

VERIDICAL HALLUCINATION AND PROSTHETIC VISION

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I

I see. Before my eyes various things are present and various things are going on. The scene before my eyes causes a certain sort of visual experience in me, thanks to a casual process involving light, the retina, the optic nerve, and the brain. The visual experience so caused more or less matches the scene before my eyes. All this goes on in much the same way in my case as in the case of other people who see. And it goes on in much the same way that it would have if the scene before my eyes had been visibly different, though in that case the visual experience produced would have been different.

How much of all this is essential to seeing?

II

It is not far wrong to say simply that someone sees if and only if the scene before his eyes causes matching visual experience. So far as I know, there are no counterexamples to this in our ordinary life. Shortly we shall consider some that arise under extraordinary circumstances.

But first, what do we mean by 'matching visual experience'? What goes on in the brain (or perhaps the soul) is not very much like what goes on before the eyes. They cannot match in the way that a scale model matches its prototype, or anything like that. Rather, visual experience has informational content about the scene before the eyes, and it matches the scene to the extent that its content is correct.

Visual experience is a state characterised by its typical casual role, and its role is to participate in a double casual dependence. Visual experience depends on the scene before the eyes,¹ and the subject's beliefs about that scene depend in turn partly on his visual experience. The content of the experience is, roughly, the content of the belief it tends to produce.

The matter is more complicated, however. The same visual experience will have a different impact on the beliefs of different subjects, depending on what they believed beforehand. (And on other differences between them, e.g. differences of intelligence.) Holmes will believe more on the basis of a given

¹ I shall have more to say about this dependence in what follows. So although my concern here is with the analysis of seeing in terms of visual experience, what I say would also figure in a prior analysis of visual experience in terms of its definitive causal role.

visual experience than Watson; and Watson in turn will believe more than someone will who suspects that he has fallen victim to a field linguist no less powerful than deceitful.² We should take the range of prior states that actually exist among us, and ask what is common to the impact of a given visual experience on all these states. Only if a certain belief would be produced in almost every case may we take its content as part of the content of the visual experience. (The more stringently we take 'almost every,' the more we cut down the content of the visual experience and the more of its impact we attribute to unconscious inference; for our purposes, we need not consider how that line ought to be drawn.)

Beliefs produced by visual experience are in large part self-ascriptive: the subject believes not only that the world is a certain way but also that he himself is situated in the world in a certain way. To believe that the scene before my eyes is stormy is the same as to believe that I am facing a stormy part of the world. Elsewhere³ I have argued that the objects of such beliefs should be taken, and that the objects of all beliefs may be taken, as properties which the subject self-ascribes. Hence the content of visual experience likewise consists of properties — properties which the subject will self-ascribe if the visual experience produces its characteristic sort of belief. The content is correct, and the visual experience matches the scene before the eyes, to the extent that the subject has the properties that comprise the content of his visual experience.

Equivalently we might follow Hintikka's scheme and take the content of visual experience as a set of alternative possibilities.⁴ A modification is desirable, however, in view of the self-ascriptive character of visually produced belief. We should take these visual alternatives not as possible worlds but as possible individuals-situated-in-worlds. The visual experience characteristically produces in the subject the belief that he himself belongs to this set of alternative possible individuals. Matching then means that the subject is, or at least closely resembles, a member of his alternative set.

Not all of the content of visual experience can be characterised in terms of the beliefs it tends to produce. It is part of the content that the duck-rabbit look like a duck or a rabbit, but the belief produced is that there is no duck and no rabbit but only paper and ink. However, aspects of the content that do not show up in the produced belief also are irrelevant to our task of saying what it is for visual experience to match the scene before the eyes. We can therefore ignore them.

III

I shall not dwell on the question whether it is possible to see even if the scene before the eyes does not cause matching visual experience. Three sorts of

² The problem of the suspicious subject is raised in Frank Jackson, *Perception: A Representative Theory* (Cambridge: Cambridge University Press, 1977), pp. 37-42.

³ 'Attitudes *De Dicto* and *De Se*', *The Philosophical Review*, LXXXVIII (1979), pp. 513-543.

