

# Metamerism, Constancy, and Knowing Which\*

Mark Eli Kalderon

July 12, 2007

---

Nature loves to hide.

---

HERACLITUS

## §1 TWO CONCEPTIONS OF EXPERIENCE

When Norm perceives a red tomato in his garden, Norm perceives the tomato and its sensible qualities—Norm perceives something red, round, and bulgy. Not only does Norm perceive the red of the tomato but Norm also perceives what that red is like—Norm can see that it is reddish and not at all bluish. Moreover, there is a way in which it is like for Norm to perceive the tomato. What it is like for Norm to perceive the red tomato is different from what it is like for Norm to perceive a green tomato. Not only are these experiences numerically distinct they are qualitatively distinct as well.

Let us say that this qualitative distinction is a difference in the *phenomenal properties* of these experiences. Phenomenal properties, so understood, are properties of experience at least in the minimal sense corresponding to the fact that we can intelligibly classify experiences on the basis of their phenomenology. What it is like for Norm to perceive a tomato is a property of Norm's experience of the tomato and not a property of the tomato itself. The phenomenal properties of Norm's

---

\*Thanks to Keith Allen, David R. Hilbert, Guy Longworth, MGF Martin, James Pryor, Sydney Shoemaker, Maja Spener, Scott Sturgeon, and Charles Travis, and to the Philosophical Society at Oxford University where a version of this material was presented. Special thanks to the anonymous referees whose queries prompted substantive development of this paper.

experience of the tomato are thus distinct from the qualities of the tomato, even its sensible qualities such as being red, round, and bulgy. The sensible qualities of the tomato perceptually available from Norm's point of view may be perceptually present in Norm's experience of it, but they are properties of the tomato and not of Norm's experience of the tomato.

Phenomenal properties and sensible qualities may be distinct, but this is not to say that they are unrelated. Talk of phenomenal properties is merely meant to register a respect in which experiences may differ—it is, so far at least, noncommittal as to how this difference is to be understood. Thus, for example, it is consistent with the present linguistic regimentation that an experience having the phenomenal property that it does is constituted by the quality that is perceptually present to the subject in the experience—just as the regimentation is consistent with phenomenal properties being subjective monadic qualities of experience.

What is the relation between colors and the phenomenal properties of our experience of them? A naïve thought is this—the phenomenal character of color experience is determined by the qualitative character of the perceived color. When Norm perceives a red tomato, the phenomenal character of his color experience is determined, at least in part, by the qualitative character of the redness manifest in his experience of the tomato.

According to the naïve conception of color experience, the phenomenal character of color experience is determined by the partial perspective it provides on the chromatic features of the material environment. To know what it is like to undergo a color experience would be to know the color selectively presented to the perceiver's partial perspective (see Nagel, 1979, 166, 172, 173–4). An experience would be intrinsically connected to its subject matter since experience, so conceived, just is a perceptual presentation of that subject matter to a perceiver's partial perspective. According to the naïve conception, then, experience is *relational*. Compare Hume's characterization of experience as conceived by the vulgar:

...when men follow this blind and powerful instinct of nature, they always suppose the very images, presented by the senses, to be the external objects, and never entertain any suspicion, that the one are nothing but representations of the other. This very table, which we see white, and which we feel hard, is believed to exist independent of our perception, and to be something external to our mind, which perceives it. (Hume, 1740/2006, 113–4)

Not all philosophers accept the naïve conception of color experience—Hume maintained that it took the “slightest bit of philosophy” to reveal its inadequacies. Indeed, from at least the early modern period, a persistent temptation has been to conceive of color experience, not as a relation to the chromatic features of the ma-

terial environment, but as the qualitative effect of that environment, as a conscious modification of the perceiving subject.

Placing an object a certain distance from another does not modify that object, only its location—though, of course, changing the distance among its parts will modify an object. Thus moulding a lump of clay into triangle modifies that lump of clay. On the naïve conception, an experience is not a modification of the perceiving subject since the relata are not, in this way, constituent parts of the perceiver. So conceived, the perceiver is not modified by being perceptually presented with objects, qualities, and relations of the material environment. However, on the alternative conception, experience is a modification of the perceiving subject in the way that being triangular is a modification of the clay. But whereas experience is a *conscious* modification, being triangular is not. So understood, the phenomenal character of color experience, what it is like for a perceiver to undergo that experience, is a monadic quality of a mental episode, the color experience elicited in the perceiver by some material cause in the environment.

On the naïve conception, experience may not be, *in this sense*, a qualitative effect of the material environment, but that is not to say that there are no perceptual effects, so conceived. There is nothing incoherent about a cause having a relational effect (where a relational effect is an event constituted by the obtaining of a relation). And there is nothing incoherent about the relational effect of a cause consisting in the obtaining of a relation between a thing and that cause. (Consider the power of the wind to cause a weather vane to point in its direction.) The crucial difference is that on the naïve conception of experience perceptual effects are not conscious modifications of the perceiving subject.

On the conception of experience as a conscious modification of the perceiving subject, not only are experiences understood to be the qualitative effects of material causes, but the causal correlation is sufficiently systematic to be epistemically significant. The qualitative character of experience must be sufficiently varied for experiences with a certain quality to be reliably correlated with features of the material environment. The causal correlation between qualitative experiences and features of the material environment is sufficiently reliable, across a broad range of cases, for the immediate, noninferential perceptual judgments that we are liable to form on their basis to be at least warranted if not indeed a mode of knowledge of those features.

The conception of experience as the qualitative effect of the material environment is what Johnston (2006) describes as “The Wallpaper View” and what Martin (1998) attributes to Ducasse (1942). It is familiar from the early modern period. Thus, Walter Charleton, following Gassendi, in a vein that will subsequently become typical, writes:

By the Quality of any Concretion, we understand in the General, no

more but that *kind of Appearance, or Representation whereby the sense doth distinctly deprehend, or actually discern the same, in the capacity of its proper Object*. An *Appearance* we term it because the *Quale* or *Suchness* of every sensible thing, receives its peculiar determination from the relation it holds to that sense, that peculiarly discerns it. (Charleton, 1654, 128)

Though prominent in the seventeenth century, it continues to have its advocates. Thus Block (1996) and Chalmers (2004, 2006) offer sophisticated variants of it.

Reflection on Moore's transparency intuition might count against conceiving of color experience as the qualitative effect of material causes:

In general, that which makes a sensation of blue a mental fact seems to escape us: it seems, if I may use a metaphor, to be transparent—we look through it and see nothing but the blue. (Moore, 1903, 37)

When we try to introspect the sensation of blue, all we can see is the blue: the other element is as it were diaphanous. (Moore, 1903, 41)

Moore is right at least to this extent: In introspectively reflecting on what it is like to undergo a color experience, a perceiver attends only to what that experience is *of* or *about*, and not at all to the qualities of experience, if any. However, this is so far consistent with conceiving of color experience as the qualitative effect of the material environment, for attention is one thing and introspective awareness another. Thus Block writes:

An ontology of colors of things plus internal phenomenal characters of our perception of those colors is all that is needed. I think that the only grain of truth in [the] phenomenological point is that when we try to attend to our experience in certain circumstances, we only succeed in attending to what we are seeing, e.g., the color of the apple. But attention and awareness must be firmly distinguished. For example, we can experience the noise of the refrigerator (and be aware of it in that sense) but only notice it or attend to it when it ceases. (Block, 1999)

Some philosophers, representationalists prominent among them, have held that reflection on transparency establishes a stronger claim, one that is inconsistent with conceiving of color experience as the qualitative effect of material causes. In introspecting what it is like to undergo a color experience, the reason we attend only to the color of the perceived object and not to any quality of the experience is because the perceived color, and not any quality of experience, determines the phenomenal character of that experience (see, for example, Harman, 1990). While this latter claim is indeed inconsistent with the present conception of color experience, it is a substantive explanatory claim and not the deliverance of intuition.

As long as there are intelligible alternatives to this explanatory claim, it may be intelligibly doubted. (For more on these two interpretations of transparency see Crane 2006; Martin 2002; Siewert 2003; Stoljar forthcoming.)

## § 2 METAMERISM AND KNOWING WHICH

I believe that color experience has a presentational phenomenology inadequately captured by the view that color experience is merely the qualitative effect of material causes. I do not believe, however, that this disagreement is fruitfully pursued by reflection on transparency alone. Instead, I will argue that there is an aspect of color phenomenology that is epistemically significant—an epistemic significance that color experience could not have if it were merely the qualitative effect of material causes.

