objects (just as light is necessary for perceptual access to the colors of opaque surfaces).⁶

In fact, Revonsuo's and McGilvray's claim that sensed colors and locations are *mental constructions* of our perceptual systems is simply the result of a conflation of the epistemology of color (which involves a psychological theory of visual processes) and its metaphysics.

A remaining objection to disjunctive physicalism is that disjunctive physical properties are not acceptable candidates for being sensed colors, simply because they are disjunctive. For example, since Savage defends a version of physicalism, it seems that his argument against disjunctive physicalism—in which he presents considerations relating colors and pains—is motivated by skepticism about the claim that colors are disjunctive. He asserts that a disjunctive physicalist about color would claim that pain is a disjunctive physical property of the causes of pain and that this claim about pain is absurd. However, the implausibility of this account of pain is primarily due to its proposal that pain is a property of the causes of pain. And there is no reason to think that a disjunctive physicalist about color is committed to this proposal about pain.

A stronger objection to disjunctive physical colors, presented by Jakab, is that, whereas colors are causes (for example, they are causes of visual experiences of color in perceivers), disjunctive properties cannot be causes. However, as Jakab notes, the disjuncts of disjunctive physical colors are causes. While the issue is complex, it seems that the causal efficacy of the disjuncts allows us to say that disjunctive physical colors are causes in a derivative sense (Armstrong, 1987, p. 10 gives this response).

However, an underlying worry about disjunctive physical colors might be that the colors of physical objects do not look disjunctive (whatever it might mean for a property to look disjunctive). Certainly this is true. Nevertheless, we cannot assume that colors are not disjunctive simply because they do not look disjunctive. For this assumption rests on the controversial claim that the constituting nature of color is fully revealed in color experience. (See Ross, 1999a, for an argument against this claim.)

Future Research for Color Realists: The Hard Problem

David Chalmers's *hard problem*, that is, the problem of explaining the qualitative aspect of experience (which is distinct from the problem of simply identifying the

⁶ Revonsuo also claims that color experience in dreams indicates that subjectivism is correct. How can disjunctive physicalism accommodate color experience in the absence of physical objects? Disjunctive physicalism can be combined with a theory of perceptual states which holds that visual experiences are representational states. According to such a theory, such states can occur in the absence of the objects and properties that they represent; when they do, they are illusory. (By contrast with the virtual color proposal, disjunctive physicalism identifies the qualitative aspect of color experience with physical properties of physical objects we perceive; in the case of color experience in the absence of physical objects—presumably an unusual kind of case—our relation to physical color is merely representational.) A similar response can be given to the case of synesthetic color experience (although, so little is currently known about synesthesia that it is difficult to know how to characterize synesthetic color experience).

qualitative aspect with a physical property of physical objects, neural process, or other property, and which is also—arguably—distinct from the problem of explaining our ordinary color categories), goes beyond my discussion of subjectivism. However, Thomas is right to suggest that acceptance of color realism (and I would claim disjunctive physicalism in particular) and phenomenal externalism may put us in a better position to address the hard problem. (*Phenomenal externalism* is the view the qualitative aspect of color experience supervenes on relations between physical properties of objects and their effects on perceivers' visual systems.⁷)

Chalmers asks the question: “Why should physical processing [which encompasses neural processing] give rise to a rich inner life at all?” (1998, p. 11). The problem Chalmers presents is to understand how inner processes can embody the qualitative aspect of experience. And, by limiting our view to inner processes, the question seems unanswerable. But it may become answerable if we characterize inner processes as giving access to rather than embodying the qualitative aspect of experience. Perhaps thinking of the qualitative aspect of experience as constituting an *inner* life is part of the problem.

Of course, in relocating the qualitative aspect from neural processes to physical objects, we have relocated the problem, not solved it. The problem now is to understand how physical properties of physical objects can embody the qualitative aspect of experience, and this remains no easy task. Nevertheless, if my argument against subjectivism is correct, relocating the qualitative aspect is necessary in any case, in order to provide a plausible theory of perception.

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⁷ I have defended this view in my 1999b. Thus I disagree with Jakab's claim that disjunctive physicalism cannot be combined with phenomenal externalism (a claim which he rests on his objection that disjunctive properties cannot be causes).