⁴ Jaakko Hintikka, 'On the Logic of Perception', in his *Models for Modalities: Selected Essays* (Dordrecht: Reidel, 1969). The proposed modification solves (by theft rather than toil) a problem for Hintikka's important idea of perceptual cross-identification: where do we get the cross-identification of the perceiving subject himself, in relation to whom we perceptually cross-identify the things that surround him?

examples come to mind. (1) Perhaps someone could see without having visual experience. He would need something that more or less played the role of visual experience; but this substitute might not be visual experience, either because it played the role quite imperfectly⁵ or because it is not what normally plays the role in human beings (or in some other natural kind to which the subject in question belongs).⁶ (2) Perhaps someone could see in whom the scene before the eyes causes non-matching visual experience, provided that the failure of match is systematic and that the subject knows how to infer information about the scene before the eyes from this non-matching visual experience. (3) Perhaps someone could see in whom the scene elsewhere than before the eyes causes visual experience matching that scene, but not matching the scene before the eyes (if such there be). I do not find these examples clear one way or the other, and therefore I shall consider them no further. They will not meet the conditions for seeing that follow, wherefore I claim only sufficiency and not necessity for those conditions.

Two further preliminaries. (1) My analysandum is seeing in a strong sense that requires a relation to the external scene. Someone whose visual experience is entirely hallucinatory does not see in this strong sense. I take it that he can be said to see in a weaker, phenomenal sense — he sees what isn't there — and this is to say just that he has visual experience. (2) My analysandum is seeing in the intransitive sense, not seeing such-and-such particular thing. The latter analysandum poses all the problems of the former, and more besides: it raises the questions whether something is seen if it makes a suitable causal contribution to visual experience but it is not noticed separately from its background, and whether something is seen when part of it — for instance, its front surface — makes a causal contribution to visual experience.⁷

IV

My first stab is good enough to deal with some familiar counterexamples to causal analyses of seeing: they are not cases of seeing because they are not cases in which the scene before the eyes causes matching visual experience.⁸

Example 1: *The Brain*. I hallucinate at random; by chance I seem to see a brain floating before my eyes; my own brain happens to look just like the one I seem to see; my brain is causing my visual experience, which matches it. I do not see. No problem: my brain is no part of the scene before my eyes.

Example 2: *The Memory*. I hallucinate not at random; visual memory

⁵ As in cases of 'blind sight' in which the subject claims to have no visual experience and yet acquires information about the scene before his eyes just as if he did.

⁶ See my 'Mad Pain and Martian Pain', in Ned Block, ed., *Readings in the Philosophy of Psychology* Vol. 1 (Cambridge, Massachusetts: Harvard University Press, 1980).

⁷ Alvin Goldman considers transitive seeing in his 'Discrimination and Perceptual Knowledge', *Journal of Philosophy*, LXXIII (1976), pp. 771-791. Despite the difference of analysandum, I have followed his treatment to a considerable extent.

⁸ Example 1 and an auditory version of Example 2 are due to P. F. Strawson, 'Causation in Perception', in his *Freedom and Resentment and other essays* (London: Methuen, 1974), pp. 77-78.

influences the process; thus I seem to see again a scene from long ago; this past scene causes visual experience which matches it. I do not see. No problem: the past scene is not part of the scene before my eyes.⁹

However, more difficult cases are possible. They are cases of *veridical hallucination*, in which the scene before the eyes causes matching visual experience, and still one does not see. They show that what I have said so far does not provide a sufficient condition for seeing.

Example 3: The Brain Before the Eyes. As in Example 1, I hallucinate at random, I seem to see a brain before my eyes, my own brain looks just like the one I seem to see, and my brain is causing my visual experience. But this time my brain is before my eyes. It has been carefully removed from my skull. The nerves and blood vessels that connect it to the rest of me have been stretched somehow, not severed. It is still working and still hallucinating.

Example 4: The Wizard. The scene before my eyes consists mostly of a wizard casting a spell. His spell causes me to hallucinate at random, and the hallucination so caused happens to match the scene before my eyes.

