

# PERCEPTION AND HALLUCINATION

The Case for Continuity

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I am most grateful for Professor Howard Robinson for reading a draft of this paper and making many helpful suggestions, concerning both detail and general principles, which I feel greatly improved it.



I think the present paper is a very lucid and useful article. [...] This is the best case I know of, of an attempt to make an empirical – as opposed to a ‘philosophical’ – argument against direct realism.

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**PERCEPTION AND HALLUCINATION:  
THE CASE FOR CONTINUITY**

**Abstract**

This paper discusses what the author considers to be empirical evidence supporting the representative theory of perception as against the theory of direct realism. The majority of the material is taken from research into hallucinatory experiences in apparently normal subjects. It is argued that many of these involve the complete replacement of the perceptual field with a hallucinatory one, even in cases where only a constituent element is definitely unrealistic, and that these 'metachoric' experiences, as they are called, are often phenomenologically indistinguishable from normal perception. A model is proposed in which hallucinatory images and normal perceptual images lie on a continuum rather than forming two qualitatively distinct classes. In particular, it is argued that both sorts of perceptual or quasi-perceptual image can be more or less closely determined by sensory input. Other sorts of empirical evidence are also adduced for this view, notably the experiments on perceptual 'filling-in' by Ramachandran & Gregory.



## **1. Introduction: the two-process model of perception and hallucination**

This paper is about the relationship between perception and hallucination. Its argument will be that this relationship is much closer than is usually recognised. In particular I will be arguing for the following thesis:

There is no qualitative difference between the content of consciousness in the two processes, hallucination and perception.

I maintain that this statement is true on two distinct levels. On the empirical level, I believe there is no phenomenological difference between hallucination and perception in many cases of hallucinatory experience occurring to normal people. This assertion can be supported empirically by many of the cases reported to Celia Green and McCreery (Green & McCreery 1975, 1994; Green 1968b).

On the philosophical level, I shall be arguing for a representative theory of perception, & in particular for the view that the immediate content of consciousness in both perception and hallucination is something distinct from anything in the outer world, and made of the same ‘substance’ in both cases. I.e. in my view what is present to consciousness during both hallucination and perception is what might have been called by the empiricists, Locke, Berkeley and Hume, ‘ideas’, or by more recent philosophers ‘sense data’. I shall be arguing for the view that there is no qualitative distinction to be made between the ‘ideas’ present to consciousness in the two cases, perception and hallucination, on the philosophical level, even if on the empirical level (for example, degree of veridicality) there are quantitative distinctions to be made, as we will discuss later.

It may help to clarify what I have said so far if I begin by discussing what I might call the conventional point of view, according to which perception and hallucination are two quite different processes, having qualitatively different end-products in consciousness. I will call this the dual process model. For example, C.D. Broad (1962), who undertook a detailed discussion of various hallucinatory phenomena, writing of dreams, says: ‘The whole context is hallucinatory, though certain features in it may ultimately originate in specific sensory stimuli from

within or without the dreamer's body' (p.191). However, writing of someone who has 'an hallucinatory *quasi*-perception' while wide awake, he says: 'the principal figure, and possibly some of its immediate appurtenances, are hallucinatory; but the background is usually that of normal waking sense-perception.'

While Broad himself may not have been a direct realist, I feel that this way of describing the situation in waking hallucinatory experiences encourages us implicitly to assume some sort of ontological distinction between the content of consciousness in hallucination and perception. It reinforces our instinctive feeling that perceptions are real in some way that hallucinations are not. And by that we do not simply mean that the objects of perception are real but the objects represented by hallucinations are not – for example, that when we look at a chair the chair is really there in the external world but that when we hallucinate a chair there is nothing there. In some way we implicitly believe that the perceptual image or idea itself is real in a way that the hallucinatory image or idea is not.

It is possible that some such implicit belief lies behind the words of the authors of the *Census of Hallucinations* (Sidgwick et al., 1894), who wrote:

[T]he percipient, while experiencing the hallucination, is at the same time normally perceiving real objects within his range of vision, and the hallucinatory percept is brought into relation with these, so as to occupy apparently as definite a place in the field of vision. The phantasm appears to stand side by side with real objects.

