

# CAN THE PHYSICALIST EXPLAIN COLOUR STRUCTURE IN TERMS OF COLOUR EXPERIENCE?<sup>1</sup>

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*Physicalism* about colour is the thesis that colours are identical with response-independent, physical properties of objects. I endorse the *Argument from Structure* against Physicalism about colour. The argument states that Physicalism cannot accommodate certain obvious facts about colour structure: for instance, that red is a unitary colour while purple is a binary colour, and that blue resembles purple more than green. I provide a detailed formulation of the argument. According to the most popular response to the argument, the Physicalist can accommodate colour structure by explaining it in terms of colour experience. I argue that this response fails. Along the way, I examine other interesting issues in the philosophy of colour and colour perception, for instance the relational structure of colour experience and the description theory of how colour names refer.

## I. Introduction

*Physicalism* about colour is the thesis that colours are identical with response-independent, physical properties of objects [Armstrong 1997; Byrne and Hilbert 2003; Jackson and Pargetter 1987; Lewis 1997; McLaughlin 2003; Shoemaker 1991; and Tye 2000]. On the most popular form of Physicalism, colours are identical with dispositions to reflect various proportions of light at various wavelengths, or *reflectance properties* for short. I will focus on this version of the view, although what I shall say carries over to other versions. Physicalism has much to recommend it: it is realist and it is reductionist.<sup>2</sup>

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<sup>2</sup>Some Physicalists identify colours with 'reflectance-types', which seem to be *disjunctions* of reflectances [Byrne and Hilbert 2003]. Others identify them with properties of the form: *having some reflectance or other meeting second-order condition F*, where *F* is a complicated observer-independent condition concerning the short, medium, and long components of a reflectance [Tye 2000; McLaughlin 2003: 128–31]. Here such subtleties may be ignored. Versions of Physicalism vary along another dimension: Rigid and Non-Rigid. According to *Rigid Physicalism*, colour names such as 'the colour red' are rigid designators [Armstrong 1997; Byrne and Hilbert 2003; and Tye 2000]. On this view, 'tomatoes have the colour red' iff they optimally cause

I endorse the *Argument from Structure* against Physicalism [Campbell 1969; Hardin 1988; Maund 1995; Thompson 1995]. According to this argument, the thesis that colours are literally identical with reflectance properties cannot be correct because it entails that certain obvious claims about colour structure are false: for instance, that red is a unitary colour while purple is a binary colour, and that blue resembles purple more than green. The reason is that reflectance properties do not have the requisite structural features. In my view, *Primitivism* is the correct theory of colour and colour structure: colours are primitive properties and claims about colour structure report primitive facts about them (Pautz 2006; unpublished b). For the Primitivist there is no pressure to reject colour structure claims.

It has been said that the Argument from Structure poses the most serious threat to Physicalism about colour [Byrne and Hilbert 2003: 7; McLaughlin 2003: 111]. As we shall see, it does not rely on *Revelation*: the claim that, for every truth about the colours touching on their essential nature, we can come to know that truth on the basis of experience of the colours together with sufficient reflection. Nor does it rely on the apparent epistemic gap between colours and reflectances—the objective analogue of the epistemic gap between experiences and brain states. Instead, it relies on claims about the colours that we know to be true on the basis of simple experience. Thus it provides a way of showing that Physicalism is false that does not rely on controversial, a priori intuitions about the colours.

But the Argument from Structure has some gaps that need filling. Since Hardin and others first presented the Argument from Structure, Physicalists have responded by asserting that the actual truth-conditions of colour structure claims are such that these claims come out true even if colours are identical with reflectance properties. Therefore there is no incompatibility between Physicalism and colour structure claims. The main accounts are the Hue-Magnitude Account and the Experiential Account. According to the *Hue-Magnitude Account*, the truth-conditions of colour structure claims concern so-called ‘hue-magnitudes’ red, green, yellow, and blue, which themselves can be identified with reflectance properties [Byrne and Hilbert 2003; Tye 2000]. According to the *Experiential Account*, the truth-conditions of colour structure claims most directly concern our colour experiences, and concern the colours only derivatively [Shoemaker 1990, 1991; Lewis 1997; McLaughlin 2003; Cohen 2003]. If Argument from Structure is to be defended, it must be shown that these accounts misidentify the

red experiences’ is a posteriori and contingent. According to *Non-Rigid Physicalism*, colour names are equivalent to descriptions. For instance, ‘the colour red’ is equivalent to something like ‘the property that optimally causes red experiences’ and is non-rigid on at least one reading [Jackson and Pargetter 1987; Lewis 1997; McLaughlin 2003]. On the Non-Rigid view, ‘tomatoes have the colour red iff they optimally cause red experiences’ is a priori. Further, at least on the alleged non-rigid reading of ‘the colour red’, it is necessary. Nevertheless, as I use these terms, the Non-Rigid view is a form of Physicalism, not a form of Dispositionalism. For, on the Non-Rigid view, colour names do not refer to dispositions to produce colour experiences; rather they refer to the response-independent physical properties which ground those dispositions. Here my usage agrees with that of Byrne and Hilbert [1997], Jackson and Pargetter [1987], and McLaughlin [2003]. It should be noted that, although Cohen [2003] argues that the Argument from Structure against Physicalism fails, he does not endorse Physicalism; he does not think that colour names refer to response-independent physical properties. Rather, he thinks that they refer to *functional role properties* of the form: having some property or other that is the basis of the disposition to produce experiences of kind *K* under circumstances *C* (personal communication).

conditions that the colours must satisfy in order for colour structure claims to be true.

I argue against the Hue-Magnitude Account elsewhere [Pautz 2003, Pautz unpublished a]. Here my aim is to show that the Experiential Account is mistaken. It is not the only response to the Argument from Structure on offer—there is also the Hue-Magnitude Account—but it is perhaps the most popular and systematic one. By arguing that it is mistaken, I hope to fill one major gap in the Argument from Structure. Along the way we will have occasion to examine other interesting issues in the philosophy of colour and colour perception, for instance the relational structure of colour experience and the description theory of how colour names refer.

My plan is as follows. I begin by providing my favoured formulation of the Argument from Structure. My formulation shows that the argument implicitly depends on a natural understanding of what it takes for colour structure claims to be true, which I will call the *Simple Account*. Then I turn to the rival Experiential Account of colour structure claims. I explain how, if correct, it answers the Argument from Structure. Then I raise several objections against the Experiential Account. Finally, I state some tentative conclusions.

## II. The Argument from Structure Formulated

I will focus on two types of colour structure claims: claims about the resemblance of colours and claims about the unitary/binary character of colours. For instance:

- [1] Blue resembles purple more than green
- [2] Purple is a binary colour, while green is a unitary colour<sup>3</sup>

[1] is a claim about the resemblance of colours and [2] is a claim about the unitary/binary character colours. Purple is a perceptual mixture in the sense that it contains a hint of two other colours: every shade of purple is to some degree reddish and bluish. It is a *binary colour*. By contrast, green does not, as it were, contain a hint of any other colour. It is not at all yellowish or bluish (or reddish, reddish greens never being found). It is a *unitary colour*. In consequence, while green cannot readily be described in terms of other colours, purple can be described as red-blue. There are exactly four types of unitary colours: reds, greens, yellows, and blues. All remaining colours are binary combinations of two of the four unitary colours and so can be characterized in terms of them; these include red-yellows, red-blues, green-yellows, and green-blues. The resemblances among colours, their

<sup>3</sup>A note on metaphysics: I assume that there are determinable colour universals and that colour names like 'blue', 'purple', and 'green' in statements like [1] and [2] are singular terms referring to such universals. All the claims at play in what follows could be stated without loss of content in terms of determinate colour universals or tropes.

unitary-binary character, and other such facts about them, make up colour structure.

My version of the Argument from Structure relies on three premises. I will state and briefly defend these premises. Then I will show how they entail that Physicalism is false.

The first premise is *Realism*: intuitively true colour structure claims are in fact true. The case for Realism is founded on our experience of the colours. By experiencing the colours we know that they stand in certain resemblance relations. Unitary-binary claims may seem unusual to the uninitiated, but experiments demonstrate that, at least with a little practice, we can come to non-collusive agreement about the unitary/binary structure of colours on the basis of experience. For instance, once we have had a little practice, we are able to come to agree that a given shade of orange is 75% red and 25% yellow [Boynton et al. 1964]. Note that my case for Realism does not rely on the highly controversial thesis of *Revelation*: roughly, the claim that, for every truth about the colours touching on their essential nature, we can come to know that truth on the basis of experience of the colours together with sufficient reflection. It just requires that we know *some* truths about colours on the basis of experience, namely truths about colour structure. This is obvious and ought to be granted by everyone.

The second premise is the Simple Account of colour structure claims. By an account of claims (statements, propositions, sentences, beliefs) of a certain kind, I simply mean a systematic description of their truth-conditions. We may also semantically descend and speak of accounts of properties and facts. The Simple Account says that colour structure claims have the simple truth-conditions they seem to have. For instance, it says that the sentence [1] is true iff blue resembles purple more than green in the ordinary sense of 'x resembles y more than z'; here the three-place comparative resemblance predicate 'x resembles y more than z' means just what it does in other claims of comparative resemblance. It does not have a special meaning in these contexts. Likewise, the Simple Account says that 'is binary' and 'is unitary' pick out intrinsic and non-relational properties, just as they seem to do. Beyond this, it is neutral between rival views about the nature of these properties: for instance, it is neutral between the view that these properties are to be analysed in terms of 'hue-magnitudes' and the view that they are primitive properties.