Example 5: The Light Meter. I am blind; but electrodes have been implanted in my brain in such a way that when turned on they will cause me to have visual experience of a certain sort of landscape. A light meter is on my head. It is connected to the electrodes in such a way that they are turned on if and only if the average illumination of the scene before my eyes exceeds a certain threshold. By chance, just such a landscape is before my eyes, and its illumination is enough to turn on the electrodes.

V

Ordinarily, when the scene before the eyes causes matching visual experience, it happens as follows. Parts of the scene reflect or emit light in a certain pattern; this light travels to the eye by a more or less straight path, and is focused by the lens to form an image on the retina; the retinal cells are stimulated in proportion to the intensity and spectral distribution of the light that falls on them; these stimulated cells stimulate other cells in turn, and so on, and the stimulations comprise a signal which propagates up the optic nerve into the brain; and finally there is a pattern of stimulation in the brain cells which either is or else causes the subject's visual experience.

That is not at all what goes on in our three examples of veridical hallucination. Rather, the scene before the eyes causes matching visual experience by peculiar, non-standard causal processes. Perhaps, as has been proposed by Grice¹⁰ and others, seeing requires the standard causal process.

⁹ However, it seems that some past things are part of the scene now before my eyes: distant stars as they were long ago, to take an extreme case. It would be circular to say that they, unlike the past scene in Example 2, are visible now. Perhaps the best answer is that the stars, as I now see them, are not straightforwardly past; for lightlike connection has as good a claim as simultaneity-in-my-rest-frame to be the legitimate heir to our defunct concept of absolute simultaneity. (I owe the problem to D. M. Armstrong and the answer to Eric Melum.)

¹⁰ H. P. Grice, 'The Causal Theory of Perception', *Proceedings of the Aristotelian Society*, Supplementary Volume XXXV (1961), pp. 121-152.

That would explain why Examples 3, 4, and 5 do not qualify as cases of seeing.

(The proposal faces a technical dilemma. If the standard process is defined as the process in which light is reflected or emitted, etc. (as above), then it seems to follow that few of us now (and none in the not-too-distant past) know enough to have the concept of seeing; whereas if the standard process is defined as the most common process by which the scene before the eyes causes matching visual experience, whatever that may be, then it seems to follow that any of our examples of veridical hallucination might have been a case of seeing, and what I am doing now might not have been, if only the frequencies had been a bit different. Either conclusion would be absurd. However, the dilemma can be avoided by appeal to the recent idea of fixing reference by rigidified descriptions.)¹¹

Unfortunately, requiring the standard process would disqualify good cases along with the bad. Some cases in which the scene before the eyes causes matching visual experience by a non-standard process seem fairly clearly to be cases of genuine seeing, not veridical hallucination.

Example 6: The Minority. It might be found that a few of us have visual systems that work on different principles from other peoples'. The differences might be as extreme as the difference between AM versus FM transmission of signals; analogue versus digital processing; or point-by-point measurement of light versus edge detection. If so, would we be prepared to say that the minority don't really see? Would those who belong to the minority be prepared to say it? Surely not.

I anticipate the reply that the abnormal process in the minority is not different enough; the boundaries of the standard process should be drawn widely enough to include it. But I think this puts the cart before the horse. We know which processes to include just because somehow we already know which processes are ones by which someone might see.

Example 7: The Prosthetic Eye. A prosthetic eye consists of a miniature television camera mounted in, or on, the front of the head; a computer; and an array of electrodes in the brain. The computer receives input from the camera and sends signals to the electrodes in such a way as to produce visual experience that matches the scene before the eyes. When prosthetic eyes are perfected, the blind will see. The standard process will be absent, unless by 'standard process' we just mean one that permits seeing; but they will see by a non-standard process.