It is a common place observation that two garments can match in color appearance when viewed in a store and yet fail to match in color appearance when viewed in sunlight. The fluorescent lighting of many stores is notoriously prone this kind of metamerism—where two samples are metameric pairs if they match in color appearance in one condition and yet fail to match in color appearance in others and where the colors instantiated by metameric pairs are metameric counterparts. In an environment known to be populated by metameric pairs, a savvy shopper has a motive to vary the conditions of illumination sufficiently to determine, say, whether those trousers really do match that shirt.

However, even if Norm, a normal perceiver, is not involved in a matching task, in an environment known to be populated by metameric pairs, Norm can still be motivated to vary the conditions of illumination in order to determine the color of an object, say by taking the object out of the shop and into the sunlight. An interest in knowing which color an object is, quite apart from any matching task, is sufficient to motivate varying the conditions of illumination. Norm is not trying to enjoy a veridical experience of the color, one had only under specific conditions of illumination, conditions that failed to obtain in the shop. Though Norm veridically perceives the color even under the initial conditions of illumination, his perception of the color is insufficient for Norm to know which color he is perceiving. It is only by viewing the object under different conditions of illumination that Norm is in a position to know, or at least be confident, which color he is perceiving.

If perception provides only a partial perspective on the sensory aspects of the material environment, then this observation is a natural one. The partiality of perception has recently been defended by Hilbert (1987), but it has ancient roots as well—arguably, Heraclitus is an advocate (see Kalderon, forthcoming):

Heraclitus' message was quite different: not the empty subjectivity of sensible appearances but their one-sided partiality. ...Are they right or

we? The implied answer is that each is right—from his own point of view. It follows that the different but equally valid points of view are one-sided, partial reflections of reality. At some deeper level, from as it were an absolute god's-eye vantage-point, the opposition and contrast is overcome. The sea is both pure and impure; mud is both clean and dirty; rubbish is wealth. (Burnyeat, 1979, 69)

Not only is perception partial in the sense that there are properties of an object not perceptually available (objects may have unobservable aspects), not only is perception partial in the sense that some sensible qualities of an object may be occluded from view (the backs of objects are colored as well), but perception is also partial in the sense there are sensible qualities of an object that are not determined by a given perception. If perception is partial, as a Heraclitean epistemology would have it, then it is intelligible that not every aspect of a perceived color is determined by a given perception of it. In the store, under initial conditions of illumination, Norm veridically perceives the color; moreover, Norm perceives what that color is like—at least to some extent. Thus Norm can perceive that the color is a determinate of certain sufficiently broad color determinables. Nevertheless, not every aspect of the color of the object is manifest to Norm in his initial color experience. The qualitative nature of the color is insufficiently manifest in Norm's perceptual encounter with it for Norm to know which color he is perceiving.

The phenomenal character of color experience can vary under different conditions of illumination. The same color instance can elicit phenomenally distinct color experiences in different conditions of illumination. Norm's experience of the color of the garment in the shop is phenomenally different from Norm's experience of that color in broad daylight. This is an aspect of the explanatory challenge posed by the phenomena of color constancy—to explain how the color of an object can appear the same and yet different across a broad range of scenes and conditions of illumination. (Human color vision does not exhibit constancy for every possible scene and every possible condition of illumination. The explanatory challenge is, rather, to explain the degree of constancy it exhibits in some scenes in some range of illumination.) Moreover, it is by undergoing these phenomenally distinct color experiences that Norm is in a position to know, or at least be confident, which color the garment is. This is a positive epistemic achievement. A subject thereby gains knowledge—by means of a course of phenomenally distinct color experiences, a subject comes to know which color the object is. This achievement is only possible if the different phenomenal characters of Norm's color experience in the store and in daylight has positive epistemic significance. It is only by undergoing these phenomenally distinct color experiences that Norm can come to know which color the garment is.

Two clarifications are in order. First, the claim is not just that color experience

has positive epistemic significance, but that a specific aspect of color experience, its phenomenal character, has positive epistemic significance. Second, the claim is not that, in all circumstances, in order to know which color he is perceiving, the perceiver must vary the conditions of illumination. If the circumstances are propitious, Norm can tell at a glance that the tomato in his garden is a particular shade of red. It is only necessary to vary the conditions of illumination to know which color is being perceived in *certain* circumstances, such as an environment known to be populated with metameric pairs. In such circumstances, the phenomenal character of the distinct experiences elicited under different conditions of illumination is epistemically significant.

If, however, color experience were merely the qualitative effect of material causes, then the phenomenal character of color experience could not have this positive epistemic significance. Recall that qualities of color experience are supposed to be sufficiently varied for them to be reliably correlated with features of the material environment, and that the causal correlation between qualitative experiences and features of the material environment is sufficiently reliable, across a broad range of cases, for the immediate, noninferential perceptual judgments that we are liable to form on their basis to be at least warranted if not indeed modes of knowledge of those features. The qualitative character of color experience is only epistemically significant insofar as there is a reliable correlation between experiences with that character and features of the material environment. Color experience is merely a causal intermediary between features of the perceiver's material environment and the perceptual judgments that the perceiver is liable to form about that environment.

The qualitative character of color experience is thus not devoid of epistemic significance. As Johnston has observed, the qualitative character of color experience, so conceived, can have a negative epistemic significance:

For a subject used to enjoy sensory qualia, the loss, or fading, or inversion of qualia should be an alarm bell, a warning that things are far from normal. That certainly can have epistemic significance; in particular it can provide a ground for withholding beliefs about the scene before the eyes, and, more generally, for withholding beliefs about the scenarios before the senses. (Johnston, 2006, 261)

While the phenomenal character of color experience, so conceived, can have a negative epistemic significance, it can be hard to understand how it could have the kind of positive epistemic significance it must have if undergoing phenomenally distinct experiences of the same color under different conditions of illumination suffices for knowing which color is being perceived.

If color experience were the qualitative effect of the material environment, then what epistemic significance it would have would entirely derive from being a causal

intermediary in the reliable connection between perceptual judgment and its subject matter—a subject matter that concerns those features of the material environment that are among the causal antecedents of that experience. Notice that systematically varying the qualitative character of experience would preserve the reliable connection between perceptual belief and the causal antecedents of color experience. Indeed, the reliable connection would be preserved if experience lacked a qualitative character altogether. The first possibility corresponds to the possibility of the inverted spectrum. Suppose that what it is like for Norm to see a violet corresponds to what it is like for Norma to see a marigold. Though their color experiences differ in qualitative character, each are reliably correlated with features of the material environment and so equally a source of warrant or knowledge about those features. The second possibility corresponds to the possibility of philosophical zombies, sentient creatures altogether lacking a perceptual phenomenology that are nevertheless capable of reliably forming perceptual beliefs about their environments. If the epistemic significance of a qualitative experience entirely derives from being a causal intermediary in the reliable connection between perceptual judgment and its subject matter, an epistemic significance shared by qualitatively distinct experiences or causal intermediaries that lack a qualitative character altogether, then the fact that an experience instantiates a certain quality lacks positive epistemic significance about the obtaining of an environmental condition.

The problem is not that there is a contingent connection between the qualities of experience and the sensible qualities of the material environment. I am granting, for the sake of argument, that the connection between perceptual judgments and the color instances that are their subject matter is sufficiently reliable, across a broad range of cases, for such judgments to be at least warranted if not indeed a mode of knowledge of the colors. But reliable connections are themselves contingent, and so the contingent connection between the qualities of experience and the qualities of the material environment is not the problem. The problem, rather, is that the *sole* source of epistemic significance of color experience, conceived as the qualitative effect of the material environment, consists in its being a causal intermediary in the reliable connection between perceptual judgments and the color instances that are their subject matter. But being a causal intermediary in the reliable connection between perceptual judgment and its subject matter does not require that experience have a particular quality or indeed that it have a qualitative character at all. And that means that the phenomenal character of color experience, understood as a monadic quality of that experience, could not have the positive epistemic significance it must have, if by undergoing a color experience with a particular phenomenal character a subject can come to know which color he is perceiving. If color experience is the qualitative effect of the material environment, then its epistemic significance entirely consists in its *relational* fea-

tures; but then it is hard to understand how phenomenal character, as such, could have positive epistemic significance when conceived as a nonrelational feature of experience.

