INDISCRIMINABILITY AND PHENOMENAL CONTINUA

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The relation of perceptual indiscriminability is widely thought to be non-transitive: there can be a series of objects (stimuli) \( s_1 \ldots s_n \) in which \( s_1 \) is pairwise indiscriminable on some perceptual dimension from \( s_2 \), and \( s_2 \) is indiscriminable from \( s_3 \), and \( s_3 \) from \( s_4 \), and so forth, but \( s_n \) is discriminably different from \( s_1 \). For example, Timothy Williamson writes that

[t]wo stimuli whose difference is below the threshold cannot be discriminated. Since many indiscriminable differences can add up to a discriminable difference, one can have a series of stimuli each indiscriminable from its successor, of which the first member is discriminable from the last. Indiscriminability is a non-transitive relation. (Williamson 1994, 69)

According to some theorists, the possibility (indeed, actuality) of a phenomenal continuum—viz., a seemingly continuous progression from an instance of one color (pitch, loudness, etc.) to an instance of another, incompatible color—shows that perceptual indiscriminability must be nontransitive. Here is Crispin Wright, for example:

It is familiar...that we may construct a series of suitable, homogeneously coloured patches, in such a way as to give the impression of a smooth transition from red to orange, where each patch is indiscriminable in colour from those immediately next to it; it is the non-transitivity of indiscriminability which generates this possibility. (Wright 1975, 338–9)

Suppose that we are to construct a series of colour patches, ranging from red through to orange, among which indiscriminability is to behave transitively. We are given a supply of appropriate patches from which to make selections, an initial red patch \( C_1 \), and the instruction that each successive patch must either match its predecessor or be more like it than is any other patch not matching it which we later use. Under these conditions it is plain that we cannot generate any change in colour by selecting successive matching patches; since indiscriminability is to be transitive, it will follow that if each \( C_i \) in the first \( n \) selections matches its
The only way to generate a change in colour will be to select a non-matching patch. (Wright 1976, 344–5)

The alleged nontransitivity seems to cause trouble wherever it goes, however. Just for example, it threatens the coherence of the ordinary idea of determinate perceptual qualities like shades, pitches, and intensities; and it helps to generate a particularly toxic version of the sorites paradox. In what follows I want to begin by illustrating the kinds of problems that are created by the alleged nontransitivity, and the lengths to which philosophers have often had to go in order to deal with them. Then I will suggest a way of thinking about phenomenal continua that may eliminate some of the difficulty.

I

Before going further, we need to draw two important distinctions. First, we need to distinguish between the statistical relation of indiscriminability and the phenomenal relation of appearing (looking, sounding, tasting, etc.) the same. The statistical relation, employed primarily in psychology and psychophysics, is expressed in terms of percentages of same/different comparisons in which two physically different stimuli appear the same. Thus understood, indiscriminability is clearly nontransitive: there can be a series of stimuli $s_1 \ldots s_n$ such that, under some constant viewing conditions (suppose even that $s_1 \ldots s_n$ are all in view simultaneously), $s_1$ appears the same as $s_2$ in (e.g.) 75 percent of same/different trials, $s_2$ appears the same as $s_3$ in 75 percent . . . and $s_{n-1}$ appears the same as $s_n$ in 75 percent, but $s_1$ and $s_n$ appear the same in only 30 percent of trials. (More intuitively, perhaps: there can be a series of stimuli such that $s_1$ and $s_2$ can be told apart 25 percent of the time, $s_2$ and $s_3$ can be told apart 25 percent of the time, and so forth, but $s_1$ and $s_n$ can be told apart 70 percent of the time.)

In contrast, virtually all philosophical discussions of indiscriminability concern not the statistical psychophysical relation but rather the phenomenal relation of appearing (looking, sounding, etc.) the same, in terms of which the statistical relation is defined. Philosophers tend to refer to stimuli as looking the same as if this were an invariant relation, i.e., as if stimuli that “look the same” under certain conditions always look the same under those conditions. But there are no stimuli that always look the same, so it can be hard to understand what the philosophers have in mind, and interpretative decisions may have to be made. In order to connect with the philosophical discussions, for the sake of argument, in what follows I will bracket this worry and go along with the idea that appearing the same is an invariant relation. I’ll suppose that it’s the latter relation whose nontransitivity is at issue.

