

Phenomenal Continua and the Sorites

DELIA GRAFF

I argue that, contrary to widespread philosophical opinion, phenomenal indiscriminability is transitive. For if it were not transitive, we would be precluded from accepting the truisms that if two things look the same then the way they look is the same and that if two things look the same then if one looks red, so does the other. Nevertheless, it has seemed obvious to many philosophers (e.g. Goodman, Armstrong and Dummett) that phenomenal indiscriminability is not transitive; and, moreover, that this non-transitivity is straightforwardly revealed to us in experience. I show this thought to be wrong. All inferences from the character of our experience to the non-transitivity of indiscriminability involve either a misunderstanding of continuity, a mistaken interpretation of the idea that we have limited powers of discrimination, or tendentious claims about what our experience is really like; or such inferences are based on inadequately supported premisses, which though individually plausible are jointly implausible.

If two colour patches *A* and *B* look the same in respect of colour, and patch *B* looks the same in respect of colour as a third patch *C*, must it be that *A* and *C* look the same in respect of colour? If *A* and *B*, and also *B* and *C* look the same in respect of height, must it be that *A* and *C* look the same in respect of height? Is *looking the same as* (in a given respect) a transitive relation? I will argue that it is. Nelson Goodman (1951), famously, assumed otherwise. His assumption, that *looking the same as* is not transitive, has been used in philosophy to argue for controversial conclusions, but has nevertheless been widely regarded among philosophers as itself uncontroversial. The putative non-transitivity of *looking the same as* figures essentially in Michael Dummett's (1975) argument that there are no phenomenal qualities, and that languages that contain predicates—such as 'looks red' or, on some views, 'is red'—purporting to express such qualities are 'infected' with 'inconsistency'. Anthony Everett (1996) has recently argued in a similar vein, taking non-transitivity for granted, 'against the thesis that our conscious experience has distinctive qualitative phenomenological features, that is, against the thesis that we experience qualia' (p. 205).¹ David Armstrong (1968) also puts non-transitivity to substantive work. He argues that since *being the*

¹ Everett considers, apparently just for the sake of thoroughness, whether *modus ponens* should be rejected. The non-transitivity assumption is never similarly questioned.

same as in respect X surely is a transitive relation, while *looking the same as in respect X* is not, it cannot be, as a 'sense-data' theorist would have it be, that two things look the same in respect *X* just in case the corresponding sense-data *are* the same in respect *X*.

Frank Jackson and R. J. Pinkerton, concerned to defend a sense-data theory of perception, have argued that *looking the same as* really is a transitive relation,² but their argument, as we will see below, will not persuade their opponents, and they have remained virtually alone in their opinion. Jamie Tappenden, for example, cites the existence of 'sorites chains of indiscernible color samples' as an 'indisputable fact' (1993, p. 553). Rohit Parikh claims 'there is little doubt that such a series of patches *can* be constructed' (1983, p. 241).

Goodman gives us some insight into his grounds for thinking that *looking the same as* is not transitive. It seems to him, apparently, that non-transitivity is straightforwardly revealed to us in experience. He writes, 'We cannot simply ignore the experience of gradually shaded coloring, of phenomenal motion too slow to be momentarily perceived, of phenomenal specks so small that none smaller ever appears' (1951, p. 230; 1977, p. 203), here suggesting without argument that our having such experiences is incompatible with the transitivity of *looking the same as*. Crispin Wright (1975, pp. 345–347), though, offers something like a *proof* that such experiences are incompatible with transitivity.

My plan here is to pay close attention to the sorts of experiences Goodman tells us we cannot ignore. I want to incite a bit of doubt that we really do have such experiences, but I also argue that our having such experiences (if we do have them) does not provide the required support for non-transitivity, and after presenting Wright's proof, I say at just what step I think we should balk. I begin carrying out that plan in section 4 of the paper. The preceding sections are organized as follows: in the first section I explain why I am interested in the transitivity of *looking the same as*. There I explain how, if this relation is not transitive, sorites reasoning can render suspect certain claims I regard as truisms. In section 2, I address Jackson and Pinkerton's argument for transitivity, there explaining why their argument leaves their opponents some room to manoeuvre, though not much. In section 3, I consider and reject an argument for non-transitivity that does not rely, as Wright's proof does, on the claim that we have this or that type of experience, but rather just on our putative inability to perceptually detect slight changes.

² See Jackson and Pinkerton (1973) and also Jackson (1977).

1. Phenomenal sorites

My own interest in the transitivity of *looking the same as* derives from my more basic interest in defending the truth of claims like the following: if two paint chips look the same in respect of colour, then if one looks red so does the other; if two paint chips look the same in respect of shape, then if one looks *square* so does the other (it was not the vagueness of 'red' that was at issue); if two sirens sound the same, then if one sounds loud so does the other (it was not just visual appearance that was at issue); if two candies taste the same, then if one tastes sour so does the other. I'll call claims of this sort 'same-appearance claims'. ('Appears' is to be neutral among 'looks', 'sounds', 'tastes', etc.)

I want to defend same-appearance claims because I believe them to be truisms. Same-appearance claims need defence because it is thought that each may occur as the 'inductive' premiss of some sorites argument,³ and it is also thought that inductive premisses of sorites arguments must all share the same fate. A standard (non-phenomenal) sorites argument goes as follows:

Premiss 1: Any seven-foot tall man is tall.

Premiss 2 (the inductive premiss): Any man one-hundredth of an inch shorter than a tall man is tall.

Conclusion: Therefore, any three-foot tall man is tall.

The conclusion is false. The inductive premiss, in this case, is to blame. Opinions differ about what exactly is wrong with the inductive premiss. Inductive premisses of sorites arguments are on alternative views false, neither true nor false, not definitely true, less than perfectly true. (There may be other options.)

A *phenomenal* sorites argument takes a similar form. The defining features of phenomenal sorites arguments are (i) the occurrence of 'looks the same as' (or 'smells the same as', etc.) in the antecedent of the inductive premiss; and (ii) the occurrence of an observational predicate—in the case below, 'looks red'—in the other constituents of the argument. A predicate is *observational* just in case its applicability to an object (given a fixed context of evaluation) depends only on the way that object appears. For an example of a phenomenal sorites argument, consider a 'sorites series' of thirty colour patches, uniformly changing in appearance from one that looks red on the left toward one that looks yellow on the right, while each patch looks the same in respect of colour as its successor in the series.

³ 'Inductive Premiss' is really a misnomer, since sorites arguments need not involve induction.

Premiss 1: The first patch looks red.

Premiss 2 (the inductive premiss): If any two patches look the same in respect of colour, then if one looks red so does the other.

Conclusion: The thirtieth patch looks red.

Again, the conclusion is false. Is the inductive premiss to blame? In this case, I think not. While I think it is false that if any two men differ in height by one-hundredth of an inch, then if one is tall so is the other (see Graff 2000), I think it is *true* that if any two colour patches look the same, then if one looks red so does the other. Why the difference in attitude? If two men differ in height by even one-hundredth of an inch, then they differ in a respect that is relevant for the applicability of 'tall'. But if two colour patches look the same (not just similar, but the *same*) in respect of colour, then they do not differ, on the face of it at least, in any respect relevant for the applicability of 'looks red'.

It is sometimes said that a paradox is a seemingly valid argument with seemingly true premisses and a seemingly false conclusion. But this is not *exactly* right. In order for an argument to be paradoxical, it need not seem as if its premisses are in *fact* true and its conclusion in *fact* false. Rather it need only seem legitimate to make some supposition under which the premisses *would* be true and the conclusion *would* be false. It certainly is legitimate to suppose that we have a series of colour patches, beginning with a patch that looks red, and ending with one that does not. But the validity of the above phenomenal sorites argument depends crucially on the auxiliary premisses: patch #1 looks the same as patch #2; patch #2 looks the same as patch #3; ... patch #29 looks the same as patch #30. Is it legitimate to suppose that these premisses are also true? Given our additional supposition that the end patches do not look the same, this just amounts to asking whether it is legitimate to suppose that *looking the same as* is not transitive.