The case for the Simple Account is founded on introspection. I favour a broadly convention-based approach to language [Lewis 1975]. At least I favour such an approach for that portion of language dealing with colours. The content of colour thought is primary, and the content of colour talk somehow derives from the content of colour thought. But it is introspectively evident that we are naive about colour resemblance. We believe that blue resembles purple more than green *in the ordinary sense*. I would add that we believe that blue resembles purple more than green by virtue of their intrinsic characters. There prevails among us a convention to use 'blue resembles purple more than green' to express this belief. Therefore,

‘blue resembles purple more than green’ is true just in case blue resembles purple more than green in the ordinary sense. It has the simple truth-condition that the Simple Account assigns to it. Likewise, we use ‘is binary’ and ‘is unitary’ to express our belief that colours have certain intrinsic and non-relational properties. So that is what is required for our unitary/binary claims to be true.

The third and last premise is *No Structure*. Let  $R_b$ ,  $R_p$ , and  $R_g$  be the reflectance properties that the Physicalists identify with the colours blue, purple, and green. According to *No Structure*, it is simply not the case that, in the ordinary sense of ‘x resembles y more than z’ that we have in mind when we assert [1],  $R_b$  resembles  $R_p$  more than  $R_g$ . More generally, it is not always the case that, if we believe that  $C_1$  resembles  $C_2$  more than  $C_3$  in the ordinary sense, then  $R_1$  resembles  $R_2$  more than  $R_3$  in the ordinary sense, where  $R_1$ ,  $R_2$ , and  $R_3$  are the reflectance properties corresponding to the colours  $C_1$ ,  $C_2$ , and  $C_3$ . (Byrne and Hilbert [1997: n32] apparently concede the point.) Likewise for unitary-binary structure. According to Simple Truth-Conditions, ‘is binary’ and ‘is unitary’ express intrinsic, non-relational properties. *No Structure* adds that these are properties which  $R_p$  and  $R_g$  do not have.

The case for *No Structure* is that it is obvious when we look at the reflectance curves for reflectances (see Figure 1). It is simply not the case that the blue reflectance resembles the purple one more than the green one, in any ordinary sense. Now, because of the phenomenon of *metamerism*, the Physicalist does not identify the colours with determinate reflectances represented in Figure 1. Rather, he identifies them with more abstract reflectance properties. For instance, he might identify *blue* with a disjunction of many different reflectances which has the reflectance represented in

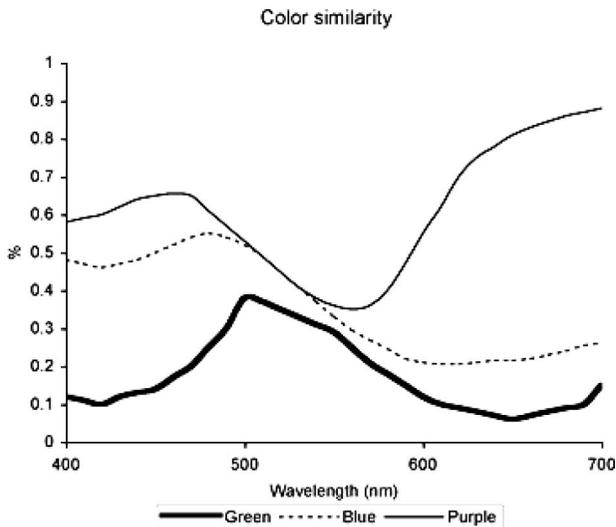


Figure 1. Spectral reflectance curves typical of purple, blue, and green objects. From Byrne and Hilbert [2003]. Reproduced with permission from Alex Byrne and David Hilbert.

Figure 1 as one of its disjuncts; or he might identify it with a property of the form *having some reflectance or other that meets spectral condition F*, where the determinate reflectance represented in Figure 1 is one of the many reflectances that meets the condition. But the same point applies to these more abstract reflectance properties. In general, blue reflectances do not resemble purple ones more than green ones.

The Argument from Structure may now be stated as follows.

1. The sentence 'blue resembles purple more than green' is true iff blue resembles purple more than green in the ordinary sense. (By the Simple Account.)
2. On Physicalism, blue is identical with  $R_b$ , purple is identical with  $R_p$ , and green is identical with  $R_g$ . So if Physicalism is true, then 'blue resembles purple more than green' is true iff  $R_b$  resembles  $R_p$  more than  $R_g$  in the ordinary sense. (By 1 and substitution.)
3. It is simply not the case that  $R_b$  resembles  $R_p$  more than  $R_g$  in the ordinary sense. (By No Structure.)<sup>4</sup>
4. So if Physicalism is true, then 'blue resembles purple more than green' is false. Call this *Incompatibilism*. (By 1, 2, and 3.)
5. But 'blue resembles purple more than green' is true. (By Realism.)
6. Therefore, Physicalism is mistaken about what the colours are.<sup>5</sup>

In the case of unitary-binary claims, the argument is similar. By the Simple Account, 'is binary' expresses a certain intrinsic, non-relational property. Therefore, if Physicalism is true and purple is identical with  $R_p$ , then 'purple is binary' is true iff  $R_p$  has this property. But, by No Structure,  $R_p$  does not have this property. So if Physicalism is true, then 'purple is binary' is false. But, by Realism, it is true. So Physicalism is wrong.

I believe that the Argument from Structure generalizes to other sensible qualities: sounds, tastes, and so on. These qualities also have certain structural features which are not possessed by their external physical correlates. So they cannot be identical with their external physical correlates. But here I will focus on the colours.

<sup>4</sup>The comparative resemblance predicate 'x resembles y more than z' is subject to a great deal of indeterminacy concerning what respects of similarity and difference matter, and concerning the importance assigned to the respects that do matter [Lewis 1986: 254]. The indeterminacy might be resolved differently in different contexts. But this does not undermine Premise 3. For ' $R_b$  resembles  $R_p$  more than  $R_g$ ' does not come out true under any resolution of the vagueness compatible with the ordinary meaning of 'x resembles y more than z'.

<sup>5</sup>Boghossian and Velleman [1991] and Johnston [1992] develop an *epistemological* version of the Argument from Structure: they argue that if Physicalism is true, then we cannot know on the basis of visual experience the truth of colour structure claims, contrary to fact. The Argument from Structure displayed in the text seems to be a more fundamental objection against Physicalism for it purports to show that if Physicalism is true then such claims are simply false. So I will focus on it. The response to this argument that I will be considering here also provides a response to the epistemological version of the argument, but I will not discuss this here.

### III. The Experiential Account

The Argument from Structure is meant to show that Physicalism is incompatible with certain ordinary claims about colours. Kripke [1982: 64–5] notes that, when presented with such an argument, the philosopher commonly avails himself of a well-worn strategy. Instead of rejecting the claims in question, he says that the appearance of incompatibility is based on a misunderstanding of what it takes for them to be true. He then provides an alternative account of the claims. Typically, the proposed account is a highly complicated one according to which the claims in question do not really say what they seem to say. Then he says that, on this correct understanding of the claims in question, there is no conflict between his theory and the truth of those claims. For instance, Berkeley suggested that there is no conflict between his Idealism and our ordinary claims about material objects because the correct account of those claims is a phenomenalist, response-dependent one in terms of the ideas we would have if we did certain things.

Physicalists who defend the Experiential Account implicitly employ this strategy. They would claim that the appearance of a conflict between Physicalism and colour structure claims is based on a mistaken account of what it takes for those claims to be true, namely the Simple Account. On the correct account of what it takes for those claims to be true, namely the Experiential Account, there is no conflict. Therefore, the Argument from Structure fails.

I will begin by providing an exposition of the Experiential Account. Then I will explain how, if correct, it answers the Argument from Structure.

Defenders of the Experiential Account propose a systematic account of colour structure claims in terms of *colour experience*. Here are some representative passages:

For surface properties of objects to be similar in color relative to a certain sort of perceptual system is presumably for it to be the case that objects with those properties standardly produce, in creatures having that sort of visual system, experiences that are similar in a certain way.

[Shoemaker 1991: 519]

Our account [Physicalism about colour] provides a correspondence between colours and colour experiences... Whatever form it takes, the correspondence yields relations among colours in the image of relations among colour experiences.

[Lewis 1997: 330]

The comparative claim about red, orange, and blue [red resembles orange more than blue] is thus true in virtue of a comparative fact about the visual experiences in question.

[McLaughlin 2003: 115]

[Physicalists about colour] may explain the structural relations among the colours in terms of the structural relations among the experiences colours dispose their bearers to produce.

[Cohen 2003: 88]

The idea, then, is this. Physicalism about colour is correct. On Physicalism about colour, by contrast to the various error theories about colour, colours are physical properties of external objects that play a causal role in the generation of our colour experiences. Suppose that this is right. Then we may define a correspondence between colours and colour experiences. A given colour (on this view, a given reflectance property) causes different colour experiences in us under different conditions of observation. But for every colour there will be the type of colour experience it would cause if *optimal conditions* obtained: conditions in which lighting conditions are normal, the subject is in a normal state of adaptation, and has a normal, properly functioning visual system, and so on. Let us use 'E[C]' as short-hand for the colour experience (type) that colour C would cause if optimal conditions obtained. And let us say that the colour experience E[C] *corresponds to* the colour C.

