

Are Colors Outside or Inside?

Comments on M. Chirimuuta's *Outside Color*

Pacific APA 2016

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In her rich, historically informed and empirically sophisticated book *Outside Color*, Chirimuuta does nothing less than defend a novel theory of color, a position that we might call “externalist adverbialism”.

My plan is as follows. First I will address Chirimuuta's objections to the standard views. Then I will raise a few questions about her own view.

1. Chirimuuta against standard options: colors as neither “outside” nor “inside”

The philosophical dispute over color has been a kind of oscillation between two approaches: realist views that locate color in the external world, and irrealist views that locate color “in the mind”. Chirimuuta holds that both sides of this traditional dichotomy are mistaken (p. 58, 65).

Let's begin with her criticisms of realist theories, such as Byrne and Hilbert's reflectance physicalism and Cohen's relationism.

Her main objection to these standard realist theories is that they have two big false commitments. She says that they are committed to a false “correspondence” picture of color experience (e. g. p. 119, p. 130), and to a false view that the representation of colors is independent of the representation of other properties (98-99).

But I think this objection falls short. For one thing, I think that she is wrong in thinking that realism has these commitments. Roughly, a minimal version of realism just says that the colors are instantiated by physical objects, or something like that. So there are minimal forms of realism that don't have the two commitments Chirimuuta criticizes (indeed, this is a point that she herself concedes at p. 119, fn. 24). What is her objection to such minimal versions?

Now, as a matter of fact, most realists do in fact accept *one* of the ideas Chirimuuta criticizes, namely, the “correspondence” picture of color experience. She characterizes this as the view that “a perceptual

state is right if it is veridical – if it correctly corresponds to a state of affairs in the environment” (p. 109).¹ Her contrasting view she calls *pragmatism*: a perceptual state is right if it is a useful guide to the environment.

But I didn’t really see what her objection was to the correspondence picture. Even if she is right that experiences can be evaluated with respect to how useful they are in guiding behavior, it doesn’t follow that they can’t also be evaluated with respect to whether they are veridical or not. The pragmatic picture and the correspondence picture are compatible (a point also made by Cohen in NDPR).

True, some philosophers – some naïve realists - reject the claim that experiences can be assessed for veridicality. But I think that this because they load too much theoretical baggage into the claim. When we are given examples of veridical and non-veridical experiences, we easily catch on. This suggests that this talk answers to a genuine, pre-theoretical distinction (Pautz 2009, 489-490; Byrne 2016 makes the same point at p. 9).

So, I question Chirimuuta’s main objections to the standard form of realism, such as Byrne and Hilbert reflectance physicalism and Cohen’s relationism. But I think her book does contain additional, independent objections to these realist theories that do hit their target. I would like to highlight these objections for a moment.

Byrne and Hilbert’s reflectance physicalism. Against this view, Chirimuuta objects that “there are great dissimilarities between features of colors as we experience them, such as the structure of color experience, and what is known of SSRs” (46-7; also 64-65; 126-130).

Suppose, for instance, that Jonathan says “blue is more like purple than green”. This is true. But it just seems false if these colors he is talking about are just identical reflectances of the types shown in the figure below (next page), because, as Byrne and Hilbert (2003, 13) concede, “there is no obvious sense” in which the blue reflectance is more like the purple one than the green one. So it is hard to see how reflectance physicalism preserves the truth of Jonathan’s claim.

¹ Actually, Chirimuuta’s formulation of the “correspondence view” is not entirely clear to me. She sometimes (110-111) seems to have in mind a somewhat stronger thesis: not merely that experiences can be said to correspond to, or fail to correspond to, the environment, but also that the *primary “function” or “biological goal”* (126) of the visual system is to produce experiences that correspond to the environment. I am not sure I understand this thesis. Anyway, I will stick to her initial, official formulation: “a perceptual state is right if it is veridical” (109).