If color experience were merely the qualitative effect of the material environment, its phenomenal character thereby lacking positive epistemic significance, then how could Norm come to know which color he is perceiving by undergoing qualitatively distinct experiences of that color under different conditions of illumination? Determining which color he is perceiving is a positive epistemic achievement. How could Norm come to know which color he is perceiving simply on the basis of undergoing qualitatively distinct experiences of that color, where this qualitative distinction has only negative epistemic significance? He could not—and yet he manifestly can. And so we must reject the conception of color experience as merely the qualitative effect of the material environment. At least some aspects of color experience must have a presentational phenomenology, if color experience is to have the positive epistemic role it manifestly has. At least some aspects of color phenomenology must be determined by the perceptually present color if that experience is to have positive epistemic significance for the perceiver in forming perceptual beliefs about the material environment. (For a similar recent suggestion about presentational phenomenology and perceptual justification see Pryor, 2000, note 37, Pryor, 2004, section 4, and Pryor, 2005, 356–7.)

### §3 DISPOSTIONALISM

Perhaps the positive epistemic significance of color phenomenology can be reconciled with color experience being the qualitative effect of the material environment given a metaphysical hypothesis about the nature of the colors. Locke (1706, 2.8.10) characterizes secondary qualities as “Such *Qualities*, which in truth are nothing in the Objects themselves, but Powers to produce various Sensations in us by their *primary Qualities*.” It is unclear what Locke meant exactly, but on one philosophically influential interpretation, colors are dispositions to cause color experiences with a certain qualitative character. Consistent with the contingent connection between cause and effect, there would be a necessary connection between the qualitative character of color experience and the nature of the perceived color since the perceived color just is the power to produce color experiences with that qualitative character.

So conceived, the colors would be manifest in our veridical color experience in distinct, but related, senses:

- I. Veridical color experiences would be the manifestation of perceived color in the sense that color experience would be the *exercise* of a dispositional color property.

2. Veridical color experience would be the manifestation of perceived color in the sense that color experience would be the *presentation* of the perceived color.

On the dispositionalist's account, these senses are importantly related—the former *explains* the latter. Dispositional color properties are presented in veridical color experience by veridical color experience being the exercise of dispositional color properties:

These sensory manifestations are not simply effects of the dispositions they manifest. They are or can be manifestations in a more interesting sense. About any disposition of objects to produce a given experience, it is plausible to hold that if one has an experience of the kind in question and takes that experience to be a manifestation of the disposition in question, one thereby know the complete intrinsic nature of the disposition. (Johnston, 1992, 167)

So understood, perceived color similarities would “be visually apparent similarities among the colors, not merely similarities among the visual appearances which the colors, whatever they may be like, cause” (Johnston, 1992, 163). Color experiences would not be causal intermediaries between the colors and perceptual judgments concerning them—they would be the exercise and so the presentation of dispositional color properties whose instantiation ground objective similarities in the material environment.

Two observations about dispositionalism are relevant here.

First, veridical color experiences are conceived to be the manifestations of dispositional color properties. Dispositionalism, however, makes no further claim about the nature of color experience. It is consistent with dispositionalism that color experience be the qualitative effect of the material environment, but dispositionalism is consistent, as well, with other conceptions of color experience. Thus Johnston (1992, postscript) observes that dispositionalism is also consistent with a variant of representationalism according to which color experience is a *sui generis* propositional attitude and what Johnston calls the multiple relation theory of experience according to which color experience involves nonpropositional acquaintance with the visible elements of the perceived scene. While dispositionalism and the conception of color experience as a conscious modification of a subject are logically distinct doctrines, there is, at least, a historical connection—the conception of colors as secondary quality emerges in the early modern period in the context of this conception of experience. (I am tempted to say: this is its proper home.)

Second, *if* dispositionalism can explain how the qualitative character of color experience can have positive epistemic significance, this is only because dispositional color properties would be present in their exercise. This is an important

partial concession—that the positive epistemic significance of color experience is properly explained only in terms of its presentational phenomenology.

While dispositionalism may be able to explain how dispositional properties can be present in the qualitative effects of the material environment, it fails to explain how a color appears to persist through phenomenally distinct experiences. What dispositionalism fails to explain is how there could be a course of experience in which the phenomenal character of the experience varies but in which one has an experience of a constant, persisting, colored surface.

Johnston, in an extended defense of dispositionalism, understands the phenomenon of color constancy in terms of the contrast between *steady* and *transient* color:

A basic phenomenological fact is that we see most of the colors of external things as “steady” features of those things, in the sense of features which do not alter as the light alters and as the observer changes position (this is sometimes called “color constancy”). A course of experience as of the steady colors is a course of experience as of light-independent and observer-independent properties, properties simply made evident to appropriately placed perceivers by adequate lighting. Contrast the highlights: a course of experience as of the highlights reveals their relational nature. They change as the observer changes position relative to the light source. They darken markedly as the light source darkens. With sufficiently dim light they disappear while the ordinary color remain. (Johnston, 1992, 141)

Moreover, Johnston argues that a Protagorean variant of dispositionalism can exploit this distinction to interpret the naïve contrast between ‘real’ and ‘apparent’ colors:

It is not widely recognized that a color relativist can consistently find some truth in many remarks about “real” colors. Chromatic lights are said to obscure the real colors of patches viewed under them. The color relativist avoids one kind of invidious distinction between the standard disposition of a cloth to look pinkish blue in daylight and the standard disposition of the same cloth to look simply pink under pink light. For the relativist, both are equally *veridical* colors. But the second color is, as things ordinarily go, the color associated with the more transient and interrupted appearance of the cloth. If we mean by “real color” the least transient veridical color then daylight and ordinary indoor light *do* typically reveal the real colors of things. (Johnston, 1992, 158–60)

There is reason to doubt, however, that color constancy is adequately explained in terms of steady and transient color.

First, any such explanation is arguably incomplete. While the distinction between steady and transient color might capture a difference in color appearance that can occur in different circumstances of perception, it would not be the only difference. The color of a surface can appear different in different scenes and conditions of illumination because of the differently distributed highlights, reflections, and shadows, but not every qualitative difference can be explained as a difference in transient color. Suppose that Norm is looking at a red chip with a matte surface, unshadowed, in diffuse light, in a monochromatic environment. If we dim the light somewhat but within the bounds of ‘normality’, then the qualitative character of Norm’s experience will vary. This is a case of color constancy—the color of the chip appears unaltered through the course of phenomenally distinct experiences—but the phenomenal difference is not due to a difference in transient color for none are present.

The second quotation offers a different application of the idea of transient color. The Protagorean, despite his generous metaphysics, can accept that the cloth is ‘really’ pinkish blue even though it looks pink in the prevailing pink light by letting the least transitory color count as ‘the real color’. The case of a cloth looking pinkish blue in broad daylight and simply pink in pink light involves veridical and non-veridical experiences. Being simply pink excludes being pinkish blue, so if the color of the cloth remains unaltered at most one of these experiences could be veridical (in the sense that the Protagorean seeks to reconstruct). But Norm’s coming to know which color he is perceiving by varying the conditions of illumination is a different kind of case. The color experiences elicited in in the store and in daylight are both veridical. So the qualitative difference between these experiences could not be a difference in the least transient of the presented colors as the Protagorean understands this.

I doubt that the distinction between steady and transient color can explain the variety of color constancy phenomena. The dispositionalist must explain at least some of these in another way. An obstacle to any such explanation is immediately salient. On its usual formulation, dispositionalism is schematically represented as follows:

Color  $c$  = the disposition to elicit experience  $e$  in normal perceivers in normal circumstances.

Suppose that color experience is the qualitative effect of the material environment. The elicited experience  $e$  would be qualitatively typed—so understood, a particular color would be the disposition to elicit color experiences with a particular qualitative character. In cases of color constancy, however, the qualitative character of color experience varies with the conditions of illumination across a broad range of circumstances *all of which are normal*, on any reasonable interpretation of that notion (on the diversity of ‘normal’ circumstances see, among others, Austin, 1962;

Dummett, 1993; Hardin, 1993). Thus a tomato can look a particular shade of red to Norm in the supermarket, in noon daylight on a cloudless day, on an overcast afternoon, and so on. Though the tomato appears to be a particular shade of red in all of these circumstances, the qualitative character of the experience elicited in each of these circumstances differ. Though the tomato appears to be a particular shade of red, and the same shade of red, the particular shade of red does not appear the same way to Norm when presented in noon daylight and when presented on an overcast afternoon. Each of these circumstances of perception are normal, on a reasonable interpretation of that notion. But then there is no qualitatively unique experience elicited in normal perceivers in normal circumstances.