It is worth mentioning that non-phenomenal versions of the sorites paradox rely on the existence of sorites series as well. Even if we help ourselves to some quasi-arithmetical principles, the conclusion of the above sorites argument for 'tall' does not follow without the auxiliary premisses that *there is* a 7' tall man, and that there is a 6'11⁹⁹/₁₀₀" tall man, and so on.⁴ That it is legitimate to suppose there to be such a series of men, even though there just might not in fact be one, is so obvious it hardly needs mention. (Of course, they need not be standing

⁴ For consider the following two claims:

$\forall x(x\text{'s height is } 7' \rightarrow x \text{ is tall})$

next to one another.) Clearly, the supposition that there is such a series cannot be the source of contradiction in this case.

It is not so obvious, however, that there could be (and hence that it is legitimate to suppose that there could be) a sorites series of colour patches on which *looking the same as* is not transitive. That such a supposition forces the retraction of same-appearance claims, which really do seem like truisms, provides grounds for calling the supposition into question. In fact, it just seems to follow from my definition of *observational* predicates, that the same-appearance claims are true. If 'looks red' is observational, then its applicability to an object depends only on how that object looks. If two objects look the same, that is if there is *no difference* in how they look, then the predicate 'looks red', if observational, applies to both or neither.⁵ It seems that those who would wish to give a uniform solution to all versions of the paradox, and also to cite the falsity (or even just the non-truth, or less-than-perfect-truth) of inductive premisses as the source of contradiction, will be committed to denying that 'looks red' is observational. I find this utterly mysterious. I cannot see my way through to the possibility that two colour patches might look the same, yet that 'looks red' applied to one but not the other. Someone who sincerely claimed that two colour patches looked the same and yet that one looked red and the other not (or even just that one looked red, while it was indeterminate whether the other did), would not merely seem to be plainly mistaken, but also to be in a state of confusion.

$$\forall x \forall y (x\text{'s height} - y\text{'s height} = \frac{1}{100} \text{''} \rightarrow (x \text{ is tall} \rightarrow y \text{ is tall})).$$

From these two claims, by logic alone, we get:

$$\forall x \forall y (x\text{'s height is } 7' \rightarrow (x\text{'s height} - y\text{'s height} = \frac{1}{100} \text{''} \rightarrow y \text{ is tall})).$$

Further appeal to the principle that if x 's height is 7' and y 's height is 6'11⁹⁹/₁₀₀" then x 's height - y 's height = $\frac{1}{100}$ " gets us:

$$\forall x \forall y (x\text{'s height is } 7' \rightarrow (y\text{'s height is } 6'11^{99}/_{100}\text{''} \rightarrow y \text{ is tall})),$$

which is equivalent to:

$$\exists x (x\text{'s height is } 7') \rightarrow \forall y (y\text{'s height is } 6'11^{99}/_{100}\text{''} \rightarrow y \text{ is tall}).$$

Iterating the reasoning gets us only to:

$$\begin{aligned} &\exists x (x\text{'s height is } 7') \wedge \exists x (x\text{'s height is } 6'11^{99}/_{100}\text{''}) \wedge \dots \wedge \exists x (x\text{'s height is } 3\frac{1}{100}\text{''}) \rightarrow \\ &\forall y (y\text{'s height is } 3' \rightarrow y \text{ is tall}). \end{aligned}$$

One could avoid the need for these auxiliary premisses by paraphrasing the argument differently. But the reliance on the existence of some sorites series or other—whether it be a series of men, or of heights, or of numbers—cannot be discharged.

⁵ Not all parties to the debate will accept this argument. Some would deny my move from two objects' looking the same to there being no difference in how they look, when this in turn means that the way they look *is* the same. Because the move is contentious, my main line of argument will not depend on it.

Nevertheless, many philosophers have recognized that there are different senses of 'looks' ('tastes', 'smells', etc.) and it may be that the extent to which the inductive premiss for 'looks red' sounds like a truism varies accordingly. The sense of 'looks' I have in mind here is that generally used for making observation reports. It is the sense according to which I may truly say that a thing looks one way, even though I know it is not in fact that way, as when I say of a friend, gently illuminated by a neon green sign in a dimly lit bar, that she looks green, even though I know that the ill-appearance of her complexion is due only to the sign. It is the sense according to which a thing may change in look quite rapidly, while undergoing nothing we would naturally think of as a change in it, as when I say, placing a paint sample against different backgrounds, 'Now it looks red ... Now it looks pink'. Finally, and this is a crucial point, it is a sense of 'looks' that carries no explicit epistemological implications, so that to hold that a person does or could know everything about the way things look to her, or even to hold that a person could have no false beliefs about the way things look to her, is to hold a substantive thesis.⁶ Following Frank Jackson (1977), I will call this the 'phenomenal' sense of looks.

When 'looks' is taken in its phenomenal sense, the *looks the same as* relation is the same as, or at least akin to, what Goodman (1951) and others have called the *matching* relation. Goodman, as against the thesis of this paper, took it that the *matching* relation is not transitive, and took it therefore that matching could not suffice for identity of *qualia*. For if *matching* is not transitive, then it cannot be that for all x and y , the way x looks is identical to the way y looks just in case x and y match, since identity *is* transitive. Goodman, rather than give up the non-transitivity of *matching*, proposed instead a more complex criterion of identity for *qualia*: that the look of x is identical to that of y , just in case x and y match not only each other, but all the same third parties as well.

The Simple Criterion of Identity for Qualia: The look of x = the look of $y \leftrightarrow x$ matches y .

⁶ In particular, I will not be concerned with either a statistical or a response-dependent sense of *looking the same as*. Whether a target colour sample *looks the same* to an observer as some other colour sample, will not be taken to be a function of the observer's ability to do better than random at identifying the target sample after sufficiently many trials. Nor will it be taken to be a function of what the observer says about whether they look the same. For more on such statistical and response-dependent notions of *looking the same as* in relation to the question of transitivity, see Hardin (1988). For discussion of another explicitly epistemological conception of indiscriminability in relation to the question of transitivity, see Williamson (1990). For Williamson, X is discriminable from y just in case one can activate the knowledge that x and y are distinct.

Goodman's Criterion of Identity for Qualia: The look of x = the look of $y \leftrightarrow \forall z (x \text{ matches } z \rightarrow y \text{ matches } z)$

One way to state the thesis of this paper is to say that we should accept the simple identity criterion. For only if matching is not transitive do we have reason to doubt it. If the thesis of this paper is correct, then the more complex criterion need not have been proposed, since if *matching* is transitive, the more complex criterion is equivalent to the simpler one.⁷ In other words, what's *not* at issue is whether Goodman's criterion should be accepted—of course it should be accepted; what is at issue is rather whether it could have been stated more simply.

(Some remarks about terminology are in order here. First, a word about *qualia*. For Goodman, a *quale* is a 'presented quality', or at another point, a 'quality of a presentation of a thing' (Goodman 1951, p 96). When discussing Goodman's criterion, I will not use the expression 'quale', but will instead use the expressions 'the way a thing looks (tastes, etc.)' or 'the look of a thing' because I find them more natural. Thus, the variables occurring in the above statement of Goodman's criterion are to range over the sorts of things that have appearances (i.e., present *qualia*). I take it, though nothing here turns on this, that *qualia* are not themselves such things. Second, a word about the *matching* relation. As Goodman used the term, 'matching' stands for a relation that holds between the phenomenal qualities of presentations of the objects we look at, i.e., *qualia*. Christopher Peacocke (1981) uses it in the same way. Timothy Williamson (1990) and Austen Clark (1993) use the term to stand for a relation that holds between the presentations, or experiences, in virtue of their qualities. I will use the term differently still. As I will use it, 'matching' and 'looks the same as' stand for the same relation, one that holds between the objects we look at themselves, though the relation must be relativized to a particular observer on a particular occasion. This difference should prove harmless for present purposes. We may say that two things match in my sense just in case their presented qualities match in Goodman's sense.)