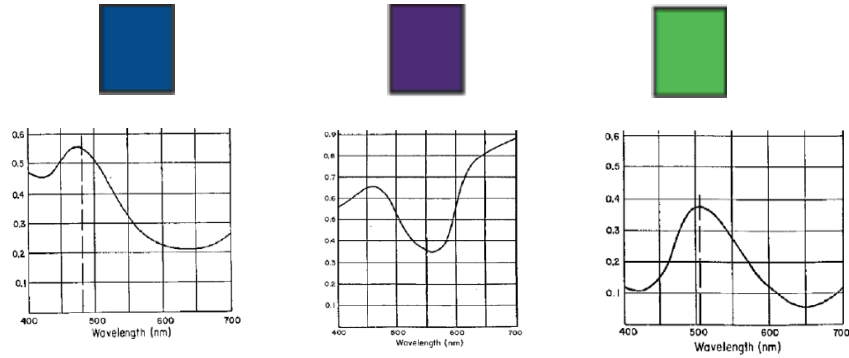


Figure 1: Reflectances typical of a blue object, purple object, and a green. From MacAdam 1985.

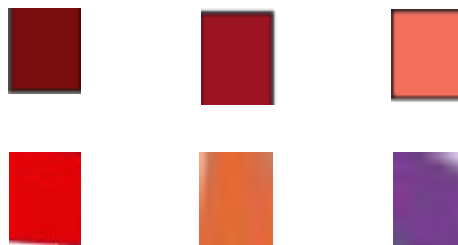
Chirimuuta notes (p. 127) that Byrne and Byrne and Hilbert (2003) Byrne and Hilbert (2003) have offered a reply. They suggest that they can after all accommodate the truth of Jonathan’s statement by holding that the semantic value of “ x is more like y than z ” in Jonathan’s mouth is the following relation:

The hue-difference relation: $\lambda x \lambda y$ (all x -objects and all y -objects have some value of a common hue, namely being bluish, but y -objects have *no* value of this hue).

This relation *is* satisfied by the above trio of reflectances, provided that all objects with either of the first two colors are bluish, while objects with the third one are not at all bluish.

But Chirimuuta raises a problem, namely, that Byrne and Hilbert have no plausible theory of hue categories themselves that does not appeal to our neural responses to reflectances. This is a big issue (indeed Byrne and Hilbert 2003, 55 had addressed worry she is pointing to), but in the end I agree.

I would like to further support Chirimuuta’s rejection of Byrne and Hilbert’s account of color-similarity by noting another basic problem with it. Their account of color-similarity just isn’t general enough. To see this, consider some other trios of colors:



Now suppose that Jonathan says “*every* trio of colors on the page is such that the first is more like the second than third”. His statement is true. But it would be false if the semantic value of his resemblance predicate were Byrne and Hilbert’s hue-difference relation. That relation may be satisfied by the original trio <blue, purple, green>. But it is not satisfied by the two other trios, for all the colors in these other trios imply the same hue, namely being reddish.²

Chirimuuta notes (62-3; 125) there is some hope that “an explanation that refers to internal mechanisms is more likely to yield an understanding of color spaces than an explanation put exclusively in terms of external physical stimuli”, such as Byrne and Hilbert’s reflectance-types.³ I agree. For instance, in a recent review, Conway (2013, p. 7) writes:

² There is another point that shows that Byrne and Hilbert’s account is not general enough. Suppose Alex is involved in a psychophysical experiment in which he experiences two trios of qualities and is asked to make judgments about the resemblance orders of the members of the trios. As it happens, Alex experiences a trio of colors, *and* a trio of taste qualities, and in each case, the first member of each trio was clearly more like the second than the third. Now suppose that Jonathan, who has no idea what qualities Alex experienced, just guesses, “for every trio of qualities Alex experienced, the first was more like the second than the third”. Then his guess *is true*. But this means that here the semantic value of the resemblance predicate, “*x* is more like *y* than *z*”, which he uses to express his guess, cannot be the hue-difference relation, for obviously this relation cannot be satisfied by the trio of the colors *and* by the trio of the tastes Alex experienced. Instead, it must be a much more *general, topic-neutral* resemblance relation, which can equally be satisfied by colors and *tastes*. To fully answer the problem of similarity, therefore, Byrne and Hilbert need to say what this more general relation is, and make it plausible that it is satisfied by certain trios of reflectance-types (e. g. those in Figure 1 above) as well as by certain trios chemical-types (those with which they identify taste qualities).