Now we may state the Experiential Account. According to the Experiential Account, the truth-conditions of [1] and [2] are:

[1a] E[blue] resembles E[purple] more than E[green]

[2a] E[purple] is binary, while E[green] is unitary.

[1a] says that the experience corresponding to blue resembles, in respect of its phenomenal character, the experience corresponding to purple more than the experience corresponding to green. This should be understandable enough. [2a] requires some explanation. Here the predicates 'is binary' and 'is unitary' are applied to colour experiences. Ordinarily we apply these predicates not to our colour experiences but to the colours that we experience. So what do these predicates mean when applied to colour experiences? I take it that the idea is this. Colour experiences have a 'phenomenal character'. Some colour experiences are 'binary' in respect of their phenomenal character, and others are 'unitary' in respect of their phenomenal character. What [2a] says is that the experience corresponding to purple is binary in respect of its phenomenal character while the experience corresponding to green is unitary in respect of its phenomenal character. What these facts about the phenomenal character of colour experiences come to depends on what theory of phenomenal character is right; we will turn to this issue presently.

The Experiential Account may be extended in the obvious way to other colour structure claims. The result is a response-dependent account of colour structure claims, in the sense that it is claimed that facts about observers enter into the truth-conditions of such claims. Thus, while defenders of the Experiential Account give a response-independent account of colours themselves (at least in the sense that they identify them with observer-independent properties, namely reflectance properties), they give a response-dependent account of their second-order, structural properties. But note that this account does not, or need not, entail that the truth of such claims depends on the actual presence of observers. For the relevant correspondence relation between colours and colour experiences is defined in counterfactual/dispositional terms. *E* corresponds to *C* iff *C* would produce *E* in us under optimal conditions.

Now for a digression. The Experiential Account explains the structural properties of colours in terms of the structural properties of colour experiences. But what is the correct account of the structural properties of colour experiences?

Here is a very natural idea. Where  $E_1$ ,  $E_2$ , and  $E_3$  are colour experiences,  $E_1$  resembles  $E_2$  more than  $E_3$  iff in having these colour experiences one experiences the colours  $C_1$ ,  $C_2$ ,  $C_3$ , and  $C_1$  resembles  $C_2$  more than  $C_3$ . For instance, what makes it the case that E[blue] resembles E[purple] more than E[green] is that in having these colour experiences one experiences, respectively, the colours blue, purple, and green (or certain determinate shades thereof), and the colour blue resembles the colour purple more than the colour green. (Here and in what follows, I use 'experience' in a loose sense. In this sense, one can be said to experience a colour, even if one is hallucinating and does not experience a material object that has that colour.) Likewise a colour experience  $E$  is binary iff in having  $E$  one experiences a binary colour. And so on. In general, the idea is that the structural properties of colours are simply inherited from (or amount to) the structural properties of the colours that we are sensorily related to in having those colour experiences. Call this the *Relational View* of the structural properties of colour experiences. For myself I believe that it is fundamentally right.

The Relational View can be developed in different ways, depending on what view one takes on what it is to have an experience as of a colour, or more generally, what it is to have an experience as of a certain ostensible property. Sense Datum theorists hold to have an experience of a colour one must experience a mental object that possesses that colour. Representationalists deny this (for instance, Tye [2000]). They say that to have an experience of a colour is to visually represent that something has that colour. One can visually represent that something has a colour even if one does not experience anything that *has* that colour, as it might be, in a case of illusion or hallucination. Other Relationist alternatives to the Sense Datum Theory are the Meinongian Theory [Smith 2002; McGinn 2004], the Property-Complex Theory [Bealer 1982; Johnston 2004], and the Multiple Relation Theory [Alston 1999]. However, for our purposes here it does not matter how the basic idea is developed.

The Relational View of the structural properties of colour experiences is very natural. Many philosophers have been impressed by the observation that when we attempt to focus on qualitative character of a visual experience we end up looking through it to the familiar properties—colours, shapes, etc.—that we experience in having the visual experience. This is called the *transparency observation* [Tye 2000]. The observation applies also to the structural properties of colour experiences. This is not surprising, since the structural properties of colour experiences supervene on their phenomenal characters. For instance, suppose that you have concurrently three colour experiences,  $E_1$ ,  $E_2$ , and  $E_3$ , in which you experience colours  $C_1$ ,  $C_2$ , and  $C_3$ , respectively. If you try to determine whether  $E_1$  resembles  $E_2$  more than  $E_3$ , you inevitably end up focusing on the colours  $C_1$ ,  $C_2$ , and  $C_3$  and trying to determine whether  $C_1$  resembles  $C_2$  more than  $C_3$ . In general, if you try to

focus on resemblances among your colour experiences, you end up focusing on the resemblances among the colours that you experience. Likewise, if you try to determine whether a colour experience is binary, you simply end up focusing on the colour you experience and trying to determine whether *it* is binary. And so on. This strongly suggests some form of the Relational View; it suggests that the structural properties of colour experiences derive from the structural properties of the colours we experience in having those colour experiences. The transparency observation may not show *which* form of the Relational View is correct. That is a matter to be decided on the basis of other, more theoretical considerations. But it does strongly suggest that *some* form of the Relational View is correct.

But the defender of the Experiential Account cannot accept the Relational View in any of its various incarnations for a very simple reason. One cannot analyse colour resemblance in terms of resemblance among colour experiences and then analyse resemblance among colour experience in terms of resemblance among colours. Likewise for unitary/binary character. That would be circular. Thus Shoemaker writes,

if the similarity of objects with respect to color (relative to a certain sort of creature) consists in their aptness to produce color experiences that are phenomenally similar, then the phenomenal similarity of color experiences cannot consist in the fact that they represent their objects as similar with respect to color (relative to a certain sort of creature).

[1991: 519]

In consequence, defenders of the Experiential Account need another account of the structural properties of colour experience. Here is one idea. According to a very simplified version of the *opponent process theory* of colour vision, we have two opponent channels, the R-G channel and the Y-B channel. Each can assume a positive or negative state of activation. When the R-G channel assumes a positive state of activation we have a reddish experience, and when it assumes a negative state of activation we have a greenish experience. (By a 'reddish experience' I mean an experience of the phenomenal type in fact produced by objects we would call 'red'. This terminology allows us to remain neutral on the debate over the nature of phenomenal character.) Likewise for the Y-B channel. Thus the structural properties of colour experiences are mirrored by, and explained by, the structural properties of certain of our brain states. Some brain states are 'binary' (they involve the joint activation in two channels) and some are 'unitary' (they involve activation only in one channel). Further, in general, if  $E_1$  resembles  $E_2$  more than  $E_3$ , then  $B_1$  resembles  $B_2$  more than  $B_3$ , where  $B_1$ ,  $B_2$ , and  $B_3$  are the opponent channel states correlated with  $E_1$ ,  $E_2$ , and  $E_3$ , respectively. This theory explains many aspects of colour vision [Hurvich 1981].

It should be noted that, while the basic opponent process scheme is generally accepted on the basis of its great explanatory power, the physiological details are not well understood. Chromatically opponent cells are found in the different areas of the visual cortex, but even at the population level there is no evidence that they fall into distinct chromatic

classes [Lennie 1999: 240]. But here all that matters is that the structural properties of colour experiences are explained *somehow* by the underlying neural mechanisms. Whether the explanation takes the simple form of the opponent process theory is irrelevant.

Given that the structural properties of colour experiences must have some kind of neural basis, the defender of the Experiential Account might identify colour experiences with neural states and the structural properties of colour experiences with the structural properties of those neural states [McLaughlin 2003: 148–9]. Call this the *Neurobiological View* of the structural properties of colour experience.<sup>6</sup>

The Neurobiological View should appeal to defenders of the Experiential Account of the structural properties of colours for two reasons. First, it doesn't appeal to the structural properties of colours, so they can accept it without fearing circularity. Second, the defenders of the Experiential Account advocate a reductive view of colours. Presumably, at least some of the reasons they have for being reductionists about colours carry over to colour experiences. So it seems that by parity of reasoning they ought to advocate a reductive view of colour experiences. The Neurobiological View is just such a view.

Here I will in various places assume that the defenders of the Experiential Account accept the Neurobiological View of colour experiences and their structural properties, although most of the points I will make are independent of this assumption and would apply even if they accept some other view. Under this assumption the Experiential Account becomes the view that colour structure claims about the colours are made true by facts about the structural properties of the corresponding brain states.

Now I am ready to say how the Experiential Account, if true, answers the Argument from Structure. Suppose you have experiences of blue, purple, and green, and so utter:

- [1] Blue resembles purple more than green
- [2] Purple is a binary colour, while green is a unitary colour

As we have seen, on the Experiential Account, perhaps somewhat surprisingly, the truth-conditions of your statements may be represented thus:

- [1a] E[blue] resembles E[purple] more than E[green]
- [2a] E[purple] is binary, while E[green] is unitary

Therefore, according to the Experiential Account, the Argument from Structure goes wrong at the first step. The Simple Account of colour structure claims is mistaken. The truth of what you say in uttering [1] and [2]

<sup>6</sup>The opponent process theory may suggest the Neurobiological View, but it is not the case that the Neurobiological View is the only account of colour experience compatible with the opponent process theory. The Relational View is also compatible with the opponent process theory. For one might say that, while colour experience is relational, it is fixed by the internal state of the subject. One might say, for instance, that if one is in a certain opponent channel state, and consequently has certain behavioural dispositions, then one stands in the awareness relation to a certain colour [Pautz 2006].

does not require that the colours blue, purple, and green *themselves* fall in the indicated resemblance order or that they *themselves* have in any sense the properties of being composite or non-composite; it just requires that the corresponding colour experiences (or brain states) do so.

