

The inverted spectrum

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1 Spectrum inversion as a challenge to functionalism

The example of spectrum inversion was introduced into the philosophical literature by John Locke:

“Neither would it carry any Imputation of Falsehood to our simple Ideas, if by the different Structure of our Organs, it were so ordered, That the same Object should produce in several Men’s Minds different Ideas at the same time; e.g. if the Idea, that a Violet produced in one Man’s Mind by his Eyes, were the same that a Marigold produces in another Man’s, and vice versa. For since this could never be known: because one Man’s Mind could not pass into another Man’s Body, to perceive, what Appearances were produced by those Organs; neither the Ideas hereby, nor the Names, would be at all confounded, or any Falsehood be in either.” (*Essay on Human Understanding*, §II.xxxii.15)

Tye discusses the example of red/green inversion. Can we imagine someone who is red/green inverted relative to you, but who is functionally identical to you — in the sense that when you and that person look at a ripe tomato, you and that person are in a state which plays the same functional roles in your respective psychologies?

Here’s the way Tye tries to develop the example:

‘One way to fix the puzzle clearly in your mind is to imagine that you are operated on by surgeons who alter some of the connections between neurons in your visual system. These alterations have the effect of making neurons that used to fire as a result of retinal-cell activity produced by viewing red objects now fire in response to such cell activity produced by seeing green objects and vice versa. On awakening from the operation, you find the world very weird indeed. Your lawn now looks red to you, the trees are varying shades of red and purple, the flamingo statues that decorate your garden look light green instead of pink. These changes in your experiences will be reflected in your behavior, for example, in your verbal reports. So there will be straightforward evidence that an inversion has occurred.

Now suppose that the surgeons operated on you at birth, so that you learned to apply color vocabulary to things with anomalous looks. For you, these looks are not anomalous, of course. So you use color terms in precisely the same circumstances as everyone else. Is this not imaginable?’

If such a person is possible, then it looks like functionalism is in trouble.

2 Inverted earth

Block (in a paper we did not read for this class) lays out an interesting variant on the standard case. Here’s Tye’s description:

‘In a variant scenario, we are asked to consider another planet, Inverted Earth. On Inverted Earth, things have complementary colors to those of their counterparts on earth. The sky is yellow, grass is red, ripe tomatoes are green, and so on. . . . [People on Inverted Earth] think that the sky is yellow, see that grass is red, and so on. However, they call the sky ‘blue’, the grass ‘green’, ripe tomatoes ‘red’, and so on, just as we do. Indeed, in all respects consistent with the alterations just described, Inverted Earth is as much like Earth as possible.

One night while you are asleep, a team of mad scientists insert color-inverting lenses in your eyes and take you to Inverted Earth, where you are substituted for your Inverted Earth twin . . . On awakening, you are aware of no difference, since the inverting lenses neutralize the inverted colors. You think that you are still where you were before. . . . But after enough time has passed, after you have become sufficiently embedded in the language and physical environment of Inverted Earth, your intentional contents will come to match those of the other inhabitants. You will come to think that the sky is yellow, for example, just as they do, because the state that was earlier on earth normally caused by blue things is now normally caused by yellow things. So the later you will come to be subject to inner states that are functionally, and hence intentionally, inverted relative to the inner states of the earlier you, whereas the phenomenal aspects of your experiences will remain unchanged. It follows, as before, that what it is like for you cannot be grounded in the functional features of your mental states.’

Now consider your experience of the sky after a long time on Inverted Earth. It will feel blue-ish – just like your experience back home on Earth. But the functional role of that state will be that of an experience of yellow, since it is a state you are typically caused to be in by experiences of yellow things.

3 Spectrum shift

It is worth knowing that some cases which are similar to these are not just imaginable, but actual. These are sometimes called cases of ‘spectrum shift.’

Subjects of different sexes, ages, and races seem to differ with respect to what it is like for them to experience certain colors. Evidence for this comes from differences in the way that subjects locate, e.g., ‘pure green’ — green that does not look blueish or yellowish.

Now suppose that A and B are each having an experience of some grass, which actually has color G. To A the grass seems true green; to B it does not. It seems to follow that they are having different conscious experiences; what it is like to be A \neq what it is like to be B. But it might seem that A and B are in the same functional state. After all, each is in a state which they are typically caused to be in G things.

4 A complication: asymmetries in color space

For the purposes of arguing against functionalism, it suffice to provide a possible case in which two subjects are inverted relative to each other, but are functionally identical (i.e., are such that all of their states have identical functional roles).

One problem with providing such a case: asymmetries in color space. Some of the main ones: purple vs. greenish yellow; dark yellow vs. dark blue; desaturated red vs. desaturated green.

One attempt to get around this problem: inversion cases involving creatures with only black and white vision. But then other problems arise, e.g. from the fact that white things reflect more light than dark things, so that more detail is visible on white paper than on black paper — and this will yield functional differences. (Compare an opaque/transparent inversion scenario.)