

# Color, Variation, and the Appeal to Essences: Impasse and Resolution

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*The greatest truth we could hope to discover, in whatever field we discovered it, is that man's truth is the final resolution of everything.*

— Wallace Stevens, “The Relations Between Poetry and Painting”.

Many philosophers have been attracted by the view that colors are mind-independent properties of object surfaces. A leading, and increasingly popular, version of this view that has been defended in recent years is the so-called physicalist position that identifies colors with (classes of) spectral reflectance distributions.<sup>1</sup> This view, has, however, come in for a fair bit of criticism for failing to do justice to the facts about perceptual variation.<sup>2</sup>

Recently, however, Byrne and Hilbert (2004) have argued that this criticism can be met. They compare cases of perceptual variation involving color to other cases of representational variation involving temperature, point out that such variation fails to undermine physicalism about temperature, and suggest, therefore, that variation is equally ineffective in blocking physicalism about color.

In this paper I shall review the anti-physicalist argument from perceptual variation (§1) and the Byrne and Hilbert response to this argument (§2). Then I shall argue that this response is inadequate as it stands, insofar as attackers and defenders of color physicalism will disagree about whether the analogy on which it turns is applicable to the case in dispute (§§3–4). Finally, I shall appeal to facts about our inferential treatment of color and other properties as a way

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<sup>1</sup>Salient recent defenses of this view include Hilbert (1987), Byrne and Hilbert (1997a), Tye (2000), and Byrne and Hilbert (2003). ‘Physicalism’ strikes me as an inapt label for this view, insofar as (i) alternative accounts also allow that colors are physical, (ii) the view comes without any substantive characterization of the physical, and (iii) the issue about what counts as physical is, in any case, orthogonal to the main lines of contrast concerning the nature of color. That said, I shall adhere to the label preferred by the defenders of the view for present purposes.

<sup>2</sup>See, for example, Block (1999), Cohen (2004), Cohen (2003), Matthen (1999), Hardin (2003), Hardin (2004), Jakab and McLaughlin (2003), Kuehni (2003), Averill (2003).

The argument from perceptual variation may be applicable to certain non-physicalist views about color as well, possibly including that of Campbell (1993). That said, I’ll focus on color physicalism in what follows, insofar as physicalists have been the most vocal proponents of the defense against variation arguments that I’ll criticize below.

of resolving this impasse (§5). Ultimately, I shall conclude, these facts give us a defeasible reason for rejecting the Byrne and Hilbert response, and so for rejecting color physicalism.

## 1 Prologue: Color Physicalism and Variation

The difficulty for color physicalism arises from the observation that there is remarkably widespread interpersonal and intrapersonal (and interspecies) perceptual variation with respect to color: a given color stimulus produces a variety of perceptual effects in different perceptual systems (or in a single perceptual system under different perceptual circumstances). Plausibly, each of these different effects represents the color of the stimulus. But if colors are mind-independent and circumstance-independent properties of surfaces, as are (classes of) spectral reflectance distributions, then physicalists are committed to saying that at most one of the variants represents the color of the stimulus veridically. However, the objection goes, it is hard to see that anything could make it the case that one of the variants is veridical at the expense of the other: what considerations could be brought forward in support of one of the variants that would not be matched by considerations of equal force in favor of some other variant?

To see that this question has force, it is important to contrive it metaphysically rather than epistemically: the question is not ‘how do perceivers know (or how do we know) which of the varying perceptual effects veridically represents the color of the patch?’, but ‘what makes it the case that one of the varying perceptual effects (as opposed to the others) veridically represents the color of the patch?’. The physicalist is committed to there being an answer to this question; but, the objection goes, it is hard to see why we should believe that there is one.