Note that since the sense of 'looks' under discussion is the *phenomenal* sense, any claim about how things look (in this sense) must be either explicitly or implicitly relativized to a particular observer.⁸ The

⁷This assumes, uncontroversially, that *matching* is also symmetric and reflexive.

⁸This is to contrast with, for example, a dispositional sense of 'looks', which is the sense of 'looks' at issue in Scott Soames's (1999) discussion of phenomenal versions of the sorites. Whether my defence of same-appearance claims in the phenomenal sense of 'looks' could be extended to same-appearance claims involving other senses of 'looks' is a question for another time.

above sorites argument for ‘looks red’ is therefore only paradoxical—it only has a semblance of validity—if just a single observer is involved. There is no problem if patch #1 looks red to Amy, neighbouring patches look the same to Sue, and patch #30 looks yellow to Tim, since one cannot infer anything about the way a patch looks to Tim from the way other patches (or even the same patch) look to Amy and Sue. If different observers were involved in the argument, we would simply reject the reasoning as invalid. This could be made explicit by using subscripts. So, for example, ‘Patch #2 looks_{Amy} red’ cannot be inferred from ‘Patch #1 looks_{Amy} red’ and ‘Patch #1 looks_{Sue} the same as patch #2.’⁹ But if we suppose that there is just one observer to whom patch #1 looks red, neighbouring patches look the same, and patch #30 does not look red, then we really do have a problem. The problem is that given the truism that if two things look the same, then if one looks red, so does the other, we are licensed to infer that ‘Patch #30 does look red’ is true in our supposition. But this is something we were supposing not to be the case. Rather than give up the truism, I will, in what follows, argue against the non-transitivity supposition; against the legitimacy, that is, of supposing there to be a series of objects on which *looks the same as* is not transitive. For if we have already gone wrong in making this supposition, then we are no longer forced, as a last resort, to turn against same-appearance claims as the only possible source of contradiction.

2. Jackson and Pinkerton’s argument for transitivity

Reconsider the presupposition that entailed non-transitivity and thus led to paradox, namely, that the following hold:

- (a) Patch #1 looks red.
- (b) Patch #*n* looks the same as patch #*n*+1 (for each positive *n*<30).
- (c) Patch #30 does not look red, it looks yellow.

⁹This use of subscripts is not intended to imply any particular view about the semantics for phenomenal ‘looks’. Formally, the subscript could be taken in more than one way. It could indicate that ‘looks red’ is to be interpreted as a context-dependent one-place predicate, so that on some occasions it would express the same property as ‘looks red to Amy’, while on other occasions it would express the same property as ‘looks red to Sue’, and that which property it expresses is a function of the context. On the other hand, the subscript could be taken as representing a ‘hidden’ argument place, in which case ‘looks red’ would be a context-invariant two-place predicate (ignoring the context-sensitivity of ‘red’), followed by an unpronounced prepositional phrase, so that uttering ‘_ looks red’ would be syntactically tantamount to uttering ‘_ looks red to *x*’, with the assignment to the free variable ‘*x*’, like the demonstrative pronoun ‘he’, being supplied by the context.

Remember, we are assuming, so as not to make the sorites argument for ‘looks red’ just trivially fallacious, that only a single observer, call her ‘Olivia’, is involved. One scenario that would support (a–c) is the following: Olivia is shown patch #1, and it looks red to her; then she is shown patch #30 and it looks yellow; then she is shown each of the twenty-nine pairs of adjacent patches in succession (not necessarily in order), and each pair looks the same. But if this is the scenario that is taken to support (a–c), then it *cannot* be concluded that ‘looks the same as’ is not transitive. Concluding, from the scenario, that ‘looks the same as’ is not transitive, would be like concluding that ‘is taller than’ is not transitive from the following: Tim is taller than Michael (in 1980); Michael is taller than David (in 1990); and Tim is not now taller than David. Just as we have no reason to presume that Michael’s height when compared to Tim’s in 1980 is the same as his height when compared to David’s in 1990, we have no reason to presume, if Olivia is shown the pairs in succession, that patch #15, say, looks the same when it is presented with patch #14 as it does when presented with patch #16. In particular, we have no reason to suppose that if patch #15 looks red when it is presented with patch #14, then it also looks red when presented with patch #16—there is no licence to carry over the ‘middle term’.

This in essence is Jackson and Pinkerton’s initial response to the claim that ‘looks the same as’ is not transitive (1973, p. 270).¹⁰ But, as they go on quite rightly to point out, if there is a *single* time at which (a–c) above hold, say as Olivia surveys the entire series of patches at once, then we must after all conclude that ‘looks the same as’ is not transitive.¹¹ To this, Jackson and Pinkerton reply that such a situation is ‘inconsistent’. They write:

However, the suggestion that *A* might look to be the same colour as *B*, *B* might look to be the same colour as *C*, while *A* looks to be a different colour

¹⁰ See also Jackson (1977, p. 113).

¹¹ One might doubt that it is possible to look at a series of thirty patches all at the same time. Richard Heck suggested to me that one could make the patches pie-shaped and arrange them in a circle—in which case one could look at all of them at once, by looking at the centre of the resulting circle.

In any case, I do not think that the case for non-transitivity *requires* it to be possible that the entire series can be surveyed at once. We *could* conclude, for example, that ‘is taller than’ is not transitive from Tim’s being taller than Michael in 1980; Michael’s being taller than David in 1990; and Tim’s not now being taller than David; as long as their heights remain stable over the entire period, given that one thing’s being taller than another is just a function of their heights. Similarly, we could conclude that ‘looks the same as’ is not transitive, even though Olivia looks at the pairs #14–#15 and #15–#16 in succession, on the condition that #15 *did* look the same when presented with #14 as when presented with #16. One problem, though, is that there is no obvious way of ascertaining whether this condition holds.

from C , to one and the same person at one and the same time, is inconsistent. As A and C *ex hypothesi* look to be different colours, looking to be the same colour as A will be distinct from looking to be the same colour as C ; therefore, the suggestion involves one object B , looking to have two different colours at the same time to the same person, which is impossible. (Jackson and Pinkerton 1973, p. 271) (Jackson 1977, p. 114)

Jackson and Pinkerton's argument, then, takes the form of a *reductio* of the assumption that the following can be jointly true:

P1: A looks to be the same colour as B

P2: B looks to be the same colour as C

P3: A looks to be a different colour from C

It is alleged that from these premisses, one may infer:

C : $\exists c \exists c' B$ (looks to have $c \wedge B$ looks to have $c' \wedge c \neq c'$)

which is claimed to be necessarily false. (In order for this last claim of Jackson and Pinkerton's to be at all plausible, we must assume the variables to range over mutually exclusive colour qualities—perhaps maximally specific ones.)

How, though, exactly is this inference supposed to go? The relation-expressions occurring in the premisses—'looks to be the same colour as' and 'looks to be a different colour from'—stand for relations that coloured-looking things bear to one another; while the relation-expression occurring in the conclusion—'looks to have'—stands for a relation that coloured-looking things bear to *colours*. Unless there are some principles to connect these various relations, the conclusion is a *non sequitur*.

There are two plausible principles which would render the argument valid, however, and I presume it is something like these that Jackson and Pinkerton had in mind. The first principle is that if two things look to be the same colour then there is a colour they both look to have:

Sameness Principle: x looks to be the same colour as $y \rightarrow \exists c(x$ looks to have $c \wedge y$ looks to have $c)$

The second principle is that if two things look to be a different colour, then there is no one colour which both look to have:

Difference Principle: x looks to be a different colour from $y \rightarrow \neg \exists c(x$ looks to have $c \wedge y$ looks to have $c)$

Granted these principles, Jackson and Pinkerton's conclusion that *B* looks to have (at least) two colours does indeed logically follow. Granted also their assumption that a thing may look to have at most one colour, we do indeed have a *reductio* of the position that *looking to be the same colour as* is not transitive.