The second distinction, observed by at least some philosophers working in the area (e.g., Graff 2001, 927, Mills 2002, 391), is between (in)discriminability construed as a relationship discernible in a single pairwise same/different
comparison (often expressed by saying of two objects that we can or cannot “tell them apart”), and looking the same construed as a more demanding, epistemically laden relationship. Pierre Chuard explains:

[F]allibilists about looks... argue that... indiscriminable adjacent patches may well look different, despite their perceptual indiscriminability; it's just that we cannot notice the relevant differences in the chromatic appearances of such patches....[V]ery small differences in chromatic appearances may be visually indiscriminable to normal perceivers because they cannot notice them, thus lacking perfect access to small differences in how things look to them. (2007, 162)

In what follows, I will sometimes speak inexactly to keep my discussion from becoming cumbersome; but where the differences are important or an author’s usage is not clear from the context, I will do my best to distinguish these varying senses of ‘indiscriminable’ and ‘looks the same’.

As I just mentioned, the alleged nontransitivity of indiscriminability appears to threaten the coherence of the ordinary idea of determinate perceptual (“phenomenal”) qualities. Intuitively we want to say that objects have the same shade or pitch or loudness just in case they are indiscriminable, i.e., just in case they appear the same, in the relevant respect. But unlike indiscriminability, the identity relation is transitive; so this natural way of individuating determinate qualities is not available. Peacocke observes:

[I]t is pretheoretically tempting to suppose that... perceived shades s and s' are identical if and only if s is not discriminably different from s'. The non-transitivity of nondiscriminable difference (“matching”) entails that there is no way of dividing the spectrum into shades that meets that condition. Take an example in which, in respect of color, x matches, y matches z, but x does not match z. To conform to the above principle about shades, the shade of y would have to be identical with shades that are distinct from one another. (1981, 83)

Drawing a famously radical conclusion, Michael Dummett contends that the nontransitivity of indiscriminability renders the idea of phenomenal qualities, and the vague predicates that ostensibly express them, incoherent:

What, then, of phenomenal qualities?... [W]e cannot take ‘phenomenal quality’ in a strict sense, as constituting the satisfaction of an observational predicate, that is, a predicate whose application can be decided merely by the employment of our sense-organs: at least, not in any arena in which non-discriminable difference is not transitive....[T]here are no phenomenal qualities, as these have been traditionally understood; and, while our language certainly contains observational predicates[, they] infect it with inconsistency. (1975, 324)

Conceptualism about the representational content of perceptual experience (e.g., McDowell 1994, Brewer 2005) has also required treatment for difficulties caused by the alleged nontransitivity of the indiscriminability relation. According
to the conceptualist, all experiential content is conceptual: we can experience, or perceptually represent, only what we can conceptualize upon inspection. An apparent counterexample is our experience of determinate phenomenal qualities: surely, opponents have argued, these shades, pitches, intensities, and the rest are too fine-grained for us to conceptualize in this way. Conceptualists reply that, on the contrary, we do have sufficiently fine-grained concepts—*viz.*, demonstrative concepts such as ‘this shade’ or ‘that shade of magenta’, or ‘that flat leading tone’. For example, McDowell contends that you possess (and deploy) a demonstrative concept of a given determinate shade of red just in case you can tell, after your experience of the shade is over, whether a (closely) subsequent experience as of a shade of red is as of *that same shade*.