Perhaps dispositionalism can be reformulated. Perhaps colors are dispositions to elicit, in normal perceivers, qualitatively distinct experiences in different circumstances of perception, all of which are normal. Dummett can be read as holding such a position:

...anyone accustomed to the uses of observational predicates knows at least implicitly, and will recognize on reflection, that they stand for essentially dispositional properties, for a propensity to present a range of appearances under a variety of conditions. (Dummett, 1993, 398)

depending, of course, on how “range of appearances” is interpreted (see section 5 for the ambiguity of such idiom). There are two models of how this might be:

1. The qualitatively distinct manifestations might be manifestations of different dispositions in different circumstances.
2. The qualitatively distinct manifestations might be manifestations of the same disposition in different circumstances.

Either model, however, faces a metaphysical problem about the unity of the colors that precludes a dispositionalist explanation of color constancy.

Suppose that the qualitatively distinct manifestations are manifestations of a different of dispositions. Colors, so conceived, are clusters of dispositions. Each disposition in the cluster has a determinate qualitative manifestation in a certain circumstance of perception. What unites the cluster of dispositions associated with a color instance? Not every plurality of such dispositions constitute a color. The disposition to appear red in one circumstance and the disposition to appear green in a different circumstance do not figure together in any of the cluster of dispositions associated with individual colors. Joint possession of these dispositions is not a way of being colored. (A CD can jointly possess these dispositions, but what color is a CD?) A cluster of dispositions is a plurality of dispositions related in a certain way. But what relation on the plurality of dispositions would explain how the joint possession of the plurality is a way of being colored?

The challenge is acute since a naïve answer is precluded. The cluster of dispositions could not be united by the color itself. To appear red in certain circumstances would be to appear the way red things appear to normal perceivers in those circumstances. So conceived, however, colors would be response-independent qualities of the material environment that explain, in part, the way they are disposed to appear in different circumstances of perception. (For a defense of the naïve answer see Yablo's, 1995, discussion of singling out properties. See also Campbell, 1997.)

Suppose that the qualitatively distinct manifestations are not the manifestations of different dispositions but are manifestations of the same disposition in different circumstances. So conceived, red is the unitary disposition of things to have a certain pattern of qualitative effects on normal perceivers in a range of circumstances all of which are normal. The problem of unity, however, arises again, though in a different way. Why are the qualitatively distinct manifestations manifestations of a unitary disposition? If there is a genuine distinction between the qualitatively distinct manifestations being the manifestations of a plurality of dispositions or a unitary disposition in a plurality of circumstances, there is a way for the qualitatively distinct manifestations to be united as the manifestations of a unitary disposition. But what way is that? And what reason do we have for thinking that it obtains in the present case?

The challenge is acute since a naïve conception of a unitary property appearing differently in different circumstances of perception is precluded. Though the tomato appears to be a particular shade of red, and the same shade of red, the particular shade of red does not appear the same way to Norm when presented in noon daylight and when presented on an overcast afternoon. In noon daylight, the particular shade of red appears the way that color appears in noon daylight. On an overcast afternoon, the particular shade of red appears the way that color appears on an overcast afternoon. (Compare Austin's, 1962, example of perceptual constancy: a straight stick submerged in water does not appear bent; it appears the way that a straight stick appears when submerged in water.) The different ways the color appears are ways the color is presented to be in different circumstances of perception. Different visible aspects of the color's constant capacity to modify light are perceptually available in different circumstances of perception. So conceived, however, colors would be response-independent qualities of the material environment that would explain, in part, the way they are disposed to appear in different circumstances of perception.

The problem of unity is inseparable from the phenomenon of color constancy. As Johnston observes:

A course of experience as of the steady colors is a course of experience as of light-independent and observer-independent properties, properties simply made evident to appropriately placed perceivers by adequate

lighting. (Johnston, 1992, 141)

Light-independent and observer-independent properties ‘simply made evident to appropriately placed perceivers by adequate lighting’ are sensible qualities of the material environment presented to a perceiver’s partial perspective on that environment. But that is not to conceive of color experience as the qualitative effect of the material environment. Nor can the relevant notion of presentation be reconstructed if the presented colors are dispositional. Consider the view that colors are clusters of dispositions. The individual dispositions may be consciously manifest in their different qualitative effects, but the appearance of the constant color persists through these qualitative differences. What’s made evident to appropriately placed perceivers by adequate lighting is what unites the cluster of dispositions. Thus without an answer to the problem of unity, the present version of dispositionalism lacks an explanation of color constancy. But the problem of unity is insoluble. What’s made evident may be what unites the cluster of dispositions, but what’s made evident to appropriately placed perceivers by adequate lighting is simply the color of the object. So conceived, however, colors would be response-independent qualities of the material environment that would explain, in part, the way they are disposed to appear in different circumstances of perception. This is an application of Anscombe’s insight:

Further, we ought to say, not: “Being red is looking red in normal light to the normal-sighted,” but rather “Looking red is looking as a thing that *is* red looks in normal light to the normal-sighted.” (Anscombe, 1981, 14)

While dispositionalism may be able to explain how dispositional properties can be present in the qualitative effects of the material environment, it fails to explain how a color appears to persist through qualitatively distinct experiences.

#### §4 INHERITANCE

Recall our epistemological problem is this: Perceptually distinguishing the color of an object from its metameric counterpart is a positive epistemic achievement. A subject thereby gains knowledge—by means of a course of phenomenally distinct color experiences, a subject comes to know which color the object is. If, however, color experience were the qualitative effect of the material environment, then it would be hard to understand how the phenomenal character of color experience could have this positive epistemic significance. Suppose the epistemic significance of a qualitative experience entirely derives from being a causal intermediary in the reliable connection between perceptual judgment and its subject matter. The problem is that the qualitative character of the intermediary can vary while preserving

the reliable connection. The dispositionalist attempted to evade this problem by denying that the qualitative effects are causal intermediaries. They are, instead, *manifestations* of the perceived color—the qualitative effects are the exercise and so the presentation of dispositional color properties. Dispositionalism failed, however, to explain how a color appears to persist through qualitatively distinct experiences. Unfortunately, the phenomenology of color constancy is essential to Norm’s positive epistemic achievement. When Norm perceives the color of the garment in the store and then in daylight, the color appears to persist through these phenomenally distinct experiences. It is because the color appears different in daylight than it did in the store, even though it appears to be the same color, that Norm can come to know which color the garment is. It is only by presenting a further qualitative aspect of the persistent color, a qualitative aspect perceptually available in daylight and not the store, that Norm’s experience allows him to distinguish the color from its metameric counterpart and so come to know which color he is perceiving.

To complete this case two further clarifications are required. First, we need to get clearer about the presentational phenomenology necessary for color experience to have positive epistemic significance. Second, we need to get clearer about what is presented in the qualitatively distinct color experiences that explains how a perceiver could come to know which color they are experiences of. These are the tasks of this section and the next.

Recall we distinguished weaker and stronger interpretations of transparency (section 1). The weak interpretation consists in the negative observation that in introspection the perceiver attends only to what the experience is of or about and not to any quality of experience. If we can distinguish what we can attend to in introspection and what we are introspectively aware of, then this is consistent with the phenomenal properties being monadic qualities of experience whose instantiation depends on the subject’s awareness of them. The stronger interpretation consists in an explanatory claim inconsistent with phenomenal properties being monadic qualities of experience—that the sensible qualities of the perceived object determine, at least in part, the phenomenal properties of the perceptual experience. Thus when Norm perceives a red tomato, an aspect of the phenomenal character of his experience, its color phenomenology, is determined by the perceived color quality, the redness of the tomato. As Campbell (1997, 189) puts it, “the qualitative character of the color experience is inherited from the qualitative character of the color”. At a minimum, this involves the following claim:

A difference in the sensible qualities present in experience suffices for a difference in the phenomenal properties of that experience.

Four observations are relevant understanding to this claim.

First, as presently formulated, the claim is noncommittal as to the nature of the objects, qualities, and relations present in experience. Thus, for example, sense-

datum theorists such as Price (1932) maintain that reflection on conflicting experiences and allied antinomies such as the problems of illusion and hallucination reveal that the objects present in perceptual experience are nonmaterial and that the qualities and relations present in experience are qualities and relations of these nonmaterial objects. (Even Moore, who struggled manfully to maintain that it was at least an open question whether sense-data were perceived material surfaces, succumbed in the end.) As opposed to this, representationalists and naïve realists maintain that, at least in the case of veridical perception, the presented objects, qualities, and relations can be features of the material environment. On this, I side with the representationalists and naïve realists. Though I provide no argument for this claim, I will assume the following for the purposes of this paper:

Objects, qualities, and relations of the material environment can be present in a subject's perceptual experience of that environment.