## 2 Exposition: Red and 70°F

Recently, Byrne and Hilbert consider a version of this objection: a particular chip looks unique green (i.e., it looks greenish without looking at all bluish or at all yellowish) to Fred under fixed viewing conditions  $C$ , but it fails to look green to a range of other observers in conditions  $C$  (Byrne and Hilbert (2004), Byrne and Hilbert (2003)). Call this case COLOR. Byrne and Hilbert agree that color physicalism requires that at most one of the variants in COLOR veridically represents the color of the chip. But they deny that facts about variation give any reason for doubting that this is so. They are prepared to concede, for the sake of the argument, that facts about variation might undercut Fred’s reason for believing that the chip is unique green, and more generally that facts about variation might undercut everyone’s reasons for believing that any object is any color. Still, they insist, no reason has been given for doubting that there is a fact of the matter about whether Fred’s (or any other observer’s) representation of the color of the chip is veridical. In other words, Byrne and Hilbert allow that

the variation might constitute a serious epistemic threat (by preventing Fred or others from *knowing* which variant is veridical), but they take this threat to be without metaphysical import, since there may nonetheless be a fact of the matter about which variant is veridical. To bolster this case, they provide an analogy to another case of representational variation — one that involves a population of intelligent, reasonably accurate, but not precisely calibrated thermometers to each of whom the ambient temperature seems to be some number of degrees Fahrenheit:

Some think the temperature is 69°F, while others think it's 70°F, and yet others think it's 71°F... Since they don't have other ways of measuring temperature, they have no "independent method" of determining whether the temperature right now is exactly 70°F, or even whether it's pretty high. Still, some of these thermometers are perceiving the temperature correctly and others are not (9).

Call this case TEMPERATURE. Since we are prepared to accept that there is a fact of the matter about which variant is veridical in TEMPERATURE, Byrne and Hilbert conclude that interpersonal variation in COLOR leaves room for a fact of the matter about which variant is veridical in COLOR. Therefore, they conclude, the existence of interpersonal variation fails to cast doubt on color physicalism.

### 3 Development: Red and Humor

What should we make of this response?

On the one hand, Byrne's and Hilbert's analogy does show that the mere fact of variation is by itself insufficient to license the conclusion that there is no fact of the matter about which variant veridically represents the color of the stimulus. On the other hand, neither does it show that, in the disputed case COLOR, there *is* a fact of the matter about which variant veridically represents the color of the stimulus — it only shows that the structure of the case leaves it open that there *may* be one.

This point matters because there are many other cases of representational variation where it is much less plausible that there is a fact of the matter about which variant is veridical. To see this, consider the case HUMOR, in which there is a population of intelligent conversants, to each of whom a given joke seems to be either humorous or not humorous. Some of them think the joke is humorous, while others think it is not. Since they don't have other ways of ascertaining whether jokes are humorous, they have no "independent method" of determining whether the joke they just heard is humorous. I take it that, in this case, it would be a mistake to insist that some of these conversants are representing whether the joke is humorous veridically while others are not.<sup>3</sup>

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<sup>3</sup>My point works on the (in my view, plausible) assumption that *being humorous* is a response-dependent property. Another candidate is the property that social situations have of being embarrassing: we might imagine a population of intelligent social interactors, to each

The moral seems to be this. While there are some cases of representational variation where there is a fact of the matter about which variant is veridical (e.g., TEMPERATURE), there are other cases of representational variation where there is not a fact of the matter about which variant is veridical (e.g., HUMOR). Now, the original challenge about COLOR was to explain what makes it the case that one perceptual variant is veridical at the expense of the others. We can now see that, in this context, the appeal to TEMPERATURE is unsatisfactory. For, we might ask, why appeal to that case of representational variation, where there is a fact of the matter about which variant is veridical, rather than another case where there is no fact of the matter about which variant is veridical?

I want to suggest that we have arrived at a serious standoff. Our assessment of the challenge from perceptual variation turns crucially on which of the analogies we think is the right one. Unfortunately, there is no obvious reason for preferring either one of them. It is important to see that the situation is not a simple matter of one side begging the question against the other, but a genuine dialectical standoff: since both analogies are available, anyone who proposes either way of thinking about the case can be accused of begging the question against the other way of thinking about the case. Since both sides of the dispute are vulnerable to this accusation, all we can predict about the dispute is that whoever speaks first will lose. This is, I take it, an extremely unsatisfactory dialectical situation for all parties concerned. All parties concerned are in need of some way to break the stalemate. What considerations can we bring to bear, then, that would get us beyond the present impasse?