Some prosthetic eyes are more convincing than others as means for genuine seeing. (1) It seems better if the computer is surgically implanted rather than carried in a knapsack, but better if it's carried in a knapsack rather than stationary and linked by radio to the camera and electrodes. (2) It seems better if the prosthetic eye contains no parts which can be regarded as having wills of their own and cooperating because they want to. (3) It seems better if the

¹¹ See the discussion of the metre and the metre bar in Saul A. Kripke, 'Naming and Necessity', in Donald Davidson and Gilbert Harman, *Semantics of Natural Language* (Dordrecht: Reidel, 1972), pp. 274-275 and 288-289.

prosthetic eye works in some uniform way, rather than dealing with different sorts of inputs by significantly different means. (4) It seems better if it does not use processes which also figure in the standard processes by which we sometimes hallucinate. But if these considerations influence us, presumably it is because they make the prosthetic eye seem a little more like the natural eye. (Or so we think — but we just might be wrong about the natural eye, and these properties of a prosthetic eye just might detract from the resemblance.) Why should that matter, once we grant that the standard process is not required? I see no real need for any limits on how a prosthetic eye might work. Even the least convincing cases of prosthetic vision are quite convincing enough.

If you insist that 'strictly speaking' prosthetic vision isn't really seeing, then I'm prepared to concede you this much. Often we do leave semantic questions unsettled when we have no practical need to settle them. Perhaps this is such a case, and you are resolving a genuine indeterminacy in the way you prefer. But if you are within your rights, so, I insist, am I. I do not really think my favoured usage is at all idiosyncratic. But it scarcely matters: I would like to understand it whether it is idiosyncratic or not.

VI

The trouble with veridical hallucination is not that it involves a non-standard causal process. Is it perhaps this: that the process involved produces matching visual experience only seldom, perhaps only this once?

No; someone might go on having veridical hallucinations for a long time. Veridical hallucinations are improbable, and a long run of them is still more improbable, but that doesn't make it impossible. No matter how long they go on, the sorts of occurrences I've classified as cases of veridical hallucination still are that and not seeing.

On the other hand, a process that permits genuine seeing might work only seldom, perhaps only this once.

Example 8: The Deathbed Cure. God might cure a blind man on his deathbed, granting him an instant of sight by means of some suitable non-standard process. For an instant he sees exactly as others do. Then he is dead. The scene before his eyes produces matching visual experience by a suitable process, namely the standard one, but only this once.

Example 9: The Loose Wire. A prosthetic eye has a loose wire. Mostly it flops around; and when it does the eye malfunctions and the subject's visual experience consists of splotches unrelated to the scene before the eyes. But sometimes it touches the contact it ought to be bonded to; and as long as it does, the eye functions perfectly and the subject sees. Whether he sees has nothing to do with whether the wire touches the contact often, or seldom, or only this once.

The proposal isn't far wrong. It asks almost the right question: when the scene before the eyes causes matching visual experience this time, is that an isolated case or is it part of a range of such cases? The mistake is in asking for a range of actual cases, spread out in time. Rather, we need a range of counterfactual alternatives to the case under consideration.

VII

What distinguishes our cases of veridical hallucination from genuine seeing — natural or prosthetic, lasting or momentary — is that there is no proper counterfactual dependence of visual experience on the scene before the eyes. If the scene had been different, it would not have caused correspondingly different visual experience to match that different scene. Any match that occurs is a lucky accident. It depends on the scene being just right. In genuine seeing, the fact of match is independent of the scene. Just as the actual scene causes matching visual experience, so likewise would alternative scenes. Different scenes would have produced different visual experience, and thus the subject is in a position to discriminate between the alternatives.

This is my proposal: if the scene before the eyes causes matching visual experience as part of a suitable pattern of counterfactual dependence, then the subject sees; if the scene before the eyes causes matching visual experience without a suitable pattern of counterfactual dependence, then the subject does not see.

An ideal pattern of dependence would be one such that any scene whatever would produce perfectly matching visual experience. But that is too much to require. Certainly one can see even if the match, actual and counterfactual, is close but imperfect and the content of visual experience is mostly, but not entirely, correct. Perhaps indeed this is our common lot. Further, one can see even if there are some alternative scenes that would fail altogether to produce matching visual experience, so long as the actual scene is not one of those ones.

Example 10: The Laser Beam. I see now; but if the scene before my eyes had included a powerful laser beam straight into my eyes, I would have been instantly struck blind and would not have had matching visual experience even for a moment.