³ Chirimuuta says that “the source of these troubles [e. g. the problem of color similarity for Byrne and Hilbert] is the correspondence-detection model” (p. 129). I am not totally sure what she means by that. Does she mean that the problem would go away if only they rejected this model of color experience but kept their claim that colors themselves are reflectance-types? If so, I do not think this is right. For the problem is about accommodating the truth of our color-similarity *judgments*, such as Jonathan’s judgments in the examples used above. Even if we cannot sensibly ask whether or not our *color experiences* “correspond to reality”, we can certainly ask whether our *color-similarity judgments* do. And the point is that these judgments *do* “correspond to reality” – they are *true* – but that Byrne and Hilbert’s reflectance view has trouble accommodating their truth.

Therefore, I think that Chirimuuta’s objection from color similarity to realists like Byrne and Hilbert is quite separate from her objection based on their commitment to a “correspondence model” of color experience.

The present evidence, accumulated from several labs, suggests that . . . in [postreceptoral visual area] V4 [there is] a more uniform representation of color space that more directly maps the perceptual color wheel, red–orange–yellow–green–cyan–blue–purple–red.

Cohen’s relationism. This might naturally suggest a version of Jonathan Cohen’s color relationism according to which colors are fine-grained *response-dependent, relational properties* of objects of the form: *causing postreceptoral neural response N (realizing color experience E) in a visual system of precise kind V in precise viewing circumstances C.* This view seems to have more promise in accommodating the kinds of facts Chirimuuta points to about the structural features of colors (Cohen 2009, 196-197).

But Chirimuuta points out (p. 170) what I regard as one of the most serious problems with Jonathan’s relationism – one that is independent of her general worry that I questioned above that all forms of realism are committed to a false correspondence picture of color experience. We might call it the *visual access problem*. Suppose you look again at the color samples above. In some sense you represent, or are presented with, the colors in having your experience. They are *visually accessible*. But it is very hard to see how Cohen’s fine-grained relational properties might be represented or presented in experience. They are so fine-grained they are hardly ever repeated. They are ecologically insignificant. Your current brain states certainly don’t have the function of indicating these non-recurring, ecologically insignificant properties that involve the precise lighting conditions and the precise state of his visual system. There seems to be no theory of visual representation that could explain how his visual system might represent them (see also Pautz (2010) and Byrne and Hilbert (2016, section 3.1) for development of this problem for Cohen-style relationism).⁴

⁴ Chirimuuta suggests (170, note 11) that relationists face this “access problem” only if they are “Russellian representationalists” who hold that we “*visually represent*” the colors. I disagree. On *any* view, we see or experience the colors. They are present to us in some sense. They are visually accessible. (This very obvious claim should be distinguished from Johnston’s version of “Access” which is much more loaded.) Even if relationists reject Russellian representationalism, they ought to accept these truisms. But, in the most general terms, the visual access problem is simply that it is very hard to see how rela-

So in the end I think Chirimuuta's book contains problems that show that it is very hard to see how colors might be located outside the head, either as reflectance properties of objects or as Cohen-style relational properties of objects.

Chirimuuta is also opposed to the other side of the dichotomy: theories that kick colors upstairs into the dustbin of the mind (in Armstrong's phrase) and hold colors are instantiated "in the head". If we set aside sense data, then this requires the bizarre view that colors are instantiated by our experiences themselves, or by neural processes in the head. H. H Price (1932, 127) called this the "colored brain theory" and called it "very singular". As Chirimuuta notes, James McGilvray has a view like this. And C. L. Hardin gives some hints of accepting it. For instance, he writes that colors "betoken states of ourselves" (1987, p. 293).

Chirimuuta thinks this view is false and I agree. But I wasn't totally sure of her grounds for rejecting it. Here is why. As we will see shortly, she herself accepts *exactly this view* in cases of hallucinatory counterparts of veridical experiences. She writes (155) that in hallucinatory cases "color [H-color she calls it] is a property of the series of neural events inside my brain". If she thinks this view of hers of hallucination is *not* ruled out by the phenomenology of hallucination, and if she thinks that the phenomenology of hallucination and normal experience might be very similar, then how can she rule out that this view is true across the board?

I will return to this issue later.

2. Chirimuuta's New Theory of Color: externalist-disjunctivist adverbialism

Chirimuuta thinks it is a mistake to locate colors in the external world, and it is also a mistake to locate them always in the head. I agree with her on this. But what is her own positive view?

She defends a kind of middle position. Her own positive view is that, in non-hallucinatory cases, colors are properties of extended world-mind processes that span the outer-inner divide. Here is how she puts it:

tionists can accept such truisms. True, I put the problem in terms of "visual representation" because as it happens I accept a representational approach to color experience, but the problem is really more general than that. (In fact, I think that Chirimuuta faces a similar problem: see note **6 of these comments**.)