## 4 Diagnosis: Variation and Essence

Before we can break the impasse by deciding on one of the two competing analogies that we have been offered for thinking about COLOR (viz., TEMPERATURE and HUMOR), we need a diagnosis of the difference between them. I want to suggest that the crucial difference between the two analogies lies in the question of whether there is an essence of the relevant properties that could serve as a standard against which to judge representational variants.

First consider TEMPERATURE. As Byrne and Hilbert point out, here we want to say that there is a fact of the matter about which of the conflicting representations veridically represents the ambient temperature. Crucially, what makes the veridical representation veridical (at the expense of the others) is that a temperature property such as *being 70° F* has a natural essence (involving a particular mean molecular kinetic energy of the ambient atmosphere) such that the possession of this essence is constitutive of being 70°F; that is, there is a representation-independent essence for this temperature property that serves as a truth-maker (/falsity maker) of the conflicting representations. In addition,

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of whom a given social situation seems to be either embarrassing or not embarrassing. That said, I don't mean to haggle over the metaphysics of *being humorous* (or *being embarrassing*) in particular; the reader who takes my examples not to be response-dependent is invited to replace them with one that is in what follows.

that there is a fact of the matter about which representation is veridical, and that it is the essence of the ambient atmosphere that constitutes this fact of the matter, is quite independent of our (yours, mine, the intelligent thermometers') epistemic state. Even if we were all unaware that the ambient atmosphere exemplified the 70°F essence, or even if we were all cognitively closed to this fact, the temperature would nonetheless be 70°F and not 71°F. That is, the capacity of the essence in question to make true (at most) one of the conflicting representations would not be compromised in any way if it should turn out that that essence is hidden from us because of our (temporary or permanent) epistemic limitations. That is why Byrne and Hilbert are justified in regarding intractable cases of representational variation about ambient temperature as merely epistemic, and without metaphysical import.

In contrast, consider the alternative analogy involving HUMOR. Here, I suggested, it seems right to deny that there is a fact of the matter about which of the conflicting representations veridically represents the joke. In particular, we would deny that there is a representation-independent essence (an essence supervening on the syntax and semantics of the sentences used to tell the joke, say) the possession of which is constitutive of being humorous and whose exemplification or non-exemplification by the joke would make it the case that (at most) one of the representations is veridical; that is, it is implausible that there is any essence that could serve as a truth-maker (/falsity-maker) of the conflicting representations.<sup>4</sup> In addition, we take our ignorance of any such essence as evidence that there is none, rather than supposing there might be an essence that eludes our epistemic powers. That is why we would be wrong to regard intractable cases of representational variation about whether the joke is humorous as merely epistemic, and without metaphysical import.

## 5 Dénouement: Essence and Inference

Now that we have located the relevant difference between the cases of TEMPERATURE and HUMOR in the availability or unavailability of an essence that can serve as a standard of correctness to adjudicate between representational variants, we are in a position to resolve the standoff over COLOR. To do this, we must ask whether color properties have essences that can serve as a standard of correctness to adjudicate between perceptual variants in COLOR.

This is, of course, a broadly empirical question to which a decisive answer is presently unavailable. Nonetheless, I believe we can advance past the current

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<sup>4</sup>For reasons of brevity, I am assuming for present purposes that representation-dependent (/subject-dependent) properties of the joke — say, the property of being disposed to cause amusement reactions in Fred — do not count as essences. I'm putting such properties aside because, even if they were allowed to count as essences, they would be crucially unlike the sort of essence at work in the temperature case in that they are not up to the task of making true one of the conflicting representations at the expense of others. For example, if Fred does and Frederica does not believe that the joke is humorous, Fred cannot show that his representation is correct (and that Frederica's is not) by demonstrating that the joke has the property of being disposed to cause amusement reactions in Fred.

impasse by noting that our inferential practices reveal a commitment to the existence of an essence in TEMPERATURE but not in HUMOR or COLOR. This will give a defeasible reason for resolving the standoff regarding COLOR by treating it as as more like HUMOR than like TEMPERATURE, hence for rejecting Byrne's and Hilbert's defense of color physicalism.