Example 11: The Hypnotic Suggestion. I must do business with Martians and I can't stand the sight of them. The remedy is hypnotic suggestion: when a Martian is before my eyes I will seem to see not a Martian but a nice black cat. Thus when there are Martians around, the scene before my eyes causes visual experience that does not match the scene very closely. But when there are no Martians, I see perfectly well.¹²

We cannot require that any two different scenes would produce different visual experience; for they might differ in some invisible respect, in which case the same visual experience would match both equally well. Its content would concern only those aspects of the scene in which both are alike. For one who sees, *visibly* different scenes would (for the most part) produce different visual experience; but that is unhelpful unless we say which differences are the visible ones, and that seems to be an empirical matter rather than part of the analysis of seeing. What can be required analytically is that there be plenty of visible differences of some sort or other; that is, plenty of different alternative scenes

¹² Adapted from an olfactory example in Robert A. Heinlein, *Double Star* (Garden City, New York: Doubleday, 1956), Ch. 3.

that would produce different visual experience and thus be visually discriminable.

That would almost follow from a requirement of match over a wide range of alternative scenes. But not quite. Most of our visual experience is rich in content; but some is poor in content and would match a wide range of alternative scenes equally well. Any pitch-dark scene would produce matching visual experience — what content there is would be entirely correct — but it would be the same in every case. Seeing is a capacity to discriminate, so this sort of match over a wide range of alternatives will not suffice.

I conclude that the required pattern of counterfactual dependence may be specified as follows. There is a large class of alternative possible scenes before the subject's eyes, and there are many mutually exclusive and jointly exhaustive subclasses thereof, such that (1) any scene in the large class would cause visual experience closely matching that scene, and (2) any two scenes in different subclasses would cause different visual experience.

The requirement admits of degree in three ways. How large a class? How many subclasses? How close a match? The difference between veridical hallucination and genuine seeing is not sharp, on my analysis. It is fuzzy; when the requirement of suitable counterfactual dependence is met to some degree, but to a degree that falls far short of the standard set by normal seeing, we may expect borderline cases. And indeed it is easy to imagine cases of partial blindness, or of rudimentary prosthetic vision, in which the counterfactual dependence is unsatisfactory and it is therefore doubtful whether the subject may be said to see.

VIII

A further condition might also be imposed: that in the actual case the subject's visual experience must be rich in content, that it must not be the sort of visual experience that would match a wide range of scenes equally well. For instance, it must not be the sort of visual experience that we have when it is pitch dark. This condition of rich content is needed to explain why we do not see in the dark, even though the scene before the eyes causes matching visual experience as part of a suitable pattern of counterfactual dependence.

But we are of two minds on the matter. We think we do not see in the dark; but also we think we find things out by sight only when we see; and in the pitch dark, we find out by sight that it is dark. How else — by smell? By the very fact that we do not see? — No, for we also do not see in dazzling light or thick fog, and it is by sight that we distinguish various situations in which we do not see.

In a sense, we do see in the dark when we see that it is dark. In a more common sense, we never see in the dark. There is an ambiguity in our concept of seeing, and the condition of rich content is often but not always required. When it is, it admits of degree and thus permits still another sort of borderline case of seeing.

IX

Given a suitable pattern of counterfactual dependence of visual experience on the scene before the eyes (including both the actual case and its counterfactual alternatives) it is redundant to say as I did that the scene causes, or would cause, the visual experience. To make the explicit mention of causation redundant, according to my counterfactual analysis of causation, we need not only a suitable battery of scene-to-visual-experience counterfactuals but also some further counterfactuals. Along with each counterfactual saying that if the scene were *S* the visual experience would be *E*, we need another saying that if the scene *S* were entirely absent, the visual experience would not be *E*. Counterfactuals of the latter sort may follow from the battery of scene-to-visual-experience counterfactuals in some cases, but they do not do so generally. According to the counterfactual analysis of causation that I have defended elsewhere,¹³ any such counterfactual dependence among distinct occurrences is causal dependence, and implies causation of the dependent occurrences by those on which they depend. It would suffice if our counterfactuals said just that if the scene before the eyes were so-and-so, then the visual experience would be such-and-such.