The nontransitivity problem rears its head when we try to say what representing that same shade consists in: how does your experience represent objects as having the same shade? The natural answer: by representing them in such a way that they are indiscriminable with respect to hue. But there the problem takes hold, for this natural answer attempts to define the transitive relation of sameness or identity with respect to hue, in terms of the nontransitive relation of indiscriminability with respect to hue. 3

Disjunctivism in the philosophy of mind also runs into trouble in its appeal to the indiscriminability relation. Bucking tradition, the disjunctivist holds that veridical perceptions are essentially different in kind from illusions and hallucinations. 4 He thinks that the mind-independent entities that are the intentional objects of our experiences are constituents of the experiences that are veridical; and for obvious reasons, no such constituency can obtain in the case of illusions or hallucinations. The disjunctivist acknowledges that veridical perceptions, illusions, and hallucinations are all experiences, but he claims that what unites them as such is just their indiscriminability from veridical perceptions—not, as philosophical tradition would have it, their qualitative or intentional or adverbial properties. Specifically, a mental event is an experience as of Φ just in case it is indiscriminable from a veridical perception of Φ. M. G. F. Martin explains:

Rather than appealing to a substantive condition which an event must meet to be an experience, and in addition ascribing to us cognitive powers to recognise the presence of this substantive condition, [disjunctivism] instead emphasizes the limits of our powers of discrimination and the limits of self-awareness: some event is an experience of a street scene just in case it couldn’t be told apart through introspection from a veridical perception of the street. . . . (2004, 48)

[A] challenge to the sufficiency of indiscriminability for identity of kind of experience comes from the alleged nontransitivity of indiscriminability for some observable properties. Certainly, given observers on particular occasions may fail to detect the difference in shade between sample A and sample B, and also fail to detect the difference between sample B and sample C, and yet be able to detect the difference between sample A and sample C. If this leads us to
the conclusion that experiences of A are indiscriminable from experiences of B, and experiences of B are indiscriminable from experiences of C, then we face a problem supposing that there are kinds of event which are sensory experiences of colour shades on the disjunctivist proposal. The indiscriminability of experience of A and experience of B would require us to suppose that these are just the same kind of experience; likewise for the experience of B and of C. By transitivity of identity, this requires that the kind of experience one has of A is of the same kind as the experience one has of C, but this contradicts the observation that the experience of C is discriminable from the experience of A since kinds of experience are discriminable only where distinct. (2004, 76)

If I understand correctly, Martin reasons that if two stimuli are indiscriminable, then the experiences they occasion are indiscriminable, and experiences are indiscriminable just in case they are phenomenally identical. Hence if indiscriminability is nontransitive, something has to give.

Now I want to consider some of the responses that defenders of these and other affected views have made to the alleged nontransitivity problem.

II

The most common response to the problem has been to argue that the relation of looking the same is transitive, or at least that there is no good reason to think it's nontransitive, because adjacent items in an ostensible phenomenal continuum are, after all, either discriminably different (Hardin 1988, Burns 1994, e.g.) or indiscriminable but phenomenally different (Graff 2001, Mills 2002, e.g.). Proponents of the latter option claim that although we cannot tell adjacent items apart in a pairwise same/different comparison, they are nevertheless phenomenally different, i.e., they appear (look, sound, taste) different. Hence there can be no phenomenal continua after all.

I haven’t yet said exactly what a phenomenal continuum is. As a first approximation, a phenomenal continuum is a series of stimuli in which neighboring items appear the same but the endpoints appear different, at a given time, to a perceiver who proceeds along the series, inspecting each pair of neighboring stimuli. Or better: a phenomenal continuum is a continuous progression in appearance that is instantiated, at a time, by a series of stimuli in which neighboring items appear the same but the endpoints appear different at that time, etc. The phenomenology of phenomenal continua is baffling because, even given perfectly constant viewing conditions, the first and last items appear different and yet nowhere between the two is any local difference in appearance discerned.