Nevertheless, as much as I welcome the result, and as much as I think the argument a good one, our opponent (Jackson and Pinkerton's and mine) has a predictable response. On the one hand, he will say that on the intended interpretation of *looking to be the same colour as*, the Sameness Principle is not true. Given the sense of *looking to be the same colour as* that's at issue, when we say that patch *A* looks to be the same colour as patch *B*, we mean that the two patches are perceptually indistinguishable; that if they could be seamlessly fused together, a homogeneous-looking patch would result; that, in Goodman's terms, they *match*. Then, echoing Goodman, he will say that the Sameness Principle is not true since two patches may match, even when they do not have identical looks, precisely because to have the same look just is to match *not only* each other, but also all the same third parties.

On the other hand, the opponent of transitivity will acknowledge that there is a sense of 'looks to be the same colour as' on which the Sameness Principle is vacuously true: namely, on which 'A looks to be the same colour as B' just *means* that *A* and *B* have identical colour-looks. But he will maintain that in *this* sense of 'looks to be the same colour as', the premisses P₁–P₃ of Jackson's *reductio* are stronger than is required to express what is meant by saying that *looking the same as* (in the *matching* sense) is not transitive, since having the same look is not a necessary condition of *matching*.

The opponent of transitivity does, then, have a logically coherent reply to Jackson's *reductio*. But that reply necessarily involves Goodman's distinction between looking the same (or *matching*) and having the same look. The opponent of transitivity is thus committed to the possibility that *A* and *B* might be perceptually indistinguishable yet have different looks. But what I have difficulty understanding is, if it is really the *look* of the two which is different, why cannot this come across, so to speak, by looking just at *them*? Why must one look at some third thing to see that the looks of *A* and *B* are distinct? Moreover, it becomes impossible, given Goodman's distinction, to tell by looking whether two things have identical looks—it becomes impossible for the identity of their looks to *visually* come across. Even if one were looking at all the things there are, and could see that *A* matched an object in view if and only if *B* did, still it could not visually come across *that* one

was looking at all the things there are, and hence it could not visually come across that *A* and *B* had the same look.¹² Thus, there is a heavy burden on the opponent of transitivity to persuade us that *the look of a thing* is, as he conceives it, still a phenomenal quality.

One can see why Jackson and Pinkerton's argument will not persuade the staunchest opponent of transitivity, since there is a *logically* consistent way of blocking their *reductio*. What surprises me, however, is that they have remained virtually alone in their opinion, since I find Goodman's distinction between *looking the same* and *having the same look* to be barely coherent—though, admittedly, the distinction sounds less implausible when stated with Goodman's terminology as the distinction between matching and identity for *qualia*—but this is a distinction which the proponent of non-transitivity is committed to uphold.¹³

Why, then, does it seem so obviously possible to people that one could connect two things that do not look the same by a *looks the same as* chain? For the remainder of the paper, I address this question. I consider three positive arguments for non-transitivity. The first, presented in the next section, is rejected as a bad argument. The remaining two arguments are rejected as involving either a misunderstanding of the nature of continuity, or some tendentious characterizations of certain sorts of experiences. Given that the supposition that *looking the same as* is not transitive has what I regard as unacceptable consequences, I conclude that the supposition is false.

3. Powers of discrimination

It is a common thought that our powers of discrimination must be in some sense coarse or finite; that if a thing changes in an observable quality (e.g., *shape*) just by some sufficiently small amount, we will be unable to perceptually detect the change; that, in the words of Charles Travis, 'physics is finer than the eye' (1985, p. 350). But what exactly does it mean to say that our *powers of discrimination are finite*, that there are *changes too slight to be perceived*? There are at least two interpretations of the claim which need to be distinguished:¹⁴

¹² Wright makes a similar remark: 'Yet, evidently, it is only in a formal sense that we have not gone beyond appearance in this account; for, as Russell noticed, the resulting relation is not one which may *appear to obtain*' (1975, p. 355).

¹³ Unless, like Everett (1996), he gives up on *looks* altogether.

¹⁴ It is intended that the remarks in this discussion be taken to hold *mutatis mutandis* for perceived differences between two things at a single time, as well as for perceived changes in a single thing over time.

- (a) For some sufficiently slight amount of change (in colour, sound, position, etc.), when we perceive an object for the entirety of an interval during which it changes by less than that amount, we perceive it as not having changed at all during that interval.¹⁵
- (b) For some sufficiently slight amount of change (in colour, sound, position, etc.), we cannot perceive an object as having changed by less than that amount unless we perceive it as not having changed at all (as having changed by a zero amount).

The key difference between (a) and (b) is that while (a) makes a claim about what our experience must be like when confronted with certain types of stimulus, (b) makes only a restrictive claim about what kinds of experiences we can have.

If our powers of discrimination are finite in the sense of (a), then we might have it true, for example, that if any object in my visual environment grows by exactly one nanometer (1 nm.) over the course of a four-second interval then it will look to me like the height of the object has remained constant during that four-second interval. My purpose in speaking of objects that are ‘in my visual environment’ is to avoid a commitment to trivially false claims like: if an object *in the basement of the house next door* grows by exactly 1 nm., then it will look to me as if its height has remained constant. The fungus on my neighbour’s hot water heater doesn’t look any way to me at all. There are too many barriers between me and the fungus for me to be able to see it. What (a) says, then is that sufficiently small changes *in our perceptual environment* appear to us as no change.

What about (b)? It says that there is a limit to how slight an *apparent* change can be. I’ll acknowledge that the implicit talk here of *amounts* of apparent change may be somewhat distracting. For it is not clear that apparent changes in height, for example, can be quantified in the same way that actual changes in height can—that apparent changes in height can be measured in inches and centimetres, or in any other type of unit. But still, it seems perfectly natural to talk of there being *lesser and greater* apparent changes in height. Suppose I am watching two bean stalks rapidly grow over a thirty second period—one by five inches, the other by ten. If everything is in working order, it will look to me as if each has

¹⁵ One might find it odd to speak of imperceptible changes in respect of colour, sound, or other ‘secondary qualities’. In that case, we could reformulate claim (a) as follows: ‘For some sufficiently slight amount of change (in the *physical bases* of colour, sound, position, etc.), when we perceive an object for the entirety of an interval during which it changes by less than that amount, we will perceive it as not having changed at all.’

grown, but that one has grown more than the other. The apparent change in the height of one is greater than the apparent change in the height of the other. What (b) says is that apparent changes cannot get smaller and smaller indefinitely (except by asymptotically approaching some non-zero limit). Looked at another way, what (b) denies is this: for every experience I could have as of a change, there is an experience I could have as of a lesser change (but for the exception just mentioned).

The two interpretations are independent—neither entails the other. We can have (a) but not (b) true if: (i) whenever we perceive an object for the entirety of an interval during which it changes by less than some requisitely slight amount, we perceive it as not having changed at all; but (ii) when we perceive an object for the entirety of an interval during which it changes by more than the requisitely slight amount, we may perceive it as having changed by any amount, no matter how slight. We can have (b) but not (a) true if: (i) whenever we perceive an object for the entirety of an interval during which it changes—by any amount, no matter how slight—we may perceive it as having changed during that interval; but (ii) there is a limit to how slight we can perceive the change as being.

If our discriminatory powers are finite in the (a) sense, then non-transitivity is just a short step away. For suppose, for example, that whenever we perceive an object that has grown in height by some amount less than ϵ , it looks to us the same in respect of height at the end of the growth as at the start. As long as an object *can* grow by an amount less than ϵ , and as long as we can eventually discern a change in height after repeated growths of amounts less than ϵ , the non-transitivity of *looking the same as in respect of height* clearly follows. The argument in no way depends on the change in height's appearing continuous to us. It does not even depend on the change in height's being continuous. It requires only that we have *some* powers of discrimination—i.e., that we can detect a change eventually—and that the requisitely small changes in height can in fact take place. The argument is easily generalized to cover changes in other respects.