More specifically, and controversially, I will assume that:

Colors are among the mind-independent qualities of the material environment that can be present in a subject's perceptual experience.

Second, the claim is noncommittal as to the nature of perceptual presentation. Representationalists maintain that the sensible qualities present in experience determine at least some of the phenomenal properties of that experience. Moreover, they maintain that the sensible qualities present in experience just are the sensible qualities that that experience represents. In so doing, they endorse a substantive and controversial claim about perceptual presentation—that perceptual presentation just is perceptual representation. As opposed to this, sense-datum theorists and naïve realists maintain that perceptual presentation is nonrepresentational. For the purposes of this paper, I will be neutral about the representational character of perceptual presentation.

Third, this is not yet to endorse the converse claim—that a difference in the phenomenal properties of experience suffices for a difference in the sensible qualities present in that experience. First of all, the phenomenal properties of experience may be due in part to the objects and relations present in that experience. Even if understood inclusively in this way—that a difference in the phenomenal properties of experience suffice for a difference in the objects, qualities, or relations present in that experience, the claim may still be intelligibly doubted. Perhaps the *way* something is presented in experience, as well as what's presented, can make for a phenomenal difference. Thus, for example, Martin (2002) argues that the phenomenal difference between the perception of a sensible quality and the sensory imagining of that quality is due to the way the sensible quality is presented in perception and sensory imagination, respectively. Extending this to the case of

color, the phenomenal difference between perceiving a color and imagining a color is due to the different ways in which the color is presented in perception and visual imagination, respectively.

There are negative and positive claims here.

The negative claim, which is surely right, concerns the limitations of arguing from the epistemic properties of experience to experience having a presentational phenomenology. The most that such an argument could establish is that *some* aspect of the phenomenology of experience must be determined by an object, quality, or relation present in experience—it could not establish that *every* aspect of the phenomenology of experience must be determined by an object, quality, or relation present in experience. The argument thus does not establish the general claim that a difference in the phenomenal properties of experience suffice for a difference in what's present in that experience.

The positive claim is a suggestion about what could determine the phenomenal properties of experience in cases, if there are any, where they are not determined by something present in experience—perhaps the way in which something is present in experience can determine at least some aspects of its phenomenology. Even granting that there may be aspects of the phenomenal character of experience not determined by what is present in that experience, and even if it were apt to describe these phenomenal aspects as ways of presenting objects, qualities, or relations, one might resist this characterization since it is liable to mislead. After all, the thought that the phenomenal character of color experience is a way of presenting the perceived color is part of the motivation for thinking of color experience as the qualitative effect of material causes.

Whether or not phenomenology is exhaustively presentational, the phenomenal difference between Norm's color experience in the shop and in daylight must be due to presentational difference if it is to have the positive epistemic significance it must have if on the basis of these phenomenally distinct experiences Norm could come to know which color he is perceiving.

Fourth, and finally, to claim that some aspect of phenomenology is presentational is to claim more than certain phenomenal properties covary with something present in experience, even if the covariation is counterfactual. It involves as well an explanatory claim—an experience has the relevant phenomenal property *because* of what is present in experience. This is implicit in the modal implications of Campbell's metaphor of "inheritance". To claim that the qualitative character of color experience is inherited from the qualitative character of the presented color is to claim that the qualitative character of the experience *depends on*, and *derives from* the qualitative character of the presented color.

While the explanatory claim entails that the relevant aspect of phenomenal character covaries with something present in experience, the converse entailment fails.

Thus, for example, Chalmers (2006) accepts that the phenomenal properties of experience covaries with what's present in experience (where perceptual presentation is understood representationally), but maintains that experience represents what it does because of its phenomenal properties:

A *phenomenal content* of a perceptual experience is a representational content that is determined by the experience's phenomenal character. (Chalmers, 2006, 50)

Though Chalmers is not as careful as he might be to distinguish the explanatory and covariation claims as he continues:

More precisely: a representational content  $c$  of perceptual experience  $e$  is a phenomenal content if and only if necessarily, any experience with the phenomenal character of  $e$  has representational content  $c$ . (Chalmers, 2006, 50)

This is merely a claim of necessary covariation that lacks the explanatory asymmetry entailed by talk of determination. Indeed it is a claim of necessary covariation accepted even by those who accept the converse order of explanation—that experience has the phenomenal properties that it has because of its representational content. For the same reason, I believe that Byrne (2001) is wrong to formulate representationalism as a supervenience thesis—it is rather an explanatory claim with the supervenience thesis as a consequence. (See Hilbert and Kalderon, 2000, for a variant argument for this claim, and see Martin, 2002, for further relevant discussion.) This is worth emphasizing since the epistemic role of perceptual experience is linked to this order of explanation.

## §5 KNOWING WHICH EXPLAINED

Subject to the qualifications discussed in the previous section, let the *inheritance thesis*, in its full generality, be the following claim:

An experience inherits a phenomenal property from something presented in that experience just in case what's presented in experience determines the phenomenal property of that experience.

However, our present concern is not with the inheritance thesis in its full generality but with a restricted version of it. Recall, there is a phenomenal difference between Norm's experience of a color instance in different conditions of illumination. Norm's color experience in the fluorescent lighting of the store differs in its phenomenal properties from Norm's color experience in broad daylight. It is these phenomenal properties that are being claimed to be presentationally determined.

At first blush, this can seem surprising. How could color phenomenology be determined by the perceptually present color—after all the same color is perceptually present in the phenomenally distinct experiences. Indeed, it is natural to describe this difference as different ways of presenting the color. And this is precisely what Norm’s phenomenally distinct color experiences would be, if color experience were merely the qualitative effect of the material environment. If the color is present in a perceiver’s experience only in the anemic sense of its instances reliably causing such experiences, then phenomenally distinct experiences of that color would be qualitatively distinct modes of presentation. A color’s looking different in different conditions of illumination, is not a matter of what appears to the perceiver but the way the color appears.

As natural as this description is, it is a misdescription. It is, after all, epistemologically inadequate—it fails to explain how color phenomenology can have the positive epistemic significance it manifestly has. It is true that the color appears differently in different conditions of illumination and that the phenomenal difference between experiences of that color in different conditions of illumination is due, in part, to the different ways that color appears. But this last claim is ambiguous, and the apparent phenomenological aptness of the description in the previous paragraph is due to an equivocation.

If we say:

The tomato appears red to Norm.

we are entitled to claim, in addition, that:

There is a way that tomato appears to Norm.

Here, “way” functions as a device of generalization quantifying over adjectival positions. Since “way”-talk involves, in this instance, a generalization over adjectival position, it must take, as its semantic value, the semantic value assigned to adjectives—a property, that is, a property that an object must instantiate in order for the adjective to correctly apply. Red is the way the tomato appears to Norm. Redness is a property of the object of Norm’s experience—it is the color present in Norm’s experience of the tomato, a color in virtue of which the adjective “red” correctly applies, if it does. It is a property of the object of experience and not a property of the experience.

Not only does “way” function as a device of generalization quantifying over adjectival positions, but it can quantify over adverbial positions as well. Thus, for example, if we say:

The tomato appeared fleetingly to Norm

we are entitled to claim, in addition, that:

There is a way the tomato appeared to Norm.

Since “way”-talk involves, in this instance, a generalization over adverbial position, it must take, as its semantic value, the semantic value assigned to adverbs—a property of properties, that is, a property that a property must instantiate in order for the adverb to correctly apply. Fleetingly is the way the tomato appeared to Norm. Fleetingness is a property of Norm’s experience of the tomato (understood as a property of Norm’s)—it is the temporal character of Norm’s experience, a temporal character in virtue of which the adverb “fleetingly” correctly applies, if it does. It is a property of the experience and not a property of the object of that experience.

Deprived of context, talk of the way something appears is ambiguous. It might be interpreted as a property of the perceived object and so present in experience, or it might be interpreted as a property of the experience and so a way the object of experience is presented. This need not be due to any confusion about whether “way” governs an adjectival or adverbial position. Thus a claim of the form:

*o* appears *F* to *S*

may, in a certain context, be used to assert how *o* appears—as instantiating *F*; but, equally, it may, in a certain context, be used to assert how *S* is—*S* is such as *o* to appear *F* to *S* (as opposed to *o* appearing *G*, or not at all). Any generalization of this claim involving “way”-talk will simply inherit this ambiguity. (See Brown, 2006; Martin, 1998, for further relevant discussion.)