Let us begin, then, by considering the sorts of inferences we are prepared to make about temperature. Of course, we currently have well-justified reason to believe not only that temperature properties have constitutive material essences, but that we know they are; but, to put ourselves in the epistemic position that matters for the purposes of the current controversy, consider what 18th-century subjects said and thought about temperature when its essence was still hidden (i.e., before scientific work in the 19th century by Maxwell, Boltzmann, Thompson, *et. al.* had revealed the essence constitutive of temperature properties, but after the scientific enterprise as a whole was sufficiently off the ground that at least some things were treated as having constitutive essences, whether hidden or not).<sup>5</sup> For one thing, I suppose that such 18th-century subjects classified samples as falling under the extension of *being 70° F* or not at least partly on the basis of the so-called surface properties of the samples — the way those samples phenomenally appeared to them. However, in addition, I take it that such subjects thought (reasonably by our post-19th-century lights) that instances of *being 70° F* have a range of characteristic causal interactions with the environment — e.g., that such instances will have cooling effects on some things and warming effects on some other things, that they have systematic connections with properties like pressure, electrical and sound conductivity, refraction of light, and so on. And this latter set of beliefs would have come out clearly in the inductions these subjects made about particular samples — for example, inductions about the temperature at which this particular instance of *being 70° F* would (like instances encountered in the past) melt ice, exert a characteristic pressure, and so on. It is hard to see why such subjects would make these inductions about particular samples, thereby projecting their beliefs about previously encountered samples onto newly encountered samples, unless they thought that the new samples were like the old ones in some aspect of their material constitution.<sup>6</sup> This suggests that such subjects attributed to samples of *being 70° F* not only a characteristic range of surface properties, but also a characteristic (but, at this time, unknown) material microstructural property in virtue of which the samples were alike in their causal interactions. Moreover, I take it that the same subjects took the possession of this microstructural property to be criterial for being instances of *being 70° F*. In particular, a subject who found a sample *S* that manifested the surface features but whose pattern of causal interaction departed from that associated with the temperature property would (quite reasonably from our point of view) hold that *S* is *not* an instance

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<sup>5</sup>Or, if you prefer to give credit for this discovery to 16th and 17th century atomists (e.g., Bacon, Boyle, Hooke, Galileo), then consider what 15th-century subjects said and thought about temperature.

<sup>6</sup>Cf. Gelman (2003), ch2–3 for evidence that such projections are grounded in commitments to a (typically unknown) material essence in both children and adults.

of the temperature property. That is, in cases where  $S$  shared surface appearances with instances of the temperature property but failed to share a pattern of causal interaction with those instances (hence, presumably, failed to share the relevant microstructural property with those instances), subjects counted  $S$  as *not* an instance of the temperature property. In sum, in the case at hand, subjects' inferential patterns clearly reveal a commitment to the temperature property's having a hidden material microstructure, and their practice of taking the presence of that microstructure as criterial for satisfying the property (even overriding cues about surface appearances) means that they are treating that hidden constitution as a hidden essence of the temperature property.<sup>7</sup>