The thought behind (a) is that there are changes too slight for us to detect by observation. Whether this is so is an empirical question, but I gather that it seems to many as if it *must* be true. Nevertheless, if the thought is true, (a) is not the way to formulate it, since (a) as it stands is implausible. It is implausible because it entails that within a certain limited domain, our experiences are invariably veridical. If, for some sufficiently slight amount of change, whenever we perceive an object changing by less than that amount we perceive it as not changing at all,

then whenever we perceive an object changing by *no* amount, we will perceive it as changing by no amount. If (a) were true, then whenever we perceived stasis we would perceive it *as* stasis. But surely a motionless object could appear to be quivering; a constant note could sound to be pulsating. It is not merely that these are *logical* possibilities; these are possibilities given our faculties as they actually are, as a number of perceptual illusions will attest.

The truth of (b), in contrast, is consistent with these possibilities; (b) requires only that when we perceive an object to be changing, we perceive it to be changing by at least some given amount, irrespective of whether the object is in fact changing, or if so, by how much. There is no equally quick route, however, from (b) to non-transitivity. For the truth of (b) requires only that when we discern a change in height, say as we watch a thing grow, there can be no interval during which the thing appears to change in height by some amount smaller than the threshold of discrimination. But as long as (a) is not true, it may just be that the thing appears to grow *discretely*—looking to take sudden jumps in height. And this is consistent with the transitivity of *looking the same as in respect of height* as applied to the thing over time. It is true that if the change in height in addition appeared *continuous*, then the situation would not be consistent with transitivity—this is the basis for Wright’s proof, and the point will be discussed in detail in sections 4 and 5—but then we would have packed in an extra assumption. Non-transitivity does not follow from (b) alone.

Is there, then, a way to reformulate (a) without retreating all the way to (b)? The reason for asking this question here is to find out whether there might be an argument for the non-transitivity of *looking the same as* that does not depend on the existence of apparently continuous changes—*phenomenal continua*—but only on our putative inability to perceptually detect very slight changes. The answer to the question is no. The problem with (a) is not just that it entails that when we perceive an unchanging thing, we always perceive it as unchanging. If it is possible for a motionless object to look like it is quivering, then surely it is also possible for an object that is *actually* quivering to look like it is quivering, even if it is quivering just within the space, say, of a nanometer. Thus it will not do to reformulate (a) just by saying: for some sufficiently slight amount of change (in colour, sound, position, etc.), when we perceive an object for the entirety of an interval during which it changes by some *positive* amount less than that amount, we perceive it as not having changed at all during that interval.

The real problem with (a) is that it has this form: whenever we’re

confronted with a stimulus of type *S*, we will have an experience of type *E*. This is a problem, since if a claim of this form is not to be vacuous, it must be that not every experience is an experience of type *E*. But then if a claim of this form is non-vacuous, it will be inconsistent with the sceptical idea that if it is possible for us to have a certain experience at all, then it is possible for us to have that experience no matter what scene is actually before us. Even if the sceptic's idea is wrong, it had better not be that it is wrong just because there are imperceptibly slight changes. So no reformulation of (a) that keeps its current form intact has a hope of succeeding.

One way to formulate the idea behind (a) might be this:

For some small amount of change, whenever an object changes by any lesser amount, we cannot have a *veridical* experience of that change. If, for example, a thing grows by just a nanometer, we cannot have a veridical experience of that growth, for an experience as of a 1 nm. growth is not the kind of experience we could have.

Put another way, that some philosophers might be happy to accept:

For some small amount of change ϵ , we cannot *visually represent* a change of any positive amount δ less than ϵ .

But note that it is surely *not* intended here that it is impossible for us to 'visually represent', or 'have an experience as of' a 1 nm. change *only* when we are in fact confronted with a 1 nm. change. Rather, the idea must be that it is impossible *simpliciter* for us to have an experience as of a 1 nm. change. But this is just to retreat to saying that our powers of discrimination are finite in the (b) sense. And as we already know, the non-transitivity of *looking the same as* does not follow from this without the further assumption that there are phenomenal continua.

4. The argument from phenomenal continua

It seems fairly easy to convince people that *looking the same as* is not transitive by telling this story:

Suppose you have a colour spectrum, ranging from red on one end, and looking to change continuously to yellow on the other. Now you could cut the spectrum up into small enough strips, so that each strip looked homogeneous in colour. Each strip will then look the same as its neighbour to the right, since if one didn't, we would see an abrupt change in colour between it and its neighbour. In fact, the strips

don't really need to be thought of as cut-outs, but just as undetached regions of the original spectrum. Whether or not the strips are viewed in succession, or all at once, has no effect on the situation, so 'looks the same as' must not be transitive.

The story, as it turns out, is really an informal version of Wright's argument, the details of which will be discussed in the next section. But convincing as the story may be, I shall provide reasons for siding with Jackson and Pinkerton against Wright.

We can cull from the story the following two-premiss argument, which I call 'The Speculative Argument':

- P1: There are (or could be) phenomenal continua—changes in colour across a spectrum, for example, which look like *continuous* changes.
- P2: Small enough regions of phenomenal continua appear homogeneous—in the sense that: there is a small enough width w which is such that all regions of width w look homogeneous.
- C: Therefore, *looks the same as* is not transitive with respect to small enough regions of phenomenal continua: adjacent regions, when they are sufficiently small, look the same, although the end regions do not look the same.

We first need to ascertain whether the argument is valid. It is tempting, but mistaken, to reason as follows: if on the colour spectrum, small enough regions of the spectrum look homogeneous, then adjacent such regions must look the same or we would see an abrupt change in colour somewhere. Anyone who is tempted by this argument, however, betrays a proclivity for transitivity. The defender of non-transitivity cannot accept that all adjacent, homogeneous-looking regions look the same as each other. Here's why: I assume we have the following principle relating *looking the same* to *looking homogeneous*:

If X and Y each look homogeneous, then: X looks the same as $Y \leftrightarrow$ the seamless fusion of X and Y looks homogeneous.

Now suppose, for *reductio*, that all adjacent, homogeneous-looking regions look the same as each other. If we then let w be some narrow width which is such that all regions of width w look homogeneous, then by the supposition, all adjacent regions of width w will look the same as each other. So by the above principle, all regions of width $2w$ will look homogeneous. Now, by the supposition, all adjacent regions

of width $2w$ will look the same as each other, and so by the principle, all regions of width $4w$ will look homogeneous. Iterating the reasoning, we must conclude that the entire spectrum looks homogeneous, which we're supposing it does not.

A better case for the validity of the speculative argument may be made as follows. I assume we have the following principle:

Z looks homogeneous \leftrightarrow All sub-regions of Z look the same as each other.

Now, given the second premiss of the speculative argument, that for some narrow width, all regions less than that width look homogeneous, then if we *divide* any such region into *two*, the two will look the same. For if they do not look the same then, by the above principle, the original region cannot look homogeneous. Given also that distant enough regions do not look the same, non-transitivity clearly follows.

I accept this stronger case for the validity of the speculative argument, and instead wish to question its soundness. I will not argue directly against either of the premisses. Rather, I will argue that we do not have sufficient grounds for accepting either premiss. Moreover—and this will emerge more clearly in the next section—the two premisses are in so much tension with one another that their conjunction cannot be admitted as plausible. Given the truism that if two things look the same, then if one looks (for example) red so does the other, the fact that we do not have sufficient grounds for accepting either premiss of the speculative argument—given, especially, the tension between them—should lead us to affirm at least this disjunctive claim: either there are no phenomenal continua after all, or it is not the case that sufficiently small parts of phenomenal continua are all homogeneous-looking.