Now enter Physicalism. On Physicalism, the colours blue, purple, and green are identical with the reflectance properties  $R_b$ ,  $R_p$ , and  $R_g$ . So, given the Experiential Account of [1] and [2], we obtain the following as the truth-conditions of [1] and [2]:

[1b]  $E[R_b]$  resembles  $E[R_p]$  more than  $E[R_g]$

[2b]  $E[R_p]$  is binary, while  $E[R_g]$  is unitary

These truth-conditions obtain. As noted previously, it is not the case that the reflectance properties  $R_b$ ,  $R_p$ , and  $R_g$  themselves fall in the right resemblance order or that they themselves in any sense have the properties of being composite or non-composite; but the corresponding colour experiences (or brain states) certainly do. We are so wired up that  $R_b$  and  $R_p$ , although not themselves similar, optimally produce in us very similar brain states, and we are so wired up that  $R_p$  and  $R_g$ , although not themselves binary or unitary, optimally produce in us ‘binary’ and ‘unitary’ brain states. (The ‘binary’ brain state is literally made up of R-activity and B-activity.) So, given that [1] and [2] have the truth-conditions that the Experiential Account assigns to them, in uttering [1] and [2], one speaks truly, despite the mismatch between colours and the corresponding reflectance properties. As McLaughlin writes, on the Experiential Account,

[n]othing we could learn about the properties that are in fact the colours that is independent of how they dispose things to look would refute any of these claims, for if the comparative claims are true, they are so in virtue of what it is like for things to look the colours in question.

[2003: 116]

So, according to defenders of the Experiential Account, the Argument from Structure fails. We see that there is no incompatibility between Physicalism and colour structure claims, once the content of these claims is properly understood.

#### IV. The Experiential Account is Mistaken

It must be kept in mind that the Experiential Account is not a reformatory analysis. The idea is not that the Simple Account is true, but we should ‘change the meanings’ of our colour structure sentences in accordance with the Experiential Account, so that we may speak truly when we utter them in spite of the truth of Physicalism. The Experiential Account is put forward as a theory of the truth-conditions of our actual, pretheoretical colour structure beliefs and statements.

As noted, it is helpful to view the Experiential Account as an instance of a general strategy in philosophy: when faced with an apparent conflict between one's philosophical theory and some common sense claims, reject the natural construal of those claims and say that on the correct construal there is no conflict. Kripke expresses [1982: 65] his opinion that typically the natural construal of the claims in question is correct, and that the real misconstrual comes when the philosopher says, 'All the ordinary man really means is . . . ' and provides a complicated analysis compatible with his own philosophy. This is my view in the present case. There is no evidence for Experiential Account.<sup>7</sup> But there is very strong evidence against it. It is open to at least five objections.

The Experiential Account may be combined with theories of colour besides Physicalism. For instance, one might identify colours with dispositions to produce colour experiences and then explain their structural features in terms of the relevant colour experiences [Johnston 1992]. My objections here are directed against the combination of the Experiential Account and Physicalism. But I believe that most apply to the Experiential Account no matter what theory of colour it is combined with.

My first objection is as follows. Intuitively, the Relational View of the structural properties of colour experiences is correct. The structural properties of colour experiences are inherited from the structural properties of the colours one experiences in having those colour experiences. But then the Experiential Account fails by reason of circularity.

For instance, suppose I experience a shade of purple. The defender of the Experiential Account says that what makes it the case that the shade of purple is binary is that *my experience of it* is in some sense binary. But what makes my experience binary? It is obvious to me that what makes my experience binary is that it is an experience of *that shade of purple* and that shade of purple is binary. The binary red-blue character of my experience is inherited from the binary red-blue character of the colour I experience. So the Experiential Account attempts to explain the property of being a binary colour in terms of the property of optimally causing binary colour experiences. But, given the Relational View of colour experience, in order

<sup>7</sup>Of course, for Physicalists, the Experiential Account has a very nice feature: it allows a compatibilist response to the Argument from Structure. But that does not *show* that it actually is true. Typically, Physicalists who defend the Experiential Account say nothing in its favour at all. For the most part, they just seem to pull it 'out of thin air'. Brian McLaughlin is an exception. He makes two points which he apparently thinks support the Experiential Account. However, I believe that they do not support the Experiential Account. (i) He notes that our beliefs about the structural properties of colours are *justified* on the basis of our experiences of colours or coloured things—on the basis of the way they look [2003: 113]. But this does not entail that colour experiences enter into the truth-conditions of those beliefs, as the Experiential Account would have it. Our beliefs about *tables* are justified by our experiences, but our experiences do not enter into their truth-conditions. (ii) McLaughlin also says, 'The unique/binary hue distinction is, moreover, drawn phenomenologically' [2003: 113]. It is true that colour scientists sometimes draw the distinction in terms of our experiences. For instance, they might define unique yellow as a yellow in which we cannot *detect* any red or even any green [Hurvich 1981]. But this just seems to be a heuristic and does not show that the Experiential Account is true. To see this, consider a simple analogy. The distinction between clean shirts and dirty shirts, like the distinction between unitary and binary colours, shows up in experience. So, it can be indirectly characterized in terms of experience: we might say, as a rough and ready heuristic, that a shirt is clean when we can detect no dirt in it, and dirty otherwise. Yet the distinction between clean shirts and dirty shirts is not correctly *analysed* in terms of our experiences. Or again: the distinction between circular shapes and square ones shows up in experience, but of course it is not to be *analysed* in terms of experience. Maybe it is the same for the distinction between unitary colours and binary colours. It seems to me, then, that there is no evidence for the Experiential Account.

to explain the property of having a binary colour experience, we must appeal to that very property. In this sense, given the Relational View, the Experiential Account is circular. Likewise for colour resemblance. If resemblances among colour experiences are analysable in terms of resemblances among the colours we experience, then we cannot analyse resemblances among colours in terms of resemblances among colour experiences.

The defender of the Experiential Account (structural relations originate as relations among colour experiences) might reply that we have no strong reason to accept the rival Relational View of the structural properties of colour experience (structural relations originate as relations among colours). For instance, David Lewis writes:

We might have had an offhand opinion that these relations originated as relations among surface properties [colours]. If so, we were wrong. But I am not sure we had any such opinion at all; and if we did, we have no business elevating it into a Moorean fact of folk psychophysics.

[1997: 330]

Against this, I believe that the transparency observation provides a strong argument for the Relational View. And I believe that there are other, more theoretical arguments for this view. Therefore one cannot answer the present objection by dismissing the Relational View as an offhand opinion.

The defender of the Experiential Account might offer a quite different reply. So far, I have only considered one version of the Relational View. But really there are two different versions. On one version, the phenomenal character of colour experience is determined by what *colours* we are perceptually related to. Call this the *Standard Relational View*. This is the version I have had in mind. But there is another version of the Relational View. On this version, having a colour experience with a certain phenomenal character is a matter of being related to a property distinct from but corresponding to a colour. For instance, Shoemaker [2006] says that an individual has a colour experience with a certain phenomenal character iff his colour experience represents there being an object having a colour that is presenting a certain ‘qualitative character’. What determines the phenomenal character of the colour experience is the qualitative character under which the colour is presented. Shoemaker says that ‘qualitative characters’ are aspects of properties in the world. On his view, if two individuals are spectrum inverted, they might represent objects as having the same colours; but they represent them as presenting different qualitative characters, and this is what makes it the case that they have different colour experiences. Call this the *Non-Standard Relational View*.

Couldn’t one combine the Experiential Account with the Non-Standard Relational View of colour experience? Indeed, Shoemaker seems to do just this. It may be thought that the defender of this combination of views can accommodate transparency while avoiding circularity. It may be thought that he accommodates transparency. As Shoemaker writes, on this view, ‘since the qualitative character is an aspect of the color, one can . . . say that *what* is perceived, or what is represented as being perceived, determines the

phenomenal character of color experience' [Shoemaker 2006: 474]. It may be thought that he also avoids circularity. Suppose again that I am now experiencing a shade of purple. According to the Experiential Account, what makes the shade of purple binary is that my experience of it is binary. What makes my experience binary? On Shoemaker's non-standard version of the Relational View, presumably, what makes my experience binary is that it represents there being an object having a colour that is presenting a 'binary' qualitative character. There is no circularity, on this combination of views, because what it is for the colour (on this view, a reflectance property) to be binary is explained in terms of what it is for something else to be binary—namely the 'qualitative character' under which the colour is typically presented to us. Likewise, resemblances among colours are explained in terms of resemblances among the qualitative characters under which those colours are typically presented to us.

But the Non-Standard Relational View is mistaken. It does not accommodate transparency. It is obvious to me that what makes my experience binary is that the *colour* I experience is binary. I find no property other than the colour. Shoemaker says that qualitative character is an aspect of a colour. This makes it seem as if he thinks that it is a second-order property of the colour. But the only second-order properties of the colour I know of are its hue, saturation, and brightness. Some hold that colour experience also represents level of illumination. Now presumably Shoemaker means to pick out with 'qualitative character' a property distinct from these properties. But I cannot find any such property. (Is the qualitative character supposed to somehow be in front of the colour, and so block my view of the colour?) Like Michael Tye [Tye 2006: 172], I have no firm grasp on the properties to which Shoemaker adverts. So if we accept transparency, we are led to the Standard Relational View. But if this view is correct, then the Experiential Account fails because it is unavoidably circular.