Now consider some contrasting inferential practices regarding the property *being humorous*. I shall take it for granted that either there is no essence of this property, or that if there is an essence it is still hidden (i.e., no one has done the scientific work that reveals the essence that is constitutive of being humorous); consequently, we are ourselves currently in the humor equivalent of the 18th-century period for *being humorous*, and so can ask about our own inferential practices about this property. We are frequently confronted with events, stories, jokes and the like, and we routinely (and reasonably) classify these as humorous or not humorous on the basis of their surface properties — on the basis of how they strike us. However, unlike what we found in the case of temperature properties, we do not suppose that instances of *being humorous* have a characteristic range of causal interactions with the environment. Indeed, the suggestion that humorous things have such a range of interactions seems absurd on its face (doesn't it?). That is to say, our inferential treatment of *being humorous* seems more or less limited to classifying situations as instances or non-instances, and in particular seems not to involve making inductive generalizations about the causal effects of humorous things. But if we do not make inductions about humorous things, this shows that we are not committed to the existence of any shared constitutive ground for our inductions about *being humorous*; indeed, I take it that we would be inclined to doubt that there is such a shared constitutive ground. For this reason, it is hard even to generate a clash between the surface appearances and the shared constitution of humorous things. That said, supposing that some researcher claimed to have identified the shared, subject-independent microstructural constitution of *being humorous*, I think we would side with the surface appearances rather than the allegedly hidden essence in cases where the two clashed: if the researcher produced a joke exemplifying the hidden microstructural constitution but it failed to strike you as humorous, I think you would insist that the situation is *not* humorous (unless you had some background reasons for distrusting your own humor-classifications on that specific occasion). In sum, in the case at hand, our inferential patterns clearly fail to reveal a commitment to humorous things sharing a hidden microstructural constitution, and our practice of taking the presence of the surface appearances as criterial for being humorous (even overriding cues about alleged

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<sup>7</sup>Cf. the fable of the snake in Fodor (1998), 152–153, where Fodor uses analogous tests to mark off natural kind concepts (our concept of water, as it might be) from concepts whose contents merely happen to be natural kinds (Homer's concept of water, as it might be).

hidden constitution) means that we are treating *being humorous* as not having a hidden microstructural essence.

With the contrast between our treatment of *being 70° F* and *being humorous* in mind, now consider how we treat a color property such as *being red*. As in the cases of both *being 70° F* and *being humorous*, our judgments about *being red* include discriminations between instances and non-instances. However, as in the case of *being humorous*, and unlike the case of *being 70° F*, it strikes us as implausible (and, as explained by Nassau (1980), it is not true) that instances of *being red* share a characteristic range of causal interactions with the environment. Indeed, the suggestion that red things have such a range of interactions seems absurd on its face (doesn't it?). That is to say, our inferential treatment of *being red* seems more or less limited to classifying samples as instances or non-instances, and in particular seems not to involve making inductive generalizations about the causal effects of red things. But if we do not make such inductions about red things, this shows that we are not committed to (indeed, we are doubtful of) the existence of any shared constitutive ground for our inductions about *being red*. For this reason, it is hard even to generate a clash between the surface properties and the shared microstructural constitution of red things (just as, for the same reason, it is hard to generate such a clash involving humorous things). That said, supposing that some researcher claimed to have identified the shared, subject-independent constitution of *being red*, I think we would side with the surface properties rather than the allegedly hidden essence in cases where the two clashed: if the researcher produced an object exemplifying the hidden microstructural constitution but it failed to strike you as red, I think you would insist that the object is *not* red (unless you had some background reasons for distrusting your own redness-classifications on that specific occasion). In sum, in the case at hand, our inferential patterns clearly fail to reveal a commitment to red things sharing a hidden microstructural constitution, and our practice of taking the presence of the surface properties as criterial for being red (even overriding cues about alleged hidden microstructural constitution) means that we are treating *being red* as not having a hidden essence.

## 6 Resolution: Getting Past the Impasse

Thus, the evidence of our inferential practices shows that we take color properties not to have hidden (or manifest) essences. And this gives a way of breaking the dialectical standoff we have run up against: it suggests that we should analogize the case of COLOR to the case of HUMOR rather than to the case of TEMPERATURE. Of course, what I have said in this regard is not decisive. An opponent who favored the TEMPERATURE analogy could, after all, insist that our treatment of *being red*, as revealed by our inferential practices, is simply wrong, and will one day be revealed to be wrong by the progress of empirical inquiry. I cannot, and do not wish to, close off this empirical possibility. However, it strikes me as egregiously flouting the general virtues of epistemic modesty and



conservatism to accept this revisionist line now; surely such a flout is not justified by a mere conjecture about an unknown empirical outcome. Moreover, and even more seriously, we should notice that an analogous revisionism is (in principle) possible for *being humorous* as well; but since, I take it, it is not plausible to suppose that empirical inquiry will reveal a hidden essence to this property, we have, so far, no reason to accept the revisionist conclusion about *being red* either.<sup>8</sup>