Premiss 1—there are phenomenal continua

It may be convenient, for some or other purpose, for us to describe a change as continuous. But can we really be sure, when an object passes before us, that it does not really look as if it is moving *discontinuously*, looking to take very tiny discrete jumps? And can we be sure, when looking at a colour spectrum, that it does not really look to change discontinuously from red on the left to yellow on the right? Can we be sure that the spectrum does not really look to contain, at certain points, discrete but barely noticeable changes in colour? I do not see that we can be at all sure of these things.

Imagine we could have both of the following two visual experiences:

the first, of a cursor on a computer screen looking to move discontinuously from one character position to the next; the second, of a cursor on a computer screen looking to move continuously, but jerkily, from one character position to the next—looking to move very quickly *between* character positions, and looking to pause momentarily in each character position. Clearly, the motion of the cursor cannot look the same in the two cases, since looking to move discontinuously is incompatible with looking to move continuously. But as I watch the cursor on my computer screen moving before me now, I cannot be sure that I am having one of these experiences and not the other. I feel unable to judge which of these experiences is the one I am having. Although continuous-but-very-jerky-looking motion is different from discontinuous-and-very-jerky-looking motion, it would seem that they would not really *strike* us as being different. We would describe both as discontinuous-looking.

Similarly, imagine we could have the following two experiences: the first, of a cursor on a computer screen looking to move discontinuously from one *pixel* to the next (imagine also that pixels are incredibly small), but in a very even way; the second of the cursor looking to move *continuously* from one pixel to the next. Again, the two experiences, although different, would not strike us as being different. We would describe both as experiences of continuous-looking motion.

We should not be misled into thinking that just because it may be convenient to describe a change as apparently continuous, that it really is that way. A trombone teacher may ask her student to make a scale more discrete-sounding, or a slide more continuous-sounding. But surely when she tells the student that he has gotten it right, she has not *really* bothered to attend so scrupulously to the character of his sound, that she can say with confidence that his slide was perfectly continuous-sounding, in the strict sense required by the speculative argument.

We speak falsely all the time for the sake of convenience. We say that there are 270 million people in the United States. But we know *that* cannot be right. We say it anyway because, although false, it is close enough to the truth to convey what ever point it is we wish to make. We may describe a change as continuous-looking as opposed to discontinuous-looking, because we want to convey that the change looks more like a smooth and gradual one than like a jerky and sudden one. And nearly always it will be conversationally appropriate to do this without ever bothering to determine whether the change *really* looked continuous in the strictest sense. I probably have described changes as continuous-appearing at some point, but whether changes genuinely look or sound

continuous to me, I find myself unable to judge with confidence.

Premiss 2—small enough regions of phenomenal continua look homogeneous

Turn now to the second premiss—the ‘homogeneity thesis’. Is it true in the case of apparently continuous change in colour (granting now, for the sake of argument, that there are such changes), that narrow enough regions of the spectrum will always look homogeneous? And is it true, in the case of apparently continuous change in position, that in small enough intervals of time, a moving object will look to remain still? We need to examine what justification there might be for accepting the homogeneity thesis.

I have found that some people take the homogeneity thesis to be true because they take it just to state a necessary fact about what’s involved in something’s being a phenomenal continuum. The idea here would be that it just is a necessary condition of a change in colour looking continuous across a spectrum that narrow enough regions of the spectrum look homogeneous in colour. The idea seems to be affirmed by Austen Clark (1993, pp. 56–57) when he says, ‘A swathe of hues can appear to be continuous, *in the sense that* any two points sufficiently close to one another will match. Yet points more widely separated do not match’ (emphasis added).

This idea is not right—it reflects a misunderstanding of the nature of continua. To see this, it is perhaps easier to consider the analogous case of continuous motion. Say we have an object moving in one direction along a straight line.¹⁶ In order for the motion to *be continuous*, it is not required that for adjacent intervals of time *I* and *J*, even very small ones, the object be in the same place during *I* that it is in during *J*. Indeed, it is not required that the object remain in a single place during any time-span longer than an instant.¹⁷ And if this is not required to be the case in order for the object to be moving continuously, why should it be required to *look* the case in order for the object to *look* to be moving continuously?

What is required for continuous motion is that for any positive distance ε , no matter how small, there is a positive amount of time δ

¹⁶ Just as we may think of the motion of the object as a function which, given a time as argument, yields the location of the object at that time as value, we may think of change in colour along the spectrum as a function which, given a point on the spectrum as argument, yields the colour of the spectrum at that point as value. The continuity of either motion or change in colour can then be identified with what it is for these respective functions to be continuous.

¹⁷ And in order for the intervals to be *adjacent*, it is required that at least one of them be longer than an instant.

which is small enough so that during any time-span shorter than δ , the object moves less than ϵ in that time-span.¹⁸ What is required for motion to *look* continuous, then, is presumably that for any distance ϵ , no matter how small, there is a positive amount of time δ which is small enough so that during any time-span shorter than δ , the object *looks* to move less than ϵ in that time-span—in other words, given any distance you like, no matter how small, there's some short enough time-span in which the object always looks to cover less than that distance. (It may seem that these conditions would be pretty difficult, if not impossible, to satisfy. If so, so much the better for my case, since it is my opponent's first premiss that such conditions can be satisfied.) Analogously, for change in colour across a spectrum to look continuous, it is required only that given any positive amount of change in colour, there is a narrow enough width such that in any region on the spectrum narrower than that width, the colour looks to change less than that amount in that region. Crucially, it is not required that any region, however narrow, look either homogeneous in colour, or the same as its immediate neighbours. Even if true, the homogeneity thesis is not necessarily true.

Another thought is that the homogeneity thesis is only contingently true—that it is not just part and parcel of the notion of a phenomenal continuum that small enough regions of them appear homogeneous: rather, the homogeneity thesis may be taken as a premiss because it states an empirical fact about phenomenal continua as they are experienced by beings like us. The thought is that a feature of *our* perceptual system that whenever a change appears continuous to *us*, small enough regions of it appear homogeneous to us. What justification could there be for such a view?

In the case of colour, the justification seems to be that we can actually cut up the spectrum into regions which look homogeneous; or that we can cover up all but an inch of the spectrum, and be left with a region that looks homogeneous; or even that we can leave the entire spectrum exposed and intact, and still judge of narrow regions of it, looking from one to another, that they each look homogeneous.¹⁹ Unfortunately, this

¹⁸ Throughout, I will make certain assumptions so as to avoid need for a definition of continuity at a point. First, we will confine our interest to closed intervals of time, in the case of continuity of change over time; and of space, in the case of continuity of change over a space. Second, we will assume in the case of change in position over time (and *mutatis mutandis* for other sorts of changes) that the changing object in question is in *some* location or other at each moment in the interval—that it never temporarily ceases to exist.

¹⁹ Dummett (1975, pp. 259–260), for example, argues for the non-transitivity of 'not discriminably different' in this way.

justification is not very good—it provides us only with a ‘can’ from which is concluded a ‘does.’ It might well be true that if you pick a sufficiently narrow width, every region of that width *can* look homogeneous. But that is no reason to suppose that there is any width such that all regions of the spectrum less than that width do look homogeneous at the same time. It might well be that every time you cover up all but a one-centimetre region of a spectrum, that region, at that time, looks homogeneous to you. But that is no guarantee that when the entire spectrum is subsequently exposed, all one-centimetre regions will still simultaneously look homogeneous to you. The appearance of the spectrum changes as one fixates on different regions of it. For example, if you take a foot-long spectrum ranging from red on the left to orange on the right, place it about two feet ahead of you, and stare at the red edge of it for a few seconds, soon you will experience a ‘spreading’ effect—nearly the entire spectrum will look homogeneously red. But just because a two-thirds region of the spectrum *can* look homogeneously red, does not mean that it always does, as one can verify by fixating one’s gaze somewhere nearer the middle, at which point the spreading effect will cease.