Why think adjacent items in a putative phenomenal continuum are phenomenally different? And why, if they are phenomenally different, are they indiscriminable, as “fallibilists” (Chuard 2007) have claimed? Typically, fallibilists construe indiscriminability as an epistemic (rather than purely perceptual) failing, but the details are unclear. They tend to cite factors—such as the small size of
the relevant stimulus differences or the slow rate of the relevant change(s) of appearance, or failures of attention—that might explain the indiscriminability of neighboring items but do not obviously leave room for any phenomenal differences as these are usually understood. Eugene Mills writes:

I deny first-person infallibility for the belief that two patches look as though they share all their color-appearance properties. But infallibility for this belief is silly anyway. Each patch has a vast array of color-appearance properties, nested and otherwise. It is fantastic to suppose that in comparing two patches, I could not fail to notice a slight difference with respect to one of these (at least) thousands of colors. (2002, 391)

Delia Graff expresses her view this way:

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. (2001, 927)

According to the fallibilist, the relation of looking the same can be transitive because adjacent items do not in fact look the same. Williamon suggests that phenomenal continua do not (cannot?) exist because physically different samples are always “impersonally” discriminable, i.e., because some observer in some context could tell that the samples are different. The trouble with this response is that all that’s required for nontransitivity is that some series of stimuli instantiate the requisite sort of progression for some observer at some time. It’s irrelevant whether some other observer could tell the stimuli in question apart. John Zeimbikis (2009) writes that a

distinction between phenomenal indiscriminability and phenomenal identity is adopted by Austen Clark (1989) when he says that that there are phenomenal differences below the threshold of sensible discrimination, or ‘a qualitative difference between the sensations engendered by indiscriminable things’. The difference could also be described as that between looking phenomenally identical and being phenomenally identical. (357–8)

The preceding are some examples of the strategies that philosophers have been forced to adopt in response to the alleged nontransitivity of indiscriminability. In my view, granting that stimuli that cannot be told apart in a pairwise comparison (under normal or standard conditions, whatever exactly these may be) may nevertheless be phenomenally different—in other words, may look different—or that stimuli that look phenomenally identical could fail to be phenomenally identical, is too high a price to pay for a resolution of the problem. In the remainder of this paper I will advance a different response to
the nontransitivity problem, one that may allow us to resolve it in a less drastic way. Specifically, rather than postulating undetectable phenomenal differences between indiscriminable adjacent items, I will urge that some of the individual stimuli in (a series that instantiates) a phenomenal continuum change their appearance, change how they look, as an observer moves along the series. In other words, instead of a difference in appearance between adjacent items, I will propose that a change occurs in the appearance of one or more items individually. I’ll call this proposal the ‘instability hypothesis’. Of course, for a claim of nontransitivity to hold good, the stimuli in a phenomenal continuum must remain constant in appearance throughout; the instability hypothesis must be false. A series in which the stimuli change their appearance doesn’t show that appearing the same is nontransitive, any more than the fact that Tom and Dick weigh the same, and Dick and Harry weigh the same, but Tom and Harry have different weights, shows that identity is nontransitive if we’ve weighed Tom and Dick in 2001, and then Dick and Harry in 2002, and then Tom and Harry in 2003.

In the next section I am going to present some experimental results that seem to support the instability hypothesis. The conclusion we should draw, I’ll suggest, is that neighboring stimuli in a phenomenal continuum appear (look, sound, etc.) the same, but such a continuum provides no evidence that appearing the same, in contrast to statistical indiscriminability, is nontransitive.

III

The experiment described below was designed and run in collaboration with Delwin Lindsey of the Psychology Department and Angela Brown of the School of Optometry at Ohio State University. The stimuli were a series of 41 patches of colored light that instantiated a phenomenal continuum (on almost all trials) between two slightly but clearly different shades of green. The stimuli were presented on a high-resolution color monitor in the circular arrangement shown in Figure 1. Nothing depended upon the locations of the endpoints. About half of the stimuli were redundant: roughly every other patch in the circle was physically identical to its predecessor. Neighboring physically different patches differed by less than the discrimination threshold or just noticeable difference in hue of our most sensitive subject. (We had established the thresholds of our subjects in an earlier experiment, requiring correct detection on 75% of trials.) The subjects in the experiment were ten philosophy and psychology faculty, students, and staff at Ohio State University, including several faculty and graduate students in psychology of vision.