I would be content to leave the matter here, because I am strongly committed to the transparency observation and the Relational View in its standard version. But I am conscious that others may not be persuaded. However, there are other objections.

My second objection is as follows. The Experiential Account is a view about the actual truth-conditions of our colour structure beliefs and statements. But it seems that we know that it gets the truth-conditions wrong on the basis of simple introspection.

We have some degree of privileged access to the truth-conditions of our beliefs and statements. The access may not be complete. This, it might be thought, is shown by unobvious analyticities, externalism about content, and the fact (if it is a fact) that the best semantic theories for certain sentences of English are at variance with our offhand semantic intuitions concerning their truth-conditions. But we do have through introspection *some* degree of access to what it takes for our beliefs and statements to be true and what objects and properties they are about.

For instance, suppose that I come to believe

[3]  $L_1$  resembles  $L_2$  more than  $L_3$

where  $L_1$ ,  $L_2$ , and  $L_3$  are determinate lengths. We know that the Experiential Account is not true in this case. My belief is not true merely iff  $E[L_1]$  resembles  $E[L_2]$  more than  $E[L_3]$ . Rather, the Simple Account is correct in this case. The truth of my belief requires that the lengths themselves stand in the indicated resemblance-order. How do we know this? First, it is introspectively evident that my belief is entirely about *what* I experience—the lengths  $L_1$ ,  $L_2$ , and  $L_3$ —and has nothing to do with experiences.<sup>8</sup> Second, it is just obvious that in believing [3] what I believe is that the lengths themselves stand in the indicated resemblance-order. I believe that  $L_1$  resembles  $L_2$  more than  $L_3$  in the ordinary sense and by virtue of their intrinsic characters. So that is what is required for my belief to be true.

But now suppose I experience a blue marble, a purple marble, and a green marble, and focusing on their colours, come to believe

[1] Blue resembles purple more than green

According to the Experiential Account, my belief is true merely iff  $E[\text{blue}]$  resembles  $E[\text{purple}]$  more than  $E[\text{green}]$ . But the very same introspective evidence against the Experiential Account and for the Simple Account applies here. So, by parity of reasoning, we ought to reject the Experiential Account and accept the Simple Account in this case as well. (If we don't, it seems that we will have to admit that we are not justified in rejecting the Experiential Account in the case of length on the basis of the introspective evidence, for in the case of length introspective evidence against the Experiential Account is exactly parallel. This is hard to believe.) First, it is introspectively evident that my belief is entirely about *what* I experience—the colours blue, purple, and green—and has nothing to do with experiences. Experience-types do not enter into the truth-conditions at all. In forming my belief, my attention was focused out, not in.<sup>9</sup> Second, in

<sup>8</sup>Nominalists would say that my belief is not about lengths (there are none) but about the particulars that we would (misleading, in their view) say 'have' lengths. I disagree, but I do not think that the matter can be decided by simple introspection. So I should rather say it is introspectively evident that my belief is about *what I experience, lengths or the things that have lengths.*

<sup>9</sup>Kripke made a well-known objection against Lewis's counterpart theory [1980]. Sometimes it is interpreted (whether rightly or wrongly) as the following objection: if the counterpart theory is correct, the claim that Humphrey might have won the election is not about Humphrey but about his counterparts. Of course, the obvious reply is that, on the counterpart theory, it remains a claim about Humphrey: it is a claim about Humphrey, which attributes to him the property of having a winning counterpart [Lewis 1986: 196].

My first introspective objection to the Experiential Account is *not* analogous to this one. I do not say that if the Experiential Account is true then colour structure claims are not about colours but about colour experiences. I believe that the Experiential Account has no such consequence, just as the counterpart theory has no such consequence. But I do say that the Experiential Account has the consequence that colour experiences, in addition to colours, enter into the truth-conditions of our colour structure claims. (It has the consequence that the truth or falsity of our colour structure claims hangs on facts about our colour experiences.) But this consequence is highly counterintuitive. Intuitively, it is only the colours that we experience that enter into those truth-conditions. This is my objection.

My first introspective objection against the Experiential Account may be usefully compared to a distinct objection against the counterpart theory. The counterpart theory *does* have the consequence that individuals in other worlds enter into the truth-conditions of our *de re* modal claims. But this is highly counterintuitive. As Salmon writes, 'when we say that Humphrey might have won, what we say certainly has nothing to do with the political goings-on in alternative universes' [1988: 239]. Lewis seems to be addressing this distinct objection to the counterpart theory when he writes, 'Counterpart theory does say ... that someone else—the victorious counterpart—enters into the story of how it is that another world represents Humphrey as winning, and thereby enters into the story of how it is that Humphrey might have won. Insofar as the intuitive complaint is that someone else gets into the act, the point is rightly taken' [1986: 196]. Here he seems to acknowledge that this distinct objection has some force. But he goes on to reply that a similar objection

believing [1] what I believe is that the colours themselves stand in the indicated resemblance-order. I believe that blue resembles purple more than green in the ordinary sense and by virtue of their intrinsic characters. I know what I believe, and this is what I believe. So that is what is required for my belief to be true.

As it is for our colour structure beliefs, so it is for the sentences we use to express them. There is a convention in our language to use the sentence 'blue resembles purple more than green' to communicate our belief that blue resembles purple more than green in the ordinary sense. So that is what is required for the sentence to be true.

To say, as the defenders of the Experiential Account do, that our beliefs about length resemblance concern the length themselves, while our beliefs about colour resemblance really concern our experiences of the colours, is to read something into our beliefs about colour resemblance that is simply not there. We are naive about colour resemblance. We believe that colours themselves fall into certain resemblance-orders, just as we believe that lengths (and properties in other families) themselves fall into certain resemblance-orders. Therefore the Experiential Account is simply wrong about the truth-conditions of our colour resemblance beliefs and statements. The Simple Account is correct. Parallel remarks apply to beliefs and statements about the unitary/binary character of the colours.

My third objection is that there is no plausible story to be told concerning how colour structure beliefs could have the truth-conditions that the Experiential Account assigns to them.

Some philosophers think that that our pretheoretic intuitions about truth-conditions are not sacrosanct and may be overruled by other considerations [Lewis 1986: 240–1]. So the defender of the Experiential Account might stand his ground and maintain, contrary to our intuitions on the matter, that colour structure statements and beliefs have the truth-conditions that the Experiential Account assigns to them. But he would still face the following distinct objection. Somehow the non-intentional facts determine the intentional facts. So if the Experiential Account is correct, and colour structure beliefs have response-dependent truth-conditions, then there must be some non-intentional facts that make it the case that they have these complicated truth-conditions. But there seem to be no such facts.

Here is a way to underscore the problem. Presumably, according to the defender of the Experiential Account, our beliefs about the resemblances among colours and our beliefs about the resemblances among properties in other families of properties have quite different truth-conditions. They give a *non-uniform* account of our thought and talk about the resemblances among properties. In particular, our beliefs about the resemblances among

applies to the ersatzist alternatives to his own view. So, he seems to think that the problem is unavoidable, and for that reason not decisive.

No analogous reply may be made in response to my first introspective objection against the Experiential Account. There is an account of colour structure claims available that does not have the consequence that colour experiences (or any other extraneous entities), in addition to the colours, enter into the truth-conditions of our colour structure claims. I have in mind the Simple Account of those claims. So, here the problem is avoidable. Since the Simple Account, unlike the Experiential Account, accommodates our intuition that our colour experiences do not enter into the truth-conditions our colour structure claims, we have reason to think that it is correct.

colours have complicated, response-dependent truth-conditions, whereas our beliefs about the resemblances among lengths have simple, response-independent truth-conditions. But underlying non-intentional (causal, functional, conceptual role) facts seem relevantly the same. So what could make it the case that they have the radically different kinds of truth-conditions, as defenders of the Experiential Account maintain? It is a semantic mystery.

It might be said that this is a problem for everyone. It is just the general problem of saying how the non-intentional facts settle the truth-conditions of our beliefs. But this is not right. For instance, I can see what might make it the case that ‘water is wet’ is true iff  $H_2O$  is wet, and maybe I can see what might make it the case that a quantificational analysis of definite descriptions is correct. But I cannot see what could make it the case that colour structure beliefs could come to have the response-dependent truth-conditions that defenders of the Experiential Account assign to them.

It might be thought that the objection can be answered by appealing to some kind of causal or counterfactual-dependence account of content: very crudely, what makes it the case that our colour structure beliefs have response-dependent truth-conditions is that they are caused by our colour experiences when things go right. This strikes me as a non-starter. Many of our beliefs are caused by our experiences, but are not about our experiences. Our beliefs about tables are caused by our experiences, but they are not about table-experiences. Likewise, our beliefs about the resemblances of lengths are typically caused by our experiences of those lengths, but the Experiential Account is not true of our beliefs about resemblances among lengths. Indeed, we can imagine a world,  $W$ , in which we only have *visual* experiences, and in which we do not interact bodily with objects in our environments. In  $W$ , our beliefs about resemblances among lengths are only caused by our visual experiences of those lengths, but even in  $W$  the Experiential Account of our beliefs about the resemblances of lengths would not be correct. So, the fact that beliefs about resemblances among colours are only ever caused by our experiences of colours cannot be sufficient to make it the case that these beliefs have the response-dependent truth-conditions that the Experiential Account assigns to them.