When Dummett (1993, 398) writes of a “propensity to present a range of appearances under a variety of conditions”, there are two ways to understand this. The “range of appearances” are different ways the color appears in different circumstances of perception. The different ways that the color appears might be interpreted as properties of experience, or they might be interpreted as properties of the object of experience. On the former interpretation, the different ways the color appears are qualitatively distinct experiences elicited in different circumstances of perception. On the latter interpretation, the different ways the color appears are the different properties of the color that appear in different circumstances of perception. So consider again: The color appears differently to Norm in different conditions of illumination, and the phenomenal difference between experiences of that color in different conditions of illumination is due, in part, to the different ways that color appears. The different ways the color appears might be interpreted as properties of experience, or they might be interpreted as properties of the object of experience. On the latter interpretation, the different ways the color appears are different properties of the color that appear in different conditions of illumination.

If perception provides only a partial perspective on the sensory aspects of the material environment, as a Heraclitean epistemology would have it, it is at least possible that different aspects of a color’s qualitative nature are perceptually available

in different circumstances of perception to a given perceiver. In the store, under initial conditions of illumination, Norm veridically perceives the color. Moreover, Norm perceives what that color is like—at least to some extent. Thus Norm can perceive that the color is a determinate of certain sufficiently broad color determinables. Nevertheless, not every aspect of the color of the object is manifest to Norm in his initial color experience. The qualitative nature of the color is insufficiently manifest in Norm’s perceptual encounter with it for Norm to know which color he is perceiving.

When Norm undergoes phenomenally distinct color experiences under different conditions of illumination, there are different ways the color appears to Norm. In the store, under initial conditions of illumination, the color appears a certain way, it presents a qualitative aspect in common with its metameric counterpart. In broad daylight, the color appears another way, it presents a qualitative aspect that distinguishes it from its metameric counterpart. These distinct ways of appearing are not properties of Norm’s experience of the color, but are properties the color is perceived to have. Norm’s phenomenally distinct color experiences are not qualitatively distinct modes of presentation of the color, rather the phenomenally distinct color experiences present qualitatively distinct aspects of the perceived color. It is only by presenting a further qualitative aspect of the color, a qualitative aspect perceptually available in daylight and not the store, that Norm’s experience allows him to distinguish the color from its metameric counterpart and so come to know which color he is perceiving.

If the different ways the colors appear are not properties of experience but properties of the object of experience, what properties might these be?

There is a metaphysical hypothesis about the nature of color that provides both an account of the relevant properties of the perceived color and explains Norm’s ability to know which color he is perceiving by undergoing phenomenally distinct experiences of it under different conditions of illumination. Though I cannot argue for this metaphysical hypothesis here, a sketch of it suffices for a plausible account of the relevant properties of the perceived color the presentation of which in different circumstances of perception explains Norm’s ability to know which color he is perceiving.

Suppose that colors are neither primary nor secondary qualities, but, in the traditional post-Lockean vocabulary, *tertiary qualities*. Locke characterizes these qualities as follows:

The *Power* that is in any Body, by Reason of the particular Constitution of *its primary Qualities*, to make such a *change* in the *Bulk, Figure, Texture and Motion of another Body*, as to make it operate on our Senses differently from what it did before. (Locke, 1706, 2.8.23)

Locke's (1706, 2.8.23) own examples of tertiary qualities are "the Sun has a Power to make Wax white, and Fire to make Lead fluid". If colors were qualities determined by ways of affecting light, then colors would be Lockean tertiary qualities, at least on a reasonable generalization of that notion. Surface color, so conceived, would be determined by a power of surfaces, by reason of the particular constitution of their material properties, to make such a change to the spectral composition of the light so as to make it operate on our sense of sight differently from what it did before. ("Before", here, should be understood as a temporal metaphor for a modal claim—the reflected light operates on color vision differently from the way the incident light would if it were, instead, the proximal stimulus.) Specifically, surface color, such as the red of Norm's tomato, would be a sensible quality of material surfaces determined by their disposition to reflect light. (Hilbert, 1987, inaugurates this contemporary tradition.) Similarly, volume color, such as the golden color of Chardonnay, would be a sensible quality of a material volumes determined by their disposition to transmit light; and radiant color, such as the green of a traffic light, would be a sensible quality of light sources determined by their disposition to emit light. (Though perhaps there is no theoretically interesting distinction between these latter kinds of color; perhaps, as Byrne and Hilbert, 2003, maintain, they belong to the unitary class of *productances*.)

The conception of colors as tertiary qualities, as described here, is neutral between reductive and nonreductive understanding of the colors. Chromatic tertiary qualities of material surfaces might be reflectance properties represented by sets of surface spectral reflectances—the surface's disposition to reflect a certain amount of light at each of the wavelengths of the visible spectrum (see Hilbert, 1987, and Byrne and Hilbert, 1997, 2003) or they might be primitive qualities that supervene on these (see Broackes, 1997 and Yablo, 1995). On either understanding, tertiary qualities are objective features of the material environment. Chromatic similarities grounded in the propensity of things to affect light in certain ways are objective similarities that a perceiver can encounter in the material environment.

If redness is a tertiary quality, then red surfaces are disposed to reflect light differently in different conditions of illumination, since the spectral power distribution of the reflected light is a product of the illuminant and the surface spectral reflectance. So, holding the reflectance property of the tomato fixed, the spectral composition of the light reflected from a red tomato in noon daylight will differ from the spectral composition of the light reflected from the red tomato on an overcast afternoon, given the different character of the illuminant. Suppose that the visual system provides information not just about the reflectance properties of objects but also about the way those objects are illuminated. The way an object is illuminated is a property of the object and not the illuminant—it is how the object is illuminated and not how the illuminant is (though, of course, these are

related). The pattern of sameness and difference characteristic of color constancy would then be explained in terms of what is presented in color perception. Norm's experiences of the tomato in noon daylight and on an overcast afternoon are the same to the extent that they present the same color to Norm—the redness of the tomato; they differ to the extent that they present the tomato as differently illuminated. (Hilbert, forthcoming, 12, observes that “One consequence of this ... is that the color appearance of an object must have more than the traditional three dimensions of variation.” The three-dimensional color space is, anyway, visibly inadequate—where in the three-dimensional color space is metallic green?)

If colors were ways of affecting light, then different qualitative aspects of red's nature would be perceptually available under different conditions of illumination. Different visible aspects of the color's constant capacity to modify light would be perceptually available in different circumstances of perception. According to Broackes:

...this conception explains how it is that in order to tell what colour an object is, we may try it out in a number of different lighting environments. It is not that we are trying to get it into one single 'standard' lighting condition, at which point it will, so to speak, shine in its true colours. Rather, we are looking, in the way it handles a variety of different illuminations (all of which are more or less 'normal'), for its constant capacity to modify light. (Broackes, 1997, 215)

Different aspects of a color's qualitative nature are perceptually available in different conditions of illumination. In certain conditions, it is only by experiencing these different qualitative aspects that a perceiver can come to know which color he is perceiving. So consider again an environment populated by metameric pairs. Under conditions of illumination prevalent in that environment, the same qualitative aspect is manifest by distinct colors. Distinct colors share a qualitative aspect that is perceptually available in the same circumstances of perception. It is only by experiencing a qualitative aspect of a color under different conditions of illumination that distinguishes it from its metameric counterpart, that a perceiver can come to know which color it is.

In general, a presentational phenomenology is required if the phenomenal properties of perceptual experience are to have a positive epistemic significance. The immediate, noninferential perceptual judgments that a subject is liable to form on the basis of experiences with a distinctive phenomenology have as their subject matter those features of the material environment that are among the causal antecedents of such experiences. Those judgments are at least warranted if not indeed a mode of knowledge of those features because the phenomenal character of the experiences that prompt them are determined by their presenting precisely those features. The phenomenal properties of experience can have a positive epistemic

significance if they are determined by the presentation of the truthmakers of the perceptual judgments that subjects are liable to form on the basis of such experiences. Norm is in a position to know which color he is perceiving because the phenomenal character of his color experience in daylight is determined by a qualitative aspect of that color, present in experience, that suffices to distinguish it from its metameric counterpart. Phenomenology can have the positive epistemic significance it manifestly has if it is determined, at least in part, by the presentation of the truthmakers of perceptual judgment (see Johnston, 2006; Martin, 2002).

## § 6 ILLUSION, PHENOMENOLOGY, AND KNOWLEDGE

Even granting the conception of colors as tertiary qualities, one might legitimately worry whether the phenomenal difference between Norm's experience in the store and in broad daylight suffices for knowing which color he is perceiving.