“Colors are properties of perceptual interactions [or processes] involving a perceiver (P) endowed with a spectrally discriminating visual system (V) and a stimulates (S) with spectral contrast of the sort that can be exploited by V.” (140)

So, suppose you look at the distant planet Pluto through a telescope, and it looks grey. There is a five-minute long process starting with Pluto and ending with your brain state. Her view is that the grey-ness is a property of that five-minute long process.

As I just said, in hallucination cases, she takes a different view, namely that “color [H-color she calls it] is a property of the series of neural events inside my brain” (p. 155). She also asserts that we can hallucinate a H-color only if we have before experienced a replica color in a veridical interaction, though I am not sure what evidence she has for this and in fact it goes against experimental evidence (Billock and Tsou 2010).

She calls her view “adverbialism”. But whereas some adverbialists think that color experiences are always inner processes, her view is that they are extended processes that go from the object to the brain process. In that sense, it is an externalist rather than internalist version of adverbialism.⁵ Since she gives a different account of hallucination, she also calls her view “disjunctivist” (156). So we can call her complete package “externalist disjunctivist adverbialism”.

3. What is Chirimuuta’s argument for externalist-disjunctivist adverbialism?

But what is Chirimuuta’s argument for externalist disjunctivist adverbialism? As we have seen, she criticizes some of the standard views, but we also also need a positive argument for her proposal.

Her main argument for her position is that “[her version of] adverbialism is uniquely position to articulate the Janus-facedness of color”.

But I was a bit unclear of what she meant by the Janus-facedness of color. She provides a number of quotes:

“The concept of human color vision involving both a subjective component and an objective one” (Mausfeld, quoted on p. 132)

⁵ She calls it “act-object” adverbialism (p. 143, 153). I use the label “externalist” to mark this feature of her view.

“colors fall right on the boundary that we have drawn by bifurcating the world into the physical and the psychological” (Mausfeld, quoted on p. 42)

“color is neither purely subjective nor purely physical” (Hurlbert, quoted on p. 13)

But I think that these quotes are not clear enough for us to get a clear picture from them of what Chirimuuta means by the Janus-faced puzzle of color.

Chirimuuta’s own official gloss of “Janus-facedness” is that “a plethora of color phenomena demand [constitutive?!, causal?! - AP] explanations that draw on physical, neurophysiological and phenomenal descriptions” (58). She also says it means that color has “inner relatedness and out-directedness”. But while she gives some idea of what she means by outer-directedness (50-51), I wasn’t entirely clear what she meant by inner relatedness. This term wasn’t clearly defined in the book. Does she perhaps mean that phenomenal internalism is true for the experience of color – that the experience of color supervenes on the intrinsic properties of the subject?

Since I am not entirely clear on what Chirimuuta means by the Janus-faced character of color, I am a bit unclear on her argument from the Janus-faced character of color to her externalist-disjunctivist adverbialism.

I do believe that there is a profound puzzle in the vicinity of Chirimuuta’s remarks on the Janus-faced character of color. In my own work, I have been puzzled by the fact that standard experiences of sensible qualities are both essentially externally-directed and internally-dependent, in ways I will not go into here (Pautz 2010a, 349ff; 2010b, p. 36ff). But I am not sure whether Chirimuuta has in mind the same puzzle as the motivation for her externalist disjunctivist adverbialism.

4. Questions about Externalist-Disjunctivist Adverbialism

Finally, I turn to some questions I have about externalist-disjunctivist adverbialism.

(1) Suppose you view a tomato. You experience a reddish quality. Here is an obvious phenomenological fact. *It seems to you that this reddish*

quality qualifies a round item. I will call this the *color-shape datum*, because the point is that color and shape *seem* to go together.

I don't see how Chirimuuta's view accommodates the color-shape datum. On her view, the reddish quality is not a property of the round tomato but a property of your interaction with the tomato (173). That interaction is certainly not round. If all that is going on is that you are undergoing an interaction with a round object, where that shape-less interaction has the property of being reddish, then this is not enough to explain why it should seem to you that there is before you something that has the properties of being round and being reddish.⁶

To drive the point home, consider an analogy. Suppose I have a philosophical interaction with (kindly) Chris Hill that is difficult and lasts only five-minutes. *This does not make it seem to me that there is something out there that is difficult, lasts only five-minutes long, and is Chris-Hill-shaped.*

The same issue arises for Chirimuuta's theory of hallucination. When you undergo a neural process that has a reddish H-color, where that neural process is not round, why should this make it seem to you that there is a reddish and *round* thing before you?