A more sophisticated reply appeals to a theory of the content of thought and language that makes heavy use of a principle of charity, as follows. What an individual believes, and what the sentences in his language mean, is given by the best total assignment of contents to his inner states and sentences. The best total assignment is determined by the functional roles of his states plus certain constitutive principles. One such principle is the principle of charity. Roughly speaking, this principle states: all else being equal, maximize the truth of our beliefs—or at any rate, those beliefs of ours which we can reasonably be expected to get right [Lewis 1974]. Colours are identical with reflectance properties (assumption). There is no ordinary sense in which  $R_b$  resembles  $R_p$  more than  $R_g$  or in which  $R_p$  is binary while  $R_g$  is unitary. So, given that colours are reflectance properties, our colour structure beliefs, and in particular [1] and [2], can come out true only if they have response-dependent truth-conditions. In consequence, they have those

response-dependent truth-conditions. (This may go against our intuitions, but our intuitions are not sacrosanct.) The same is not true of our beliefs about resemblances among lengths. These claims can come out true even if they have the ordinary truth-conditions that the Simple Account assigns to them. So they have these truth-conditions, in agreement with our intuitions on the matter. This is what makes it the case that colour structure claims and lengths structure claims have quite different kinds of truth-conditions.

But this reply is mistaken. Let *T* be the correct theory of content. Suppose that this answer to the objection from semantic mystery is correct: *T*, together with the claim that colours are reflectance properties, entails that colour structure beliefs have response-dependent truth-conditions, because this assignment of truth-conditions is in accordance with the principle of charity (and maximizes the satisfaction of the other relevant constitutive principles, and so on). Then by parity of reasoning *T* should have similar consequences in other cases. For instance, suppose that Berkeley is right: there are only minds and their ideas. If this were the case, *T* should have the consequence that an ordinary claim about the material world, *p*, is true iff *it is as if p*, because given that we live in a Berkeleyan world this assignment of truth-conditions is in accordance with charity. But this is intuitively incorrect: if Berkeleyan idealism turned out to be true, ordinary claims about material objects would not have these truth-conditions. They would have their simple, face value truth-conditions, and so would be uniformly false. The point is a general one. If the proposed answer to the objection from semantic mystery is correct, then by parity of reasoning the truth-conditions of our beliefs should be malleable to a great degree in general. They should be dependent on how the world turns out to be, so that they are by and large aligned with how the world turns out to be. As this is not the case, the proposed answer must be incorrect. Charity, although it might have some role in determining content, cannot have the very strong role that the response assigns to it.

I conclude that the defender of the Experiential Account has no plausible story concerning what might make it the case that colour structure beliefs have the complicated, response-dependent truth-conditions which that account assigns to them.

My fourth objection is that the Experiential Account is incredible given our experience of the colours. Suppose that you are looking at a shade of orange. It looks binary to you.<sup>10</sup> But it does not look disposed to produce binary experiences in people when optimal conditions obtain. Likewise, when colours look similar, they do not look such as to cause similar experiences in people when optimal conditions obtain. This strongly suggests, contrary to the Experiential Account, that colour structure facts

<sup>10</sup>Here I say that the colour orange—a property (a universal or trope)—looks a certain way. Against this, Byrne [2003] says that only *particulars* can look (in the phenomenal sense) to us to have properties, never properties themselves. Let's call this *Strong Particularism* about perception. I think that this is false. We often say that colours, for instance, look certain ways to us—saturated, or bright, or reddish—and an error theory of such talk seems to me implausible.

There is another view one might take. On this view, statements about how colours look can be true, but they are analysable in terms of statements about how *particulars* look. Thus, the statement that purple looks reddish is analysed as: everything that looks purple looks reddish. Call this *Weak Particularism*. (It may be that this is really Byrne's view [Byrne 2003: n31].) What I say is compatible with this view.

are not dispositional facts about what colour experiences colours are disposed to cause in people when optimal conditions obtain.

Here is a more informal way to appeal to phenomenology to argue against the Experiential Account. On the Experiential Account, the fact that orange is binary amounts to the fact that, if optimal conditions were to obtain, it would cause binary colour experiences (or brain states) in human beings. Thus the fact that orange is binary is an extrinsic and relational fact about it. But this just seems wrong on the basis of visual experience. The fact that orange is binary seems to be a wholly intrinsic, here-and-now fact about the colour. To see that it is binary, you only need to focus on the colour itself. Likewise for colour resemblance. On the Experiential Account, the fact that blue resembles purple more than green amounts to the fact that they are related to things—experiences or brain states—that fall into this resemblance-order. Against this, it seems perceptually obvious that the fact that blue resembles purple more than green obtains by virtue of the intrinsic character of the colours. To see that the colours fall into this resemblance-order, you only need to focus on the colours themselves.

We may distinguish between *first-order* and *second-order* claims about colours. Roughly, first-order claims about colour attribute colours to objects (the table is red) while second-order claims attribute second-order properties and relations to colours themselves (the colour red is unitary). Many philosophers have advocated response-dependent accounts of first-order claims about colours, holding that for an object to have a certain colour is just for it to be disposed to produce experiences of a certain kind in us. *Dispositionalists* hold that colours are simply identical with dispositions to produce experiences. One objection to Dispositionalism is phenomenological. In looking red, an apple doesn't look disposed to produce reddish colour experiences in us [McGinn 1996]. Physicalists who accept the Experiential Account reject Dispositionalism in the first-order case but accept something like it in the second-order case. What I am pointing out is that the phenomenological objection applies with equal force in the second-order case.<sup>11</sup>

My fifth and final objection is that the Experiential Account gets the truth-values of certain modal statements wrong. Grant, as defenders of the Experiential Account maintain, that the colour purple is identical with the reflectance property  $R_p$ . Then, because  $R_p$  might have caused unitary instead of binary experiences under optimal conditions owing to differences in our neural wiring, the colour purple might have caused unitary instead of binary experiences under optimal conditions [Pautz 2006]. For instance, it might have caused unitary reddish experiences under optimal conditions. This, together with the Experiential Account, implies that the colour purple—that very quality—might have been unitary instead of binary! By similar reasoning, on the Experiential Account, blue might have failed to resemble purple more than green. In general, since the defenders of the

<sup>11</sup>Several have raised criticisms against the phenomenological objection to a Dispositional account of first-order colour statements, and it might be thought that these criticisms also apply to my analogous phenomenological objection to a Dispositional account of second-order colour statements. I find the criticisms unconvincing, but cannot discuss the matter here.

Experiential Account analyse the structural properties of a colour in terms of its perceptual effects on us, and since they are committed to saying that those effects might have been different, they are committed to saying that the structural properties of any given colour might have been different than they in fact are. But this is not the case. It is clear that every shade of purple is necessarily somewhat reddish and bluish, and so is *necessarily* a binary colour. It is equally clear that blue could not have failed to resemble purple more than green. In general, colours have their structural properties essentially. Call this *Necessity*. Therefore the Experiential Account must be wrong. Call this *the argument from necessity*.

This, I think, is a very strong argument. I know of three replies that defenders of the Experiential Account have made or could make, but I believe that they are unsuccessful.

(i) Cohen [2003: 91–2] agrees, or at least is prepared to agree, that if the Experiential Account is correct, then *Necessity* is false. He suggests the response of biting the bullet and concluding that *Necessity* is false.

In my opinion, this is a case of failing to apply *modus tollens*. We have a very strong intuition that *Necessity* is true. In fact, I would maintain that we can be more certain of the truth of *Necessity* than of the truth of any controversial philosophical theory of colour. Therefore, if we are forced to choose between the Experiential Account and *Necessity*, the proper choice is to hold on to *Necessity* and to reject the Experiential Account.

Cohen [2003: 91] addresses the point that intuition strongly favours *Necessity*. In response, he says that the Physicalist about colour (I take it he means the Physicalist about colour who accepts the Experiential Account) ‘does not share (or any case does not accept) the intuition in question’. In other words, Cohen points out that the defender of the Experiential Account does not accept the intuition: for Experiential Account implies that *Necessity* is false and hence that the intuition in favour of *Necessity* is incorrect. Consequently, he says, ‘it is question-begging to use that very disputed intuition in an argument against her’.

Is this an adequate response? To begin with, Cohen suggests that defenders of the Experiential Account do not share the intuition in favour of *Necessity*. In my opinion this is a dubious claim, at least if it means that they do not feel the pull of the intuition. If a defender of the Experiential Account claimed that he does not *feel the pull of the intuition* in favour of *Necessity*, I would doubt his sincerity. The defender of the Experiential Account might (unreasonably in my opinion) *reject* the intuition because their account entails that it is false, but if he is like the rest of us he still shares the intuition in the sense that he feels its pull. The pull of the intuition is undeniable and very strong. This gives us very good reason to think that the intuition is correct, and that the Experiential Account is mistaken.