It appears, then, that the dialectical standoff forces a choice now between conflicting alternatives, and that we lack decisive empirical reasons for correcting our inferential practices. Consequently, those practices serve as undefeated (but defeasible) reasons for treating the representational variation in the case of COLOR as analogous to the case of HUMOR rather than that of TEMPERATURE. As such, problems about perceptual variation remain serious threats to color physicalism.<sup>9</sup>

## References

- Averill, E. W. (2003) "Perceptual Variation and Access to Colors," *Behavioral and Brain Sciences* 26:1, 22.
- Block, N. (1999) "Sexism, Racism, Ageism and the Nature of Consciousness," in R. Moran, J. Whiting, and A. Sidelle, eds., *Philosophical Topics 26 (1&2)*, *The Philosophy of Sydney Shoemaker*, University of Arkansas Press, Fayetteville.
- Byrne, A., and D. R. Hilbert (1997a) "Colors and Reflectances," in A. Byrne and D. R. Hilbert, eds., *Readings on Color, Volume 1: The Philosophy of Color*, MIT Press, Cambridge, Massachusetts, 263–288.
- Byrne, A., and D. R. Hilbert, eds. (1997b) *Readings on Color, Volume 1: The Philosophy of Color*, MIT Press, Cambridge, Massachusetts.
- Byrne, A., and D. R. Hilbert (1997c) *Readings on Color, Volume 2: The Science of Color*, MIT Press, Cambridge, Massachusetts.
- Byrne, A., and D. R. Hilbert (2003) "Color Realism and Color Science," *Behavioral and Brain Sciences* 26:1, 3–64.
- Byrne, A., and D. R. Hilbert (2004) "Hardin, Tye, and Color Physicalism," *The Journal of Philosophy* CI:1, 37–43.
- Campbell, J. (1993) "A Simple View of Color," in J. Haldane and C. Wright, eds., *Reality, Representation, and Projection*, Oxford University Press, New York. Reprinted in Byrne and Hilbert (1997b), 177–190.

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<sup>8</sup>Indeed, this sort of revisionism about *being red* is in one epistemically relevant respect even less plausible than the corresponding sort of revisionism about *being humorous*: namely, there is a history of unsuccessful attempts to adumbrate the former essence (but not the latter) that itself provides defeasible inductive reason for doubting that there is one.

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- Cohen, J. (2003) "Perceptual Variation, Realism, and Relativization, Or: How I Learned To Stop Worrying And Love Variations in Color Vision," *Behavioral and Brain Sciences* 26:1, 25–26.
- Cohen, J. (2004) "Color Properties and Color Ascriptions: A Relationalist Manifesto," *The Philosophical Review*. In press.
- Fodor, J. A. (1998) *Concepts: Where Cognitive Science Went Wrong*, Oxford University Press, New York.
- Gelman, S. A. (2003) *The Essential Child: Origins of Essentialism in Everyday Thought*, Oxford University Press, Oxford.
- Hardin, C. L. (2003) "A Spectral Reflectance Doth Not a Color Make," *The Journal of Philosophy* 100:4, 191–202.
- Hardin, C. L. (2004) "A Green Thought in a Green Shade," *Harvard Review of Philosophy* XII, 29–39.
- Hilbert, D. R. (1987) *Color and Color Perception: A Study in Anthropocentric Realism*, CSLI, Stanford.
- Jakab, Z., and B. McLaughlin (2003) "Why Not Color Physicalism Without Color Absolutism?" *Behavioral and Brain Sciences* 26:1, 34–35.
- Kuehni, R. G. (2003) "Olive Green or Chestnut Brown?" *Behavioral and Brain Sciences* 26:1, 35–36.
- Matthen, M. (1999) "The Disunity of Color," *The Philosophical Review* 108:1, 47–84.
- Nassau, K. (1980) "The Causes of Color," *Scientific American* 243, 124–154. Reprinted in Byrne and Hilbert (1997c), 3–29.
- Tye, M. (2000) *Consciousness, Color, and Content*, MIT Press, Cambridge, Massachusetts.