Let me make a clarification before proceeding. My color-shape datum differs from all the phenomenological claims that Chirimuuta discusses in the book as potential problems for her view. It differs from the representationalist claim that color experiences have truth-conditions (160). It differs from the claim that colors look like intrinsic non-relational properties (204). And it differs from the claim that colors look like properties of external, physical objects (2010). The color-shape datum is less "theoretical" than all these claims that Chirimuuta discusses. In fact, it is accommodated by a wide-range of theories of color and color experience. It is even accommodated by Cohen's relationism, for on this view, colors are co-instantiated with shapes, and represented as such in experience. It is accommodated by the sense da-

⁶ In fact, Chirimuuta's theory, as so far presented, also doesn't explain an even more basic fact: that we *experience* colors at all, that is, that we are *presented with* them (see note 4 of these comments). For, on this view, colors are properties of our interactions with objects. But we do not experience *all* the properties of our interactions with objects. For instance, if I look at the planet Pluto, the interaction or process leading from the planet to my neural processing *lasts five minutes* (since it takes that long for light to travel), *but I do not experience this property of the interaction – it is not visually manifest to me.* So something must be added to her theory in order to explain what it is that makes it the case that we experience *some* properties of such perceptual interactions (*viz. their colors*) but *not others* (e. g. *their temporal length*).

tum view, for on this view the sense data we're acquainted with literally have colors *as well as shapes*. (They share their shape with the corresponding physical objects, on a traditional Lockean version of the view.) Finally, it is accommodated by representationalism.⁷ But, as we have seen, it is very hard to see how it is accommodated by Chirimuuta's externalist-disjunctivist adverbialism.

I wonder whether Chirimuuta would deny the color-shape datum, or try to accommodate it. I myself think that denying would be problematic, so I will briefly address some ways in which she might try to accommodate it.

First, Chirimuuta considers somehow combining externalist-disjunctivism adverbialism with "Fregean" representationalism (169). But even if she were to accept Fregean representationalism, she would presumably retain her chief thesis of the book, namely that colors are properties of perceptual processes or interactions. So she would still face my problem of explaining the color-shape datum. She would still have to explain why, when you interact with an object that is round, *a property of the interaction itself*, namely redness, seems to go together with a property of the *object* of the interaction. There is nothing in Fregean representationalism that might help Chirimuuta explain why this should happen.

Second, Chirimuuta sometimes invokes Gestalt ideas to explain the phenomenology of color experience (205-210). But I don't see how this helps with the specific problem I have raised. The *standard Gestalt principles* – for instance, the law of good continuity or the law of proximity – just cannot explain what Chirimuuta needs to explain: that when you interact with an object that is round, a property of the interaction itself, namely redness, seems to go together with a property of the object of the interaction. Again, this is not *generally true*. If I have a philosophical interaction with Chris Hill that is difficult and lasts five-minutes, this does not make it seem to me that there is something out there that is difficult, lasts five-minutes long, and is Chris-Hill-shaped.

Third, Chirimuuta could be a projectivist: color qualities are in fact properties of processes or interactions, but in experience we "project

⁷ For instance, the combination of representationalism and a reflectance theory of color can easily explain the datum. You have a brain state that tracks, and represents, the shape round. You have another that tracks, and represents, the color red (a reflectance). When these states are combined in the right way in the brain, you represent the co-instantiation of red and round.

them” onto external regions. However, this is not a theory but a metaphor. How does this happen?

(2) My second question is about just what Chirimuuta’s externalist adverbialism comes to. I think it comes in two importantly different versions, and I am not sure what version Chirimuuta defends.

On one version of Chirimuuta’s externalist adverbialism, *all* features of the process starting with the object and ending with the brain state somehow jointly contribute to constituting or metaphysically grounding the color of the whole process. Call this the **joint determination version** of externalist disjunctivist adverbialism (p. 174, top). (A rough analogy would be the way in which all features of a painting holistically determine the beauty of the painting. Another analogy: if I have a ten-minute long conversation with a friend, the early, middle and late parts of the conversation all determine whether it was overall enjoyable.) On another version, it is rather the case that it is only the brain state at the end that grounds the color of the process. Call this the **brain-based** version of externalist disjunctivist adverbialism.