In the case of position, the justification for taking as given that small enough changes are perceived by us as no change at all seems to be that sometimes objects move so slowly that it seems they look still—take the moon, or the hour-hand on a clock. The thought is that if a moving object seems to look still during an interval, then it must be because we cannot visually distinguish any of the positions it is in during that interval—the *reason* it seems to look still is that our ability to visually discriminate does not extend to positions that are too close together.

When we watch the moon, or the hour-hand on a clock, we judge our experience of these objects to have the following properties: over the course of a long interval (of, say, five minutes), the object looks to change its position, in the sense that it appears that it is in a different position at the end of the interval from the one it was in at the start; but for a certain short duration (say ten seconds), the object does not look to change its position over the course of any sub-interval of that duration. When we judge an experience to have these properties, let us call it an experience of ‘slow motion.’ The proposed explanation of why we have experiences of slow motion is that there are imperceptible changes of position—imperceptible, because they are too slight.

There is something very suspect about this explanation since it should leave us wondering why not *every* experience of motion is an experience of slow motion. If the reason that the hour-hand strikes us

as still-looking for any twenty-second interval is that we cannot visually represent a change in position as small as, say, $\frac{1}{6}^\circ$ (on a normal-size clock), then the *second*-hand should look still for any $\frac{1}{36}$ second interval, for *it* changes its position only that amount during such an interval. But, when we watch the second-hand moving, it never looks still—it appears to be *constantly* moving. I do not mean here to be denying that a functioning second-hand *can* look still during a $\frac{1}{36}$ second interval, as it probably would look still if exposed for *only* that long a time (if it looked any way at all). Nor do I mean to be denying that the hour-hand *can* look still for intervals of twenty seconds, just as I did not deny that regions of the spectrum *can* look homogeneous. I only mean to be questioning whether we have sufficient ground for accepting that these objects always look still during *every* interval of the relevant duration, in particular, when these are sub-intervals of a longer interval of apparent change. Although the truth of the homogeneity thesis for position would explain why we experience slow motion, the explanation seems too strong, since it seems to preclude the possibility of experiences of constant motion.

Similar remarks may be made about changes in colour. Suppose we are watching a paint sample continuously changing its colour over time. The change may, like the motion of the hour-hand, be ‘slow’ change. But it is also possible that our chameleon paint sample should, like the second-hand, appear to be changing so quickly, that its change in colour looks like constant change. If the homogeneity thesis for colour were true, this should not be possible at all.

It might be thought that the difficulty must be surmounted, since it might be thought that nothing *other* than the truth of the homogeneity thesis could explain why we experience slow change, in either colour or position. But although the homogeneity thesis would explain why we have experiences of slow change, it is not the only explanation. Another explanation, consistent with transitivity, is that when we look (say) at the hour-hand on a clock, although it does in fact look to change in position over the course of twenty-second intervals, the change in appearance is too slight, and too slow, for us to *notice* it. We *judge* the hour-hand to look still, but our judgement about the character of our experience is mistaken.

It should not be objected that the distinction introduced here—the distinction between how things look, and what we notice about how they look—is an *ad hoc* distinction, tailored to the present purpose, since it is a distinction naturally invoked in other cases. Suppose a friend whom I see daily comes up to me and says, expectantly, ‘Do I

look different?' I may be unable to discover any change in her appearance. Still, once she goes on to tell me that she has lightened her hair (say), I may be able to tell that, yes, her hair colour does look different from how it did the day before. Yet it seems wrong to say that her hair colour looked different to me only *after* I was informed of the change. Instead, it looked different all along, but only after being informed did I *notice* that it looked different. My inability to discover the change, prior to being informed, was not a visual failing but an epistemic one.

So at present we have two competing explanations of what is going on when the hour-hand of a clock looks to have moved over some long interval, but also seems to have looked still during every sufficiently short sub-interval. The first explanation is that when we judge the hour-hand to look still, say for every twenty-second period, it does in fact look to be in the same position at the end of each period as at the start. The alternative explanation is that when we judge the hour-hand to look still, although there is at least one twenty-second period for which it does not look in the same position at the end as at the start, we do not notice this. *Noticing* the change in apparent position requires not only that there be an apparent change, but also that we believe there to be one. One reason for deciding in favour of the latter explanation is that it does not raise difficulties for the possibility of experiences of constant change.

In any case, the defender of non-transitivity is not in a position to criticize the foregoing account for relying on a distinction between the way things look and what we notice about the way they look. The defender of non-transitivity is himself committed to just this distinction. As has already been discussed, the defender of non-transitivity must accept that a colour-patch *X* might look homogeneous, in the sense that all its parts look the same as each other, even though the *way* its left half looks is different from the way its right half does. Yet only in the presence of some *other* patch that looks the same as one half of *X* but different from the other, will we be able to tell this. Thus, in the absence of such a thing, we will be unable to tell that the way *X* looks changes from left to right.

I have now given reasons for suspecting that we do not have conclusive grounds for the second premiss of the speculative argument—the homogeneity thesis. On the one hand, this should be welcome, since together with premiss one, the claim that there are phenomenal continua, premiss two entails a claim we should regard as implausible. But on the other hand, don't we *have to* suppose premiss two to be true? As Wright says, to suppose otherwise would be 'to suppose that we have

infinite powers of discrimination' (Wright 1975, p. 346). It is now time to examine his argument.

5. Wright's argument from phenomenal continua

Wright's proof proceeds contrapositively. He starts with the assumption that *looking the same as* is transitive. He goes on to show that given a certain 'natural' assumption, we can show that no process of change can appear to be continuous. Wright, unwilling to give up the natural assumption, and taking the existence of phenomenal continua for granted, concludes that *looking the same as* is not transitive.

The proof goes like this.²⁰ Suppose we have a process of change in some respect Φ over some interval, either of time or of space. Let D be the process, and let a stage of D 'be the state of D at a particular point in [the interval], an instantaneous exposure, as it were, of the process at that point' (Wright 1975, p. 345). Thus D could be a process of change in colour across a piece of paper, in which case a stage of D would be the (specific) colour of the paper at a particular point; or D could be a process of change in the location of some object over time, in which case a stage of D would be the (specific) location of the object at a particular time. The process D is to be 'non-recurrent' in the sense that the change proceeds in order: 'no distinct stages, x , y , z in D are to be such that z is in respect of Φ more like x than y is when $x < y < z$ ' (Wright 1975, p. 345), where ' $<$ ' means *precedes*.

Now pick some stage D_i of D , and a stage D_j following it with this property: D_j does not look the same as D_i , but still is close enough to it so that every stage between them looks the same as either D_i or D_j . Since we are assuming that the process is non-recurrent, if a stage D_{i+x} between the chosen stages looks the same as D_i , then so will any stage between D_{i+x} and D_i . Similarly, if D_{i+x} looks the same as D_j , then any stage between D_{i+x} and D_j will look the same as D_j . So we can divide the stages between D_i and D_j into two homogeneous-looking groups: those that look the same as D_i on one side, and those that look the same as D_j on the other. Since D_i and D_j do not look the same as each other, and since we are supposing that *looking the same as* is transitive, no stage in the first group can look the same as any stage in the second group. Thus there must appear to be a discrete change as we move from the first group to the second. Thus it cannot be that D looks continuous. Now, since it is assumed that there can be processes of change that

²⁰ The proof I present here is a slightly simplified version of Wright's, and I generalize slightly to include processes of change over a space as well as over time.

look continuous, by contraposition it is concluded that *looks the same as* is not transitive.

Wright's reasoning is impeccable. What needs to be questioned is whether we can find the requisite pair of stages D_i and D_j . It was required, recall, that while D_i does not look the same as D_j , every stage between them looks the same as at least one of them. The assumption that such a pair can be found is described by Wright as a 'very natural' assumption. He writes:

To obstruct this reasoning ... [we would have to suppose] that between any pair of stages of D discriminable in respect of Φ lies a stage discriminable from them both and from any stage outside the region which they flank. We have to suppose that we have in this sense *infinite powers of discrimination* in D , that we can always directly discern some distinction more minute than any discerned so far. The 'very natural presupposition' earlier referred to is that this is not so. (Wright 1975, p. 346, emphasis added)

Wright is here explicitly telling us that he assumes our discriminatory powers to be finite in the (b) sense from section 3:

- (b) For some sufficiently slight amount of change (in colour, sound, position, etc.), we cannot perceive an object as having changed by less than that amount unless we perceive it as not having changed at all (as having changed by a zero amount).