Suppose that object  $o$  instantiates color  $c$  and is in an environment known to be populated with metameric pairs. Norm undergoes color experience  $e_1$  when looking at  $o$  in the circumstances of perception and undergoes a phenomenally distinct color experience  $e_2$  when looking at  $o$  under different conditions of illumination. It is by undergoing the phenomenally distinct experiences  $e_1$  and  $e_2$  that Norm comes to know which color  $o$  is, namely  $c$ . By hypothesis,  $e_1$  and  $e_2$  are veridical color experiences. According to the story so far, the phenomenal difference between them is entirely due to different aspects of the qualitative nature of the color being perceptually available under different conditions of illumination. But now consider experiences  $e_1^*$  and  $e_2^*$  that are introspectively indistinguishable from  $e_1$  and  $e_2$  respectively.  $e_1^*$  and  $e_2^*$ , however, unlike  $e_1$  and  $e_2$ , are *illusory*—the object  $o$  that Norm perceives when undergoing  $e_1^*$  and  $e_2^*$  does not instantiate the relevant color,  $c$ . Norm could not come to know which color  $o$  is, namely  $c$ , since  $o$  is not in fact  $c$ . If, as seems plausible, two experiences being introspectively indistinguishable suffices for their being phenomenally identical, then there is a problem. How can the phenomenology have the positive epistemic significance I claim that it has if in one case the phenomenally distinct color experiences suffice for knowing which color the object is but not in the other?

Consider two experiences that are introspectively indistinguishable. The fact that they are introspectively indistinguishable may establish that they share *a* phenomenal property in common, but is it obvious that they share *every* phenomenal property in common? Is it obvious that the introspectively indistinguishable experiences are phenomenally identical? Even if they share a phenomenal property, there would remain a phenomenological difference.

First, consider the case of sensory imagining. Recall that Martin (2002) argues that the phenomenal difference between the perception of a sensible quality and the sensory imagining of that quality is due to the way the sensible quality is pre-

sented in perception and sensory imagination. Martin's positive suggestion may intelligibly be doubted. Thus, it is at least arguable that there is a difference in what is presented in perception and visual imagination. In veridical color perception, we are perceptually presented with a color instance, while in visual imagination we are presented with an uninstantiated color. Of course, there is a sense in which the universal is presented differently in perception and imagination. If the universal is present in its instance, either wholly or in part, then perhaps it is present as well in the veridical perception of it. But if so, there is a difference in the manner in which it is present in imagination, since imagination presents the universal without the corresponding instance. This is nevertheless consistent with the phenomenal difference between perception and visual imagination being entirely due to the difference in their object, in what is present in perception and imagination—a color instance and an uninstantiated color, respectively. (I do not mean to claim that this observation is sufficient to meet Martin's challenge to representationalism.)

There is a corresponding phenomenal difference between Norm's veridical red experience and its illusory counterpart. Norm's veridical red experience and its illusory counterpart differ in *object*. Whereas the veridical experience is a conscious manifestation of a determinate, spatiotemporally located, color instance, the illusory counterpart is not. After all, in the illusory case, there is no determinate, spatiotemporally located, color instance to be presented. In veridical color perception, Norm is perceptually presented with a color instance, while in the illusory counterpart no such color instance is presented. But that is a phenomenological difference—the two conscious episodes differ in their objects, in what they are experiences of.

Cases of veridical illusion, of the kind discussed by Lewis (1986), poses a potential problem for this suggestion. A perceiver is subject to veridical illusion when he has an unreliable but matching chromatic experience of a scene. Though veridical, the immediate, noninferential perceptual judgments he is liable to form on their basis are not warranted nor are they a mode of chromatic knowledge. Unlike, ordinary forms of illusion, in the case of veridical illusion, there is a determinate, spatiotemporally located, color instance that experience relates the perceiver to.

Lewis' case of veridical illusion involves hypothetical prosthetic vision. Tertiary quality theorists are independently committed to *actual* cases of veridical illusion. If colors are ways of affecting light, then polychromatic and non-uniformly lit three-dimensional scenes are more conducive to determining the color of a surface than a monochromatic and uniformly lit two-dimensional background. Why? Colors are qualities determined by dispositions to affect light, specifically, in the case of surface color, they are anthropocentrically determined reflectance properties represented by, if not identified with, classes of surface spectral reflectances whose structure reflects the structure of the visual system. However, the proximal visual

stimulus cannot, by itself, determine distal reflectance properties. The proximal stimulus is a spectral power distribution that is itself the function of the reflectance and the illuminant. To determine the distal reflectance property from the proximate stimulus the visual system needs to make assumptions about the nature and location of the illuminant. The visual system relies on spectral information from the general scene as evidence about the nature and location of the illuminant. The problem is that a monochromatic and uniformly lit two-dimensional background does not convey sufficient information about the illuminant to accurately determine the distal reflectance property. Perception of surface color is unreliable in those circumstances just as it is when it is sufficiently dark or when the illuminant is strongly colored. Most likely color perception is illusory in such circumstances, or if it is veridical, it is only accidentally so. Where color perception in these circumstances is accidentally veridical the perceiver is subject to veridical illusion.

In cases of veridical illusion, the experience matches the color instance present in the scene but is unreliable and, hence, illusory. So it could not be the case that what distinguishes an experience from a veridical illusion introspectively indistinguishable from it is that one but not the other is related to a color instance. In each case, the experience relates the perceiver to the instantiated color. If the veridical experience and the introspectively indistinguishable veridical illusion are phenomenally identical, then phenomenal character could not have the positive epistemic significance I claim that it has—Norm could not come to know which color he is perceiving on the basis of a veridical illusion.

In veridical illusion, experience may match the color instance present in the scene, but is the color instance present in the perceiver's experience of the scene? Here, the objector faces a dilemma. If the color instance is present in the perceiver's experience, then the perceiver is seeing it and the experience is nonillusory. After all, if, in the given circumstances, the color instance is indeed consciously present in experience, then what reason could there be to deny that that experience is a source of knowledge of that instance? It is plausible, then, that in veridical illusion, while the perceiver is related to the color instance, the relation is something other than the presentation relation. The visual system, functioning normally in other circumstances, may make it possible for elements of the perceiver's environment to be present in his experience of that environment. However, in the special circumstances under consideration, the visual system, in lacking sufficient information about the illuminant to reliably determine the instantiated color, could not make it the case that the color instance is present in the perceiver's experience (even if it is as if it is present in the perceiver's experience). But if the color is not present in the perceiver's experience, then the veridical illusion differs in object from the nonillusory veridical counterpart—the color instance is present in the latter but not the former. While in the case of veridical illusion, the color instance may be

the causal antecedent of the experience, it is not the object of that experience. (Compare Sturgeon, 2006, 186, on veridical illusion.)

That introspectively indistinguishable experiences can differ in object and, hence, phenomenology will seem plausible or not depending on the underlying conception of experience. Any remaining doubts about this claim may be due to the lingering effects of an epistemologically inadequate conception of experience.

On the naïve conception of color experience, the phenomenal character of color experience is determined by the qualitative character of the perceived color. So conceived, color experience provides a partial perspective on the chromatic features of the material environment. To know what it is like to undergo a color experience would be to know the color selectively presented to the perceiver's partial perspective (see Nagel, 1979, 166, 172, 173–4). An experience would be intrinsically connected to its subject matter since experience, so conceived, just is a perceptual presentation of that subject matter to a perceiver's partial perspective. But veridical and illusory color experiences that are introspectively indistinguishable differ precisely in this way, in what they selectively present—the former presents a color instance and the latter does not. The introspectively indistinguishable experiences would be phenomenologically distinct since they would differ in object.

This contrasts with the conception of color experience as the qualitative effect of the material environment. On this conception, the claim that introspectively indistinguishable experiences can differ in phenomenology will seem implausible. After all, so conceived, color experience is a qualitative state of the perceiver, a conscious modification of the subject. As a conscious modification of the subject it is natural to think of the qualitative state as being wholly accessible to introspection. And if color phenomenology is wholly determined by the qualitative character of this state (and, hence, independently of any subject matter extrinsic to that state), then phenomenologically distinct color experiences would be introspectively distinguishable. This conception of color experience failed, however, to account for the positive epistemic significance of color phenomenology and so should be rejected along with any doubts it may ground about the phenomenal distinctness of introspectively indistinguishable experiences.