To illustrate, suppose you view a yellow banana. Now consider an inverted earth case. On inverted earth, bananas have the blue reflectance profile. But on inverted earth, our twins naturally evolved inverting lenses on their retina. So, on inverted earth, when your twin looks at a blue-light banana, it ends up producing in the same brain state that it produces in Jane. Here’s a picture of these two “processes” or “interactions”:

You: **Brain state B** <----- retina <---- yellow-reflectance banana
Twin You: **Brain state B** <----- lenses <----- blue-reflectance banana

Now, on the *brain-based* version of Chirimuuta’s view, your perceptual process and your twin’s perceptual processes are both yellow, since the end with the same brain state, even if they start with different spectral distributions.

By contrast, on the *joint-determination version* of Chirimuuta’s view, while *your* perceptual process on viewing a banana is *yellowish*, your twin’s perceptual process has *some other color, just because the initial part of the process is different and involves a different spectral distribution, even though your brain states are identical*. (Compare: the same force, when combined with different forces, results in different resultant forces.)

I have three worries about the joint determination view. First, it violates phenomenal internalism for color experience, since Jane and twin Jane have the same postreceptoral brain state. But Chirimuuta hasn't provided in the book strong evidence for denying phenomenal internalism. Second, given an arbitrary perceptual process, starting with the spectral distribution and ending with a brain state, *what is the rule* whereby one can calculate how these jointly determine the resultant color of the whole process? (Compare: there is a rule for determining resultant force from component forces.) Or more generally: *how* do the early (spectral) parts and later (e. g. neural) parts jointly determine the color of the whole process? Third, given "structural mismatch" point discussed before and illustrated in Figure 1, it is just hard to believe that the spectral properties that start off a perceptual process help at all to metaphysically determine the color of that process. It seems to me more reasonable to suppose that the brain state at the tail end of that process plays the lion's share of the role in determining the color of the process.

For these reasons, Chirimuuta might accept the brain based version of externalist disjunctivist adverbialism: it is only the neural state that is at the end of a perceptual process that grounds the color of the whole process.

But then I am unclear what, on her view, is the explanatory role played by the early, external stages of the process involving the spectral distribution. True, even on the brain-based version of her view, the early, external stages may be a *causal role*. Everyone accepts that. But, on the brain based version of her view, it is only the brain process that *constitutively* determines the color of the interaction, and hence the phenomenology of the color experience. On this view, the early, external stages don't play a stronger, constitutive role in determining color of the process, and hence the phenomenology of the color experience. So if she accepts the brain based version of her view, I am now unclear about how her externalist version of adverbialism importantly differs from the traditional, internalist variety.

(3) My third and final question about externalist disjunctivist adverbialism is related to this. Suppose you view a tomato. Then suppose your brain state is artificially duplicated in the absence of the tomato, so you have a tomato-like hallucination that is just like your veridical experience of the tomato. As we saw, on her view, in a hallucination case, "color [H-color she calls it] is a property of the series of neural events

inside my brain” (p. 155). Now, in this hallucinatory case, since the early, external stages of the process are missing, they can’t play a role in determining the chromatic character of the hallucination.

But then, on Chirimuuta’s theory, what role are the early, external stage playing in the veridical case? They don’t seem to be making a difference to the phenomenology.

Further, I think her view faces a familiar “screening off” worry. Given that the H-color of your hallucination is an intrinsic property of the neural events in your brain, what she calls the “H-color” of the neural events in your head *must be present in the veridical case too*. But, in the veridical case, this would seem to “screen off” the earlier, external parts of the process in playing a role in determining the character of your experience.

5. Conclusion

Let me sum up. I agree with Chirimuuta on some big issues. I agree that there is a puzzle in the vicinity of what she calls the Janus-faced character of color. The experience of color is externally-directed and internally-dependent, and this is hard to explain. I also agree with her that it is wrong to think that colors are always instantiated by objects outside the head, and it is also a mistake to think that they are always instantiated inside the head. But I have raised some questions about her alternative view that they are instantiated by big, world-mind processes that span the outer-inner divide. In my view, all of these views may share a false presupposition: that colors are instantiated in the world at all.

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