Each trial began with a same/different comparison of the hues of two neighboring of ‘different’ (which happened rarely), the next trial began immediately and she was cued to judge the next pair of patches. (If the patches are numbered #1–#41, the order of the pairs was #1/#2, #2/#3, #3/#4, etc. Consecutive pairs always shared a patch.) If the subject made a judgment of ‘same’, a disk
of colored light appeared in the center of the circle, as pictured in Figure 2. The subject then adjusted the hue of the disk by moving the computer mouse back and forth until the disk matched the hue of the two patches. (The starting hue of the disk and the directionality of the mouse were randomized.) The disk then disappeared and the next trial began. In this way the subject was taken around the circle, judging each pair of patches *seriatim* and adjusting the hue of the disk accordingly. Subjects went around the circle twice. At the end of the experiment we asked roughly half of the subjects if they had noticed any changes in the colors of the patches during the experiment. All said ‘no’.

What we found was that even though all of the patches were in view throughout, and the members of every pair were judged ‘same’ by every subject on almost every trial, subjects’ settings of the disk progressed more or less systematically with the physical values (wavelengths) of the patches. In other words, subjects matched the pair #2/#3 to a longer wavelength than the pair #1/#2, the pair #3/#4 to a longer wavelength than the pair #2/#3, and so on.
More to the point, patch #2 was matched to a different wavelength when it was compared to #1 than when it was compared to #3; patch #3 was matched to a different wavelength when compared to #2 than when compared to #4; and so on. Data from one subject, which are typical, are pictured in Figure 3. On the y-axis is the setting of the disk (in arbitrary units), and on the x-axis is the number of the stimulus pair to which the disk was being matched. Black triangles indicate redundant trials in which the stimuli in a pair were physically identical; white squares indicate trials in which stimuli were physically different.

Since the graphs show the disk settings, the data points (squares and triangles) represent all and only trials in which the members of a pair were judged ‘same’. (The graphs contain more than 41 data points because subjects went around the circle twice; hence pairs that were judged ‘same’ both times received two disk settings.) The curve shows fairly steady progression of the disk settings as subjects progressed through the pairs of patches, for both the physically identical and physically different pairs.\(^\text{13}\)

No doubt our data admit of various interpretations. But I think that at the least they cast doubt upon the idea that neighboring patches are phenomenally different, i.e., that they look different. If anything, the data suggest that individual patches looked different in their different pairwise comparisons. We must proceed with caution here, though. It is overwhelmingly likely that our subjects could not have recognized, could not have noticed, any such change of hue. And this lack of recognition would not be analogous to (for example) change blindness, in which observers become aware of the change in question as soon as their attention is drawn to it or the relevant visual disruption is removed. (Subjects who experience change blindness fail to notice changes, often large ones, in visual scenes when...
the changes occur during a visual disruption such as a saccade or blink or a cut in a film.\textsuperscript{14} For example, viewers in one experiment failed to notice that two people in a scene had exchanged heads (Grimes 1996.) Nor would it be analogous to attentional blindness, in which, again, subjects see a previously unnoticed aspect of the stimulus array as soon as they start paying attention to it. In contrast, in our experiment, making the same/different comparisons and setting the hue of the disk required sustained conscious attention, with no visual disruption.

Nevertheless, I do want to suggest that phenomenal changes occurred in the appearances of one or more of the patches as subjects proceeded around the circle. But why is a hypothesis of unrecognized phenomenal changes in individual patches more plausible than the fallibilists’ hypothesis of unrecognized phenomenal differences between adjacent patches? I think there are at least three reasons. First, there are circumstances, different from the ones in the change and attentional blindness scenarios, in which these phenomenal changes could be recognized by the subject herself (or so I predict–more on this in a moment); second, recognition of such changes in appearance would defeat the nontransitivity claim but leave phenomenal continua intact; third, there will be no need to endorse the fallibilists’ counterintuitive claim that stimuli judged the same in a pairwise comparison may nonetheless look different.