To turn to Cohen’s principal charge—that of begging the question—Cohen says that it is question-begging to appeal the intuition to argue against the Experiential Account on the grounds that, if the intuition is correct, then the Experiential Account is false, so that those who accept the Experiential Account will reject the intuition. But this is not enough to show that it is *question-begging* (at least, question-begging in some probative

sense) to use the intuition to arrive at the conclusion that the Experiential Account is false. Otherwise, whenever we have an intuition that is in conflict with a philosophical theory, it is question-begging (and therefore, illegitimate) to use that intuition to argue against the theory, simply because it is in conflict with the theory, and so would be rejected by proponents of the theory. For instance, by this reasoning, we must say that it was question-begging (and therefore, illegitimate) of Kripke to appeal to our modal and semantic intuitions to arrive at the conclusion that the Description Theory of Proper Names is false, because if the Description Theory is correct then those intuitions must be false, so that those who accept the Description Theory do not accept the intuitions in question! Indeed, by this reasoning, any argument against any claim is question-begging, on the grounds that if the argument is sound then the claim is false. This is not the case. Consequently I think that Cohen has not said enough to show that it is question-begging (at least in a sense that would imply that it is illegitimate) to appeal to the intuition.<sup>12</sup>

(ii) Cohen also attempts to explain away our intuition in favour of Necessity. Necessity says that colours have their structural properties necessarily. But Cohen suggests that it is a mistake to think that intuition supports this claim. Instead, he claims, intuition supports the claim colour experiences have their structural properties necessarily. This intuition, he says, is correct. But we misreport this intuition as the intuition that colours have their structural properties necessarily. That is because we are prone to think of properties of colour experiences as properties of colours. However, Cohen says, the claim that colours have their structural properties necessarily is a distinct claim which is not itself supported by intuition. So, we are duped into thinking that intuition supports Necessity when this is not really the case. (What Cohen says about Necessity is similar to what McLaughlin [2003: 99] says about Revelation.)

In my view, this is not a credible story. To see this, suppose that you are looking at a blue thing, a purple thing, and a green thing. You focus on their colours and report the intuition that that the first colour necessarily resembles the second more than the third, that the second is necessarily binary, and so on. According to the reply, you misreport your intuition: the true subject of your intuition is not the colours you experience but your experiences of them; and if it seems to you that the subject is the colours it is because you are in the grips of some kind of confusion. But this is just not right. Your attention was focused all the while on the *colours*. It was focused

<sup>12</sup>Of course, it is possible to imagine conditions in which it would be *unreasonable* to appeal to an intuition to arrive at the conclusion that a philosophical theory is mistaken. Suppose that a theory *T* is incompatible with intuition *I*, but that it accommodates many of our other intuitions, that it is systematic, and in general, that is overall the best theory available. Under these conditions, it might be reasonable to suppose that *T* is true and that our intuition *I* is unsound—even if we cannot identify the source of the error. Then, under these conditions, it is not reasonable to use *I* to conclude that *T* is false, although I would not call this a case of begging the question. (Physicalists about the mind claim, or should claim, that these conditions hold where *T* is Physicalism and *I* is our intuition that Zombies are possible.) But Cohen has not shown that these conditions hold where *T* is the conjunction of Physicalism and the Experiential Account and *I* is our intuition that Necessity is true. (In my option, one cannot show this, for the overall best theory of colour is not Physicalism but a version of Primitivism.)

out, not in. It was focused on *what* you experience, not on your experiences. I think that this is just obvious, but if proof is needed, consider the following. Colour experiences are properties of *people*. But you were certainly not attending to properties of people: you were attending to properties that qualify *the objects that you experience or nothing at all*. And your intuition concerned *these properties*. Hence, *pace* Cohen, intuition does support Necessity: the claim that *colours* have their structural properties necessarily.

It might be thought that this objection relies on taking the transparency observation seriously and advocating the Relational View of the structural properties of colour experience. This is not the case. On the Relational View, there is a sense in which there is no such thing as focusing on a colour experience as distinct from focusing on colour experienced in having that colour experience. So if the Relational View is correct, the objection is immediate. But the objection does not depend on the Relational View. Suppose we reject the Relational View and say that at least in some cases there is such a thing as focusing on our colour experiences and their structural properties, as distinct from the colours that we experience and their structural properties. Still, even on this view, there is such a thing as focusing on the colours, as distinct from our colour experiences. This is an obvious fact that any theory of colour experience must respect. So the objection may still be made. I claim that, when we form our intuition in favour of Necessity, we are focusing on the colours, not our colour experiences; and hence that the true subject of the intuition is definitely the colours. We are not duped.

I conclude that Cohen has not undermined the argument from Necessity. He has not provided any reason to doubt our intuition in favour of Necessity, and he has not shown that it is unreasonable to appeal to this intuition to reject the Experiential Account.

(iii) Brian McLaughlin [2003: 115–16] makes some remarks which suggest a more conciliatory response to the argument from Necessity than is given by Cohen. (Cohen [2003: n23] briefly suggests, but does not develop, an analogous response.) On this response, the first step in that argument is incorrect. Even if the Experiential Account is true, Necessity can be accommodated. Therefore defenders of the Experiential Account do not have to adopt the extreme response recommended by Cohen of flatly rejecting Necessity.

The response depends on the *Description Theory of Colour Terms* [McLaughlin 2003]. Many others defend such a theory, with differences of detail, including Jackson and Pargetter [1987] and Lewis [1997]. I will focus on McLaughlin's version. According to this theory, colour terms are synonymous with definite descriptions to do with the production of colour experiences. For instance, 'purple' is synonymous with 'the property that causes purple (that is, reddish-bluish) experiences under optimal conditions'. These descriptions give the meaning of the colour terms; they do not merely fix their reference. The Description Theory of the meaning of colour terms is obviously analogous to Lewis-style functionalism concerning the meaning of mental terms. The Description Theory is used as a premise in an

argument for Physicalism about colour, parallel to Lewis's famous argument for the type-type identity theory of mental states: since by conceptual analysis colour terms refer to the properties that optimally cause our colour experiences, and since as a matter of empirical fact those properties are reflectance properties, it follows that colours are reflectance properties.

To see how the Description Theory might provide a response to the argument from Necessity, consider an instance of the claim that colours have their structural properties necessarily, for example:

[5] Necessarily, purple is reddish-bluish

By the Experiential Account, for a colour to be reddish-bluish is for it to produce reddish-bluish experiences under optimal conditions. So [5] is equivalent to

[5a] Necessarily, purple causes reddish-bluish experiences under optimal conditions

Now enter the Description Theory. By the Description Theory, 'purple' is semantically equivalent to the description 'the property that causes reddish-bluish experiences under optimal conditions'. So we may replace the occurrence of 'purple' in [5a] with this description, to obtain:

[5b] Necessarily, the property that causes reddish-bluish experiences under optimal conditions, causes reddish-bluish experiences under optimal conditions

Thus the Description Theory and the Experiential Account jointly imply that [5] is equivalent to [5b]. Hence, given this combination of views, the question of whether [5] is true becomes the question of whether [5b] is true.

Now [5b] has two readings. It has a wide scope or *de re* reading which we may gloss as follows: the property that in the actual world causes reddish-bluish experiences under optimal conditions (namely,  $R_p$ ) is such that it in every world  $W$ , it causes reddish-bluish experiences under optimal conditions in  $W$ . This reading makes [5b] false. Psychophysics is contingent. But [5b] also has a narrow scope or *de dicto* reading which we may gloss as follows: for every world  $W$ , the property that causes reddish-bluish experiences under optimal conditions in  $W$ , causes reddish-bluish experiences in  $W$ . This reading makes [5b] true (modulo worlds where there is no property that causes reddish-bluish experiences under optimal conditions).

Since the Description Theory and the Experiential Account together imply that [5] and [5b] are equivalent, and since [5b] has a reading that makes it true, these views together guarantee that [5] has a reading that makes it true—namely the alleged *de dicto* reading.

Here is a more informal way to put the point. According to the Description Theory, the semantic value of 'purple' relative to a world  $W$  is

the property that causes reddish-bluish experiences in  $W$ —for short, the property that plays the purple-role in  $W$ . (At least, this is the case if we assume that ‘purple’ is understood non-rigidly.) According to the Experiential Account, necessarily, if a property plays the purple-role, then it is reddish-bluish. That is just what it is for a property *to be* reddish-bluish. So ‘purple is reddish-bluish’ is guaranteed to come out true with respect to every world. Different properties play the purple role, and hence deserve the name ‘purple’, with respect to different worlds; but, by the Experiential Account, just by virtue of playing the purple-role, each is reddish-bluish. So, no matter what world we evaluate it at, ‘purple is reddish-bluish’ comes out true.

According to the present response, the same applies to all sentences of the form of [5] which give expression to the intuition that colours have their structural properties necessarily. The Experiential Account and the Description Theory together guarantee that they have a reading, the alleged *de dicto* reading, that makes them true. But, as McLaughlin says, the necessity is *de dicto* or *de conceptu*, not *de re* [2003: 115]. Call this the *de dicto* response to the argument from Necessity against the Experiential Account.