## §7 CONCLUSION

When Norm undergoes phenomenally distinct color experiences under different conditions of illumination, there are different ways the color appears to Norm. In the store, under initial conditions of illumination, the color appears a certain way, it presents a qualitative aspect in common with its metameric counterpart. In broad daylight, the color appears another way, it presents a qualitative aspect that distinguishes it from its metameric counterpart. These distinct ways of appearing are not properties of Norm's experience of the color, but are properties the color is

perceived to have. It is only by presenting a further qualitative aspect of the color, a qualitative aspect perceptually available in daylight and not the store, that Norm's experience allows him to distinguish the color from its metameric counterpart and so come to know which color he is perceiving.

In order for Norm's color experience to have the positive epistemic significance that it manifestly has, it must provide him a partial perspective on the chromatic features of the material environment. In the store, under initial conditions of illumination, Norm perceives what the color is like—but only to a limited extent. While Norm can perceive that the color is a determinate of sufficiently broad color determinables, not every aspect of the color is manifest to Norm in his initial experience of it. His experience in broad daylight presents another aspect of the color. And it is the appearance of this qualitatively distinct aspect in that circumstance that makes it evident to Norm which color that he is perceiving.

The epistemology of color experience is grounded in its presentational phenomenology. The truth of a perceptual judgment and the phenomenal character of the experience that elicits it are *codetermined* by the perceived color instance. The phenomenal character of color experience is determined less by a monadic quality of that experience, than by the color selectively present to the perceiver's partial perspective. Norm's phenomenally distinct color experiences are not qualitatively distinct modes of presentation of the color, rather the phenomenally distinct color experiences present qualitatively distinct aspects of the perceived color. The phenomenal character of color experience, so conceived, is inherited from the qualitative character of the perceived color, thus partially vindicating our naïve, prephilosophical conception of color experience.

## REFERENCES

- G.E.M. Anscombe. The intentionality of sensation: A grammatical approach. In *Metaphysics and the Philosophy of Mind, Collected Philosophical Papers*, volume II, chapter 1, pages 3–20. Basil Blackwell, Oxford, 1981. 15
- J.L. Austin. *Sense and Sensibilia*. Oxford University Press, New York, 1962. 12, 14
- Ned Block. Mental paint and mental latex. In Enrique Villanueva, editor, *Philosophical Issues: Perception*, volume 7, pages 19–49. Ridgeview, Atascadero, California, 1996. 4
- Ned Block. Sexism, racism, ageism and the nature of consciousness. *Philosophical Topics*, 26, 1999. 4
- Justin Broackes. The autonomy of colour. In Alex Byrne and David Hilbert, editors, *Readings on Color: The Philosophy of Color*, volume I, pages 191–225. MIT Press, Cambridge Massachusetts, 1997. 23, 24

- Derek H. Brown. On the dual referent approach to colour theory. *Philosophical Quarterly*, 56(222):96–113, January 2006. 21
- Myles Burnyeat. Conflicting appearances. In *Proceedings of the British Academy*, volume LXV, pages 69–111, 1979. 6
- Alex Byrne. Intentionalism defended. *Philosophical Review*, 110:199–240, 2001. 19
- Alex Byrne and David R. Hilbert. Colors and reflectances. In Alex Byrne and David R. Hilbert, editors, *Readings on color: The philosophy of color*, volume 1. MIT Press, 1997. 23
- Alex Byrne and David R. Hilbert. Color realism and color science. *Behavioral and Brain Sciences*, 26:3–21, 2003. URL <http://www.bbsonline.org/Preprints/Byrne/Referees/>. 23
- John Campbell. The simple view of colour. In Alex Byrne and David Hilbert, editors, *Readings on Color*, volume I, pages 177–90. MIT Press, Cambridge, Massachusetts, 1997. 14, 16
- David Chalmers. The representational character of experience. In Brian Leiter, editor, *The Future of Philosophy*. Oxford University Press, Oxford, 2004. 4
- David Chalmers. Perception and the fall from Eden. In Tamar Szabó Gendler and John Hawthorne, editors, *Perceptual Experience*, chapter 2, pages 49–125. Clarendon Press, Oxford, 2006. 4, 19
- Walter Charleton. *Physiologia Epicuro-Gassendo-Charltonia or a Fabrick of Science Natural Upon the Hypothesis of Atoms Founded: Epicuruius, Repaired: Petrus Gassendus, Augmented: Walter Charlton, Dr. in Medicine, and Physician to the late Charles, Monarch of Great Britain*. Tho. Newcomb, 1654. 4
- Tim Crane. Is there a perceptual relation? In Tamar Szabó Gendler and John Hawthorne, editors, *Perceptual Experience*, chapter 3, pages 126–147. Clarendon Press, Oxford, 2006. 5
- C. Ducasse. Moore’s “Refutation of idealism”. In P. A. Schilpp, editor, *The Philosophy of GE Moore*, pages 232–3. Open Court, La Salle, Illinois, 1942. 3
- Michael Dummett. Common sense and physics. In *The Seas of Language*, chapter 16, pages 376–410. Oxford University Press, Oxford, 1993. 13, 21
- C.L. Hardin. *Color for philosophers: Unweaving the rainbow*. Hackett Publishing, expanded edition, 1993. 13

- Gilbert Harman. The intrinsic quality of experience. In J. Tomberlin, editor, *Philosophical Perspectives* 4. Ridgeview, 1990. 4
- Heraclitus. *The Art and Thought of Heraclitus*. Cambridge University Press, Cambridge, 1979.
- David R. Hilbert. *Color and color perception: A study in anthropocentric realism*. Center for the Study of Language and Information, 1987. 5, 23
- David R. Hilbert. Color constancy and the complexity of color. *Philosophical Topics*, forthcoming. URL <http://tigger.uic.edu/~hilbert/papers/Colorconstancy.pdf>. 24
- David R. Hilbert and Mark Eli Kalderon. Color and the inverted spectrum. In Steven Davis, editor, *Color perception: Philosophical, psychological, artistic, and computational perspectives*, volume 9 of *Vancouver Studies in Cognitive Science*, pages 187–214. Oxford University Press, 2000. 19
- David Hume. *An Enquiry Concerning Human Understanding*. Clarendon Press, Oxford, 1740/2006. 2
- Mark Johnston. How to speak of the colors. *Philosophical Studies*, 68:221–63, 1992. 10, 11, 15
- Mark Johnston. Better than mere knowledge? The function of sensory awareness. In Tamar Szabó Gendler and John Hawthorne, editors, *Perceptual Experience*, chapter 7, pages 260–290. Clarendon Press, Oxford, 2006. 3, 7, 25
- Mark Eli Kalderon. Color pluralism. *Philosophical Review*, forthcoming. 5
- David Lewis. Veridical hallucination and prosthetic vision. In *Philosophical Papers*, volume II, chapter 24, pages 273–86. Oxford University Press, Oxford, 1986. 26
- John Locke. *An Essay Concerning Human Understanding*. Oxford University Press, Oxford, 1706. 9, 22, 23
- M. G. F. Martin. Setting things before the mind. In Anthony O’Hear, editor, *Contemporary Issues in the Philosophy of Mind*, Royal Institute of Philosophy Supplements. Cambridge University Press, 1998. 3, 21
- M. G. F. Martin. The transparency of experience. *Mind and Language*, 17(4):376–425, September 2002. 5, 17, 19, 25
- G.E. Moore. The refutation of idealism. *Mind*, 12:433–53, 1903. 4

- Thomas Nagel. What is it like to be a bat? In *Mortal Questions*. Cambridge University Press, Cambridge, 1979. 2, 28
- H. H. Price. *Perception*. Methuen & CO. LTD., London, 1932. 17
- James Pryor. The skeptic and the dogmatist. *Noûs*, 34, 2000. 9
- James Pryor. What's wrong with Moore's argument. *Philosophical Issues*, 14, 2004. 9
- James Pryor. There is immediate justification. In Matthias Steup and Ernest Sosa, editors, *Contemporary Debates in Epistemology*. Blackwell, 2005. 9
- Charles Siewert. Is experience transparent? *Philosophical Studies*, 117:15–41, 2003. 5
- Daniel Stoljar. The argument from diaphanousness. *Canadian Journal of Philosophy*, forthcoming. 5
- Scott Sturgeon. Reflective disjunctivism. In Mark Eli Kalderon, editor, *Proceedings of the Aristotelian Society, Supplementary Volume*, volume 80, pages 185–216. The Aristotelian Society, Blackwell, July 2006. 28
- Stephen Yablo. Singling out properties. *Philosophical Perspectives*, 9:477–502, 1995. URL <http://web.mac.com/yablo/iWeb/Site/Papers.html>. 14, 23