He proves to us that if our discriminatory powers are finite in the (b) sense, then there can only be phenomenal continua if *looking the same as* is not transitive. But while I don't think it *implausible* that our discriminatory powers are finite in the (b) sense, it is not at all clear to me why it is *natural* to assume that they are. Why then does Wright regard his assumption as natural? The assumption—that on any phenomenal continuum we can find two apparently distinct stages, between which no third apparently distinct stage occurs—turns out to be equivalent to the homogeneity thesis of the speculative argument—the thesis that on any phenomenal continuum, for some sufficiently narrow width, every region of that width looks homogeneous. We considered various justifications for the homogeneity thesis, which all had a common feature: they were all in some way based on the character of our experience. Wright's reasons seem different, however. He regards his assumption as natural to make, not because we have this or that type of experience, but rather just because he is convinced that our perceptual faculties are limited. ('Physics is finer than the eye')

Given, however, that he is taking it for granted that there are processes of change that look continuous to us, the assumption is anything

but natural. Suppose that *D* is a non-recurrent process of change of the position of an object *o* over time. If the change is to be in fact continuous, then the following must hold

1. If *o* changes its position over an interval, then it must change its position by some lesser amount over some proper part of that interval.
2. Between every two positions *o* occupies, there is a third position it occupies.

These are two different ways of stating the same elementary fact about continuous motion. But if Wright's 'natural' assumption is correct, then even when the motion of *o* *appears* continuous, the following phenomenal versions of 1 and 2 *cannot* hold:

- 1'. If *o* *appears* to change its position over an interval, then it must *appear* to change its position by some lesser amount over some proper part of that interval.
- 2'. It *appears* to be that between every two positions *o* occupies, there is a third position it at some time occupies.

Wright is in effect, then, saying the following: Although 1 and 2 express a necessary condition of a change in position's *being* continuous, it is *natural* to assume that this condition does *not appear* to hold, even when a change in position *appears* continuous.²¹ I do not mean, at this point, to be disputing Wright's assumption. Rather I mean only to be pointing out the oddity of regarding it as natural to accept the assumption as true, and nevertheless still taking it for granted that there *can* be phenomenal continua. If, for some reason, it is an empirical fact about us that (1) and (2) can never appear to hold, how *could* there still be apparently continuous changes, when (1) and (2) express a necessary condition of continuity? The correct assessment, then, of Wright's proof goes in my mind like this: although the two premisses of the proof—(i) that there are phenomenal continua; and (ii) that our powers of discrimination are (b)-finite—are, taken individually, not implausible, they are in so much tension with each other that it is utterly unreasonable to accept them jointly when neither has anything remotely like adequate support.

²¹ As elsewhere in the paper, one can generalize here to cover other types of processes of change.

6. Conclusion

The best reason for thinking that *looking the same as* is transitive, is that while there are very good reasons to think it is, there is not sufficient reason to think it is not. I began the paper with a discussion of a phenomenal version of the Sorites Paradox, and noted that if *looking the same as* is not a transitive relation, then we cannot accept what seems to be a truism, namely, that if two things look the same, then if one looks red (or square, or shorter than the Empire State Building, etc.), then so does the other. I then considered Jackson and Pinkerton's simple and elegant argument for the transitivity of *looking the same as*, but found that they tacitly assume what their opponent explicitly rejects, namely, that if two things look the same, then the way they look is the same. I suggested, however, that when one denies this conditional it starts to look implausible that the way a thing looks can still be considered a *phenomenal quality*.

I then set out to dispense with a bad argument for non-transitivity—the argument that relied, implausibly, on our powers of discrimination being finite in the (a) sense:

- (a) For some sufficiently slight amount of change (in colour, sound, position, etc.), when we perceive an object that has changed by less than that amount, we perceive it as not having changed at all.

What makes this claim implausible is its incompatibility with the fact that we have certain very mild hallucinations.

The speculative argument and Wright's argument, though they did not rely on blatantly false assumptions, relied on premisses whose justification was not adequate to support such a dubious conclusion. Each argument led with the premiss that there are phenomenal continua, which in the case at least of my own experiences is something I cannot with any confidence judge to be true. In order for these arguments to go through, it is required that there be changes that are apparently continuous in the strictest sense. It is not sufficient that there be changes which we are content, for the sake of convenience, to describe as apparently continuous just because they appear relatively smooth and gradual. Nor is it sufficient that there are changes that do not strike us as discontinuous.

The second premisses of these arguments turn out to be equivalent, though, because of their different formulations, were apt to be given different types of support. Support for the homogeneity thesis proceeded by direct appeal to the character of our experience. In the case of

colour, it was proposed that one could verify the homogeneity thesis by repeatedly covering up all but some narrow region of the spectrum, and noting that each time one did this, the exposed region looked homogeneous. I objected that one could not move from (i) for every region r of width w , there is a time at which r looks homogeneous, to (ii) there is a time at which every region r of width w looks homogeneous. The interchange of quantifiers here is fallacious since the colour-appearance of something is very sensitive to the colour of its surroundings, and sensitive also to whether it is at the focal point or in the periphery of one's gaze.

In the cases of both position and colour, it was proposed that the homogeneity thesis is justified by experiences of what I called 'slow' change. My objection to this proposal had two parts. On the one hand I argued that the homogeneity thesis would be required to explain experiences of slow change *only* if our beliefs about the character of our experiences were incorrigible, but that this is not in general so, and moreover must be denied by the proponent of non-transitivity anyway. On the other hand, I argued that if the homogeneity thesis were required to explain experiences of slow change, then the possibility of experiences of *constant* change would be precluded, which it had better not be.

The only support given for Wright's assumption that our powers of discrimination are (b)-finite was a claim about what it would be natural to assume. Ultimately, I suspend judgement about the (b)-finitude of our discriminatory powers, as well as about the existence of phenomenal continua. I would be prepared to accept the truth of either, though I doubt that either question could be decided on the mere basis of inward reflection on the character of our own experiences. Still, despite my agnosticism about these claims, my position is that we should deny their conjunction, since first, there is such a *straightforward* tension between them—(if we really have only finite powers of discrimination, how *could* there be phenomenal *continua*?)—and second, when taken together, they have an implausible consequence.

Supposing I am correct about the transitivity of *looking the same as*, what should we say about phenomenal versions of the Sorites Paradox?

Patch #1 looks red

If two patches look the same, then if one looks red so does the other

Patch #1 looks the same as patch #2

Patch #2 looks the same as patch #3

⋮

Patch #29 looks the same as patch #30

Patch #30 looks red

It is legitimate to suppose that we could arrange a series of thirty colour patches, the first of which looked red and the last of which did not, so that when each pair of adjacent patches is looked at in succession, the pair look the same. But just because it is legitimate to suppose that some sentence *A* is true at some time, and to suppose that some different sentence *B* is true at another time, it does not follow that it is thereby legitimate to suppose that *A* and *B* are *jointly* true, at a single time. A simple case is when *B* is the negation of *A*. But only if two sentences can be jointly true is it legitimate to suppose that they could form the premisses of some sound argument. If *looking the same as* is transitive, then it is illegitimate to suppose that all of the last twenty nine premisses of the above argument are true together at any time at which the first premiss is true and the conclusion is false, and hence we may with peace of mind accept that if two patches look the same, then if one looks red so does the other.²²

Sage School of Philosophy
218 Goldwin Smith Hall
Cornell University
Ithaca, NY 14853

DELIA GRAFF

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