Could the *de dicto* response to the argument from Necessity be correct? I don’t think so, for a couple of reasons. First, it depends essentially on the Description Theory of Colour Names, but I would argue that the Description Theory is false. The objections parallel the modal, semantic, and epistemic objections that Kripke raised against the Description Theory of Proper Names [Kripke 1981]. (i) The Description Theory implies that colour terms refer to different properties with respect to different worlds or counterfactual situations: that they are non-rigid designators (or at least that they have a reading on which this is so). But, intuitively, ‘red’ refers to the same property in every world. The intuition of rigidity applies just as strongly to ‘red’ as it does to ‘Gödel’ and ‘pain’ [Kripke 1981]. (ii) The Description Theory implies that whether or not ‘purple’ refers in the actual world depends on whether or not there is a property that plays the purple-role in the actual world. If there is such a property, ‘purple’ refers to it; otherwise it does not refer. But, again, intuitively this is not the case. For instance, suppose that it turned out that (‘consider a world as actual in which’) we are brains in vats and our colour experiences are not caused by the properties of external objects, but by the operation of an evil scientist’s computer program. In that case, there would be no property that plays the purple-role, for there would be no such property as the surface property of objects that causes reddish-bluish experiences in us under optimal conditions. So by the Description Theory ‘purple’ would not refer. But, intuitively, ‘purple’, no less than names of primary qualities such as ‘square’, would still refer: it would refer to a property presented in experience that things look to have but do not. This intuition does not arise out of the acceptance of a controversial theory of the nature of colour experience (such as a form of the Relational View); rather it is a quite theory-neutral intuition which I think ordinary folk would claim to have. If mere intuition is not enough, and proof is needed of the claim that

‘purple’ would still refer if such a scenario turned out to be actual, consider the following. Intuitively, if it turned out that we are brains in a vat, certain sentences whose truth requires that ‘purple’ refers would still be true. For instance, ‘blue resembles purple more than green’ would still be true. But then, contrary to the Description Theory, it must be that ‘purple’ would still refer even if it turned out that we are brains in a vat. (iii) The Description Theory of Colour Names implies that it is a priori that if the colour purple exists, then it is the cause of reddish-bluish experiences under optimal conditions, just as a simple version of the Description Theory of Proper Names implies that it is a priori if Aristotle exists then he was the teacher of Alexander. Thus, the Description Theory implies that a certain version of Eliminativism about colours, according to which the colour purple exists but is not a property of physical objects that causes reddish-bluish experiences under optimal conditions (maybe it is a property of nothing at all), is a priori false. Against this, while such a version of Eliminativism might be false, we cannot rule it out a priori. I can think of responses to all of these objections; but in my view the objections are ultimately successful against the Description Theory of Colour Names. If the Description Theory is false, the *de dicto* response to the argument from Necessity against the Experiential Account cannot even get off the ground.

But there is a more fundamental objection against the present response to the argument from Necessity. Our intuition that colours have their structural properties necessarily is *de re*. So, Necessity is properly formulated in terms of *de re* modality. For instance, suppose that we are having a conversation about the colour purple (or a certain determinate shade of purple) and someone says

[6] It could not have failed to be reddish-bluish

Intuition supports the claim that [6] is true in the context. Intuition also supports the following *de re* modal claims:

[7] The property that is actually the colour purple is necessarily binary

[8] The colour purple is such that it is necessarily binary

But even if the Description Theory of Colour Names is correct, the Experiential Account implies that [6]–[8] are false. [6] does not even contain the name ‘purple’. So even if The Description Theory is correct, and ‘purple’ is short for the description ‘the property that causes reddish-bluish experiences under optimal conditions’, the *de dicto* response does not apply in this case. The Experiential Account inescapably implies that [6] is false. (I note that Lewis [1986: 250] also appeals to the trick of using ‘it’ to make the *de re* reading compulsory, but he appeals to it in a different connection.) Likewise for [7] and [8]. [7] contains the rigidifier ‘actually’, and [8] is so formulated as to favour the *de re* reading. So even if the Description Theory is true, the Experiential Account implies that [7] and [8] are false. Suppose

that you are looking at a shade of purple. The Experiential Account implies that *it* – this very same quality – might have failed to be reddish-bluish. But, intuitively, this is not the case.

Although it is a bit more cumbersome, we can also formulate *de re* modal claims about colour resemblance, for instance

- [9] The properties that are in fact blue, purple, and green could not have fallen into a different resemblance-order

Even if the Description Theory is true, the Experiential Account implies that [9] is false. But it is obviously true.

To conclude. Given the Description Theory of Colour Names, the defender of the Experiential Account may be able to secure the truth of [5], at least relative to the alleged *de dicto* reading. But the Description Theory is false. Further, intuition supports such *de re* modal claims about the colours as [6]–[9]. And, even if the Description Theory is true, the Experiential Account implies that these claims are false. So even if the Description Theory is true, the Experiential Account does not accommodate Necessity, properly understood.<sup>13</sup>

## V. Conclusion

I have shown that the Argument from Structure is successful only if the Simple Account of colour structure claims is correct. I have also argued against a rival account of the truth-conditions of those claims, namely the Experiential Account. It is circular, it is introspectively incredible, there is no plausible story to be told about how it might be true, it is phenomenologically implausible, and it has patently false modal consequences.

<sup>13</sup>David Chalmers suggested to me another way in which the defender of the Experiential Account might attempt to accommodate Necessity: he might revise the Experiential Account so that it says that ‘Purple is binary’ is true iff it is *actually the case* that purple causes binary experiences. For present purposes, this may be taken to mean: iff, in the actual world @, purples causes binary experiences. On the Rigidified Experiential Account, ‘Necessarily, purple is binary’ comes out true, because the proposition that purple actually causes binary experiences is true at every world. I have two objections. The first is that my second objection, the objection from semantic mystery, is exacerbated. What in the world—our linguistic intentions, causal roles of our inner states, and so on—could possibly make it the case that the actuality operator enters into the truth-conditions of ‘Purple is binary’ but not other second-order sentences about colours, for instance ‘Purple is Mary’s favourite colour’? Second, I believe that the Rigidified Experiential Account faces a problem about belief attributions. Consider the counterfactual ‘If it had rained today I still would have believed that purple is binary’. Given the revised Experiential Account, it seems that this is true only if, in the closest world *W* in which it rained out today, there is a counterpart of me with a belief having the following truth-condition: in the actual world @, purple causes binary experiences. But it is implausible that, in *W*, my counterpart has a belief whose truth-condition involves the distinct world and highly specific world @. What could possibly make it the case?

My second objection is inspired by an argument due to Soames [1998] against the analysis of names as rigidified descriptions. But it should be noted that I do not say that the Rigidified Experiential Account implies that my counterpart’s belief is *about* the actual world @. Rather, I say that, given a simple and natural analysis of belief attributions, it implies that the actual world @ *enters into its truth-condition*. This, I say, is implausible.

The defender of the Rigidified Experiential Account might appeal to the distinction between primary and secondary intensions to answer the second objection, but I believe that any such solution would have equally implausible consequences.

Have I shown, then, that the Argument from Structure against Physicalism is successful? I have not. As noted, there is another type of physicalist account of colour structure claims on offer: the Hue-Magnitude Account [Byrne and Hilbert 2003; Tye 2000]. Physicalists who defend this type of account provide a quite different answer to the Argument from Structure. But in my view this type of account fails as well [Pautz 2003; unpublished a]. If Physicalism is true, then colour structure claims are false. Of course, the Physicalist might nevertheless accept Physicalism, and so conclude that all or most colour structure claims are false. But this is absurd. As Byrne and Hilbert say, if Physicalism cannot accommodate the truth of colour structure claims, then it is ‘Hamlet without the prince—it strips the hues of their essences, and so cannot be a satisfactory theory of color at all’ [2003: 13]. If Physicalism cannot accommodate the truth of colour structure claims, the proper response is to conclude that Physicalism is mistaken. In my view, the overall best theory of colour and colour experience has the following components.

First, *Primitivism*. Colours are simple properties which are not identical either with reflectance properties or dispositions to produce experiences [Campbell 1993; Maund 1995; McGinn 1996]. Further, there is no interesting analysis of what it is for colours to resemble or be unitary or binary.

Second, the *Relational View*. The phenomenal characters of our colour experiences, and so their structural properties, are determined by what primitive colours those experiences are experiences *of*. This accommodates the transparency observation. As we saw, defenders of the Experiential Account are constrained to reject the Relational View in its standard version, and so do not respect the transparency observation.

Third, *Internalism*. While colour experience is essentially relational, it is fixed by the internal physical state of the subject. What primitive colours we experience at a time, and thereby the structural properties of our experiences, is determined by internal factors. Internalism is supported by the fact that it is our neurobiology which explains why we experience unitary and binary colours. (Whether the explanation takes the simple form of opponent process theory is not relevant.) It is also supported by considerations concerning the link between experience and behaviour [Pautz 2006].

Fourth, *Eliminativism*. Once Primitivism is accepted, we confront a choice between Realist Primitivism and Eliminative Primitivism. Realist Primitivism holds that physical objects instantiate primitive colours over and above their reflectance properties and dispositions to produce colour experiences [Campbell 1993; McGinn 1996]. Eliminative Primitivism holds that they do not. I favour Eliminative Primitivism [Pautz unpublished b]. On the version I defend, there are primitive colour *properties*, and we are related to them in colour experience. We experience these properties as instantiated in physical space. But they are not instantiated by anything, including our own experiences. Therefore there are no coloured *things*. On another, more radical version of Eliminativism, not only are there no coloured things, there are no colour properties, not even uninstantiated colour properties. I reject

this more extreme version. The reason is that I accept certain second-order claims about colour properties: for instance, that red is a unitary colour while purple is a binary colour, and that blue resembles purple more than green. I believe that such second-order claims about colours are not open to doubt in the way that first-order ones are. And these claims require for their truth the existence of colour properties.

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