If we leave the causation implicit, however, then we must take care that the counterfactuals from scene to visual experience are of the proper sort to comprise a causal dependence. We must avoid backtrackers: those counterfactuals that we would support by arguing that different effects would have to have been produced by different causes.¹⁴ Backtracking counterfactual dependence does not imply causal dependence and does not suffice for seeing. *Example 12: The Screen.* I am hallucinating at random. My hallucinations at any moment are determined by my precursor brain states a few seconds before. My brain states are monitored, and my hallucinations are predicted by a fast computer. It controls a battery of lights focused on a screen before my eyes in such a way that the scene before my eyes is made to match my predicated visual experience at the time. It is true in a sense — in the backtracking sense — that whatever might be on the screen, my visual experience would match it. But my visual experience does not depend causally on the scene before my eyes. Rather, they are independent effects of a common cause, namely my precursor brain states. Therefore I do not see.

The same example shows that it would not suffice just to require that the laws of nature and the prevailing conditions imply a suitable correspondence between visual experience and the scene before the eyes. That could be so without the proper sort of counterfactual, and hence causal, dependence; in which case one would not see.

¹³ 'Causation', *Journal of Philosophy*, LXX (1973), pp. 556-567.

¹⁴ This is circular in the context of a counterfactual analysis of causation; but in 'Counterfactual Dependence and Time's Arrow', *Noûs*, XIII (1979), pp. 455-476, I have proposed a way to distinguish backtrackers without the circular reference to causation, at least under determinism.

X

The following case (Example 11 carried to extremes) is a hard one. It closely resembles cases of genuine seeing, and we might well be tempted to classify it as such. According to my analysis, however, it is a case of veridical hallucination. The scene before the eyes causes matching visual experience without any pattern of counterfactual dependence whatever, suitable or otherwise.

Example 13: The Censor. My natural or prosthetic eye is in perfect condition and functioning normally, and by means of it the scene before my eyes causes matching visual experience. But if the scene were any different my visual experience would be just the same. For there is a censor standing by, ready to see to it that I have precisely that visual experience and no other, whatever the scene may be. (Perhaps the censor is external, perhaps it is something in my own brain.) So long as the scene is such as to cause the right experience, the censor does nothing. But if the scene were any different, the censor would intervene and cause the same experience by other means. If so, my eye would not function normally and the scene before my eyes would not cause matching visual experience.

The case is one of causal preemption.¹⁵ The scene before my eyes is the actual cause of my visual experience; the censor is an alternative potential cause of the same effect. The actual cause preempts the potential cause, stopping the alternative causal chain that would otherwise have gone to completion.

The argument for classifying the case as seeing is that it is just like a clear case of seeing except for the presence of the censor; and, after all, the censor doesn't actually do anything; and if the scene before the eyes were different and the censor nevertheless stood idly by — as in actuality — then the different scene would indeed cause suitably different visual experience.

My reply is that the case is really not so very much like the clear case of seeing to which it is compared. The censor's idleness is an essential factor in the causal process by which matching visual experience is produced, just as the censor's intervention would be in the alternative process. No such factor is present in the comparison case. If the scene were different this factor would not be there, so it is wrong to hold it fixed in asking what would happen if the scene were different. We cannot uniformly ignore or hold fixed those causal factors which are absences of interventions. The standard process might be riddled with them. (Think of a circuit built up from exclusive-or-gates: every output signal from such a gate is caused partly by the absence of a second input signal.) Who knows what would happen in an ordinary case of natural (or prosthetic) vision if the scene were different and all absences of interventions were held fixed? Who cares? We do not in general hold fixed the absences of intervention, and I see no good reason to give the censor's idleness special treatment.

The decisive consideration, despite the misleading resemblance of this case to genuine cases of seeing, is that the censor's potential victim has no capacity at all

¹⁵ See my discussion of preemption in 'Causation'.

to discriminate by sight. Just as in any other case of veridical hallucination, the match that occurs is a lucky accident.¹⁶

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