Let me illustrate what I have in mind. (I have not done an experiment to test the hypothesis I’m about to put forward; for now I can only make a prediction.)

\textbf{IV}

Consider a hypothetical version of the experiment using only 6 (non-redundant) patches, arranged in a straight line, progressing from one shade of green to another, slightly but perceptibly different one. Suppose that you perform the experimental tasks at some time $t$, and you reproduce our results: you judge adjacent patches the same and the endpoints #1 and #6 different, and your disk settings progress steadily. How then should we characterize the phenomenology: how do the patches look to you? Specifically, as against the fallibilists, can we characterize how the patches look, compatibly with preserving the intuition that objects judged the same in a pairwise comparison appear the same?

Perhaps, despite the systematic progression of your disk settings, until a patch that is pairwise clearly different from patch #1—\textit{ex hypothesi} #6—becomes sufficiently prominent in your attentional field, all of the patches you have observed to that point (\textit{viz.}, #1-#5) look the same, i.e., you have no experience of a \textit{phenomenal} progression. (Plausibly, the same/different judgment of each successive pair of patches is made in a distinct attentional act, and you cannot attend to all 6 patches, a \textit{fortiori} all 6 pairs, simultaneously.) However, when #6 enters your attentional field, you experience a phenomenal progression. The question is: if #1 and #5 look the same pairwise, how does #6 get to look different from #1 without #5 looking different from #6?
My thought is that #5 and #6 never need to look different because as soon as #6 looks different from #1, so does #5, and maybe also #4, depending upon how much attention #4 receives. Thus #5 (and possibly #4) undergoes a shift in its hue appearance as you shift your attention from the #4/#5 pair to the #5/#6 pair; #5 looks different in its two comparison pairings with #4 and #6. And you can notice this. I predict that if you were to scan quickly back and forth along the series, from one end (#1) to the other (#6), you would see and notice, would recognize, at least some of the patches between #1 and #6 subtly (very subtly!) shifting their hues back and forth, together, now looking like #1, now like #6, now like #1, now like #6. The result would be that you never see a hue difference between adjacent patches. The fallibilist would contend that adjacent patches look different to you, but unrecognizably so; in effect, he asks us to take these phenomenal differences on faith. In contrast, on the view I am proposing, you can recognize the kind of phenomenal change that (e.g.) #5 undergoes.

I remarked earlier that our experimental subjects probably could not have noticed or recognized hue shifts of the kind that, if I am right, would be recognized in (e.g.) a shorter series like #1-#6. There may be various reasons why: for example, maybe the large number of stimuli used in the experiment, or their circular arrangement, or the slow and halting pace of subjects’ progression through the series, or the demands of performing two different tasks, made the hue shifts unnoticeable. Whatever the reasons, they are compatible with the notion that one or more individual patches in the experimental series changed their appearance, changed how they looked, even if subjects could not notice that.

This changing of hue appearance is what makes a phenomenal continuum possible, enabling the first and last items to appear different although nowhere between the two is any local difference in appearance discerned. It makes possible the perception of an apparently smooth, continuous progression in hue. To put the point another way, these subtle changes, not any nontransitivity, are what make phenomenal continua possible. If this is correct, then neighboring items in a phenomenal continuum do indeed look—“really look” (cf. Graff, 2001)—the same in pairwise comparisons, but the instability of their appearances across different pairings defeats the nontransitivity claim.

The picture I am proposing requires letting go of the notion that shades of color are stable, mind-independent properties of objects, “out there” on their surfaces. Shades are neither stable nor mind-independent nor (simply) out there. Under normal or standard conditions (we leave open what these are), shades are informative about what’s out there, in particular about the surfaces of objects and the light striking them. But they are also informative about what’s “in here”—about the state of my visual system, what I have been looking at recently, what order I have been judging things in, and so forth.

Where then have we gotten to? I proposed the instability hypothesis as a way of undercutting the nontransitivity claim with respect to the relation of appearing the same, without being pushed into the counterintuitive strategies
described earlier. To the extent that it succeeds, the hypothesis allows us to (1) reject the nontransitivity claim, (2) acknowledge the reality of phenomenal continua, and (3) preserve the intuition that stimuli judged the same in a pairwise comparison look the same. In addition, nothing in the proposed account stands in the way of claiming that whenever two or more stimuli look the same, they share a look—viz., a determinate quality (shade, pitch, loudness, etc). This isn’t yet to provide identity conditions for shades or looks; indeed, I don’t think that such identity conditions can be formulated in terms of discriminatory or same/different judgments. I think there is a way to do it, in terms of a perceptual task called magnitude estimation, in which shades are identified by their percentages of different chromatic components. For example, unique blue is the shade containing 100% blue and 0% of any other hue; balanced orange is the shade containing 50% red and 50% yellow; balanced red-orange contains 75% red and 25% yellow; and so on. I cannot go into the details here, but see my 2013 for discussion.

Notes

1. As we’ll see, not everyone would accept the idea that statistical indiscriminability is defined in terms of appearing the same.
2. See also Goodman 1951.
3. I don’t mean to suggest that the conceptualist is without a response (though I think the present predicament is not easily escaped; see e.g. Pelling 2007 for discussion). My present goal is just to illustrate the kinds of difficulties posed by the alleged nontransitivity.
4. Here I ignore many significant differences among disjunctivist positions; see e.g. Haddock and Macpherson 2008 and Soteriou 2009 for detailed surveys.
5. The notion of (in)discriminability as a relation between experiences is probably not coherent; see Siegel 2004, 109, and my 2013.
6. Briefly, the trouble with Hardin’s and Burns’s ingenious proposals is that nontransitivity requires only that adjacent items appear the same and the endpoints appear different, to some individual observer on some single occasion.
7. Consider that in order for Mills’ view here to undercut the nontransitivity claim, I must invariably fail to notice some such slight difference. Nontransitivity requires only the possibility of a single occasion on which adjacent items in the series look the same, to a single subject.
8. Adopting this view allows Graff (2001) to hold on to the principle that “if two samples really do look alike then they share a look”.
9. An ancestor of the instability hypothesis is proposed, but not tested, in my 2000.
10. Lindsey.43@osu.edu, Brown.112@osu.edu. These experimental results are presented also in my 2011 and 2013, for different philosophical purposes.
11. There were 21 physically distinct stimulus values (wavelengths; but see note 9). If we label the 21 values as a–u, their order in the circle can be specified as a, a, b, b, c, c, and so on. Consecutive trials then involved the pairs a/a, a/b, b/b, b/c, c/c, and so on. (The “redundant” pairs [a/a, b/b, etc.] tested for false alarms,
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viz., ‘different’ responses to identical stimuli. The latter data are irrelevant to the present discussion.)

12. For convenience I use the term ‘wavelength’, but strictly speaking it is incorrect. Rather, the stimuli were mixtures of broadband lights, and neither the primaries nor the mixtures had a defined wavelength.

13. This result suggests that subjects may have been matching the hue of the disk to the mean physical value of the two patches in each pair.


15. Note that I have said nothing about the related, difficult question of how an unattended patch looks at any given time. For example, when you are making a same/different judgment of the #5/#6 pair, how does #3 look? I am not certain of the answer. One possibility is that unless stimuli are attended to at least some significant degree, the contents of our experiences of them are merely “determinable”, becoming determinate only when our attention focuses on them. For instance, maybe the content of our unattended experience of #3 could be expressed by something like ‘on the way from the green of #5 and #6 to the slightly yellower green of #1’. I am not now in a position to develop the latter idea further, however. While this question about experiences of the unattended patches will need to be answered soon, I think it doesn’t need to be answered immediately. (I will say more below about the nature of the determinate contents of our hue experiences of attended stimuli.)

References