We shall be discussing shortly an empirical difficulty raised by the view that two ontologically distinct sorts of image, one real and the other hallucinatory, are co-existing in the same field of vision in this situation. For the moment I would suggest that a distinction is being implied here between the end-products of the two processes, hallucination and perception, which cannot be justified and does not in fact exist. As with the Broad quotation, it could be defended by maintaining that all the authors are doing is describing the situation as we know it to be, namely that in the one case (perception) there is something 'out there' to justify the image in consciousness while in the other (hallucination) there is not. However, this does not seem to be all that the authors are saying. It seems to be implied that there are two quite distinct end-products to the two

processes, perception and hallucination, not just that there is one end-product with two different types of cause. I shall be arguing for the latter view. I will be arguing that there is no qualitative or ontological difference between the end-product in the two cases; only quantitative distinctions between, for example, the degree of veridicality in the two cases, or the degree to which each is determined by sensory input. I suggest that it would be philosophically justifiable, if somewhat surprising, if we rephrased the crucial content of the above passage as follows:

The percipient of an apparition is hallucinating a non-existent figure while also hallucinating his/her real environment. The veridical and non-veridical elements are fully integrated into a single perceptual field.

If this formulation sounds odd, I believe that this is only because it violates linguistic convention, not because it is any less accurate than the usual one. The conventional formulation can only be defended by appeal to the model of perception known as ‘naïve realism’, which we shall be criticising below.

An interesting recent example which may also illustrate the point we are making comes from Ramachandran (1992) in his discussion of his experiments on the ‘filling-in’ of blind spots on the retina. (The natural blind spot, from which no input can be derived, arises from the fact that the optic nerve leaves the retina at that point.) He writes: ‘We were also able to show that filling in is not ‘cognitive’, that is it is not based on expectations of what things ought to look like. For example, we generated an image that consisted of a vertical column of large spots, one of which was positioned inside the blind spot [...]. All subjects saw the spot vanish; they did not ‘hallucinate’ the missing spot in order to preserve the pattern.’ (p.46)

As with the other examples we have just discussed, Ramachandran’s views on the philosophical status of a perceptual *versus* a hallucinatory image or ‘idea’ not explicit in this passage. The scare quotes round the word ‘hallucinate’ suggest that he himself may regard the distinction, at least in the context he is discussing, as rather arbitrary. Nevertheless, his use of the word might be taken to imply that there is a difference in ontological status between the image which arises where the blind spot should be and the rest of the visual field. The

distinction would presumably be related to the fact that the latter is ostensibly determined by sensory input, whereas the former apparently is not. However, as we shall be seeing later in this paper, it is actually not possible to sustain a qualitative distinction between perception and hallucination based on this criterion of relevant input.

Having given some examples of what I think are misleading ways of talking about hallucinatory images, let me attempt to formulate my own view of them in rather more detail than I have done so far.

For the sake of the present discussion we will set aside scepticism about the existence of the external world and accept as our premiss that there is an ontological distinction to be made between, say, a real red apple and a hallucinated red apple. In other words we will take it as meaningful to say that the one apple is real and the other is not, and that by saying one is real we are saying that it has an existence independent of any consciousness perceiving it, whereas the hallucinated one has no existence except as an image present to a specific consciousness. However, what we will be arguing in this paper is that the image of the hallucinated apple has the same ontological status as the image of the real apple. That is to say, the image of the real apple is a representation in consciousness of something existing in the external world, whereas the image of the hallucinated apple is not, but the image of the hallucinated apple is no less real *in itself* than the image of the real one.

## **2. The apparent integration of perception and hallucination**

Let us now consider the empirical difficulty referred to above. This arises from the fact that a significant proportion of hallucinatory images seen by sane people, in fact probably a majority, are solid-looking rather than transparent (Green & McCreery 1975). That is to say, the real environment is not visible through them. If a hallucinatory image was something qualitatively different from a perceptual one, that is made of some essentially different 'stuff', then this would indeed be a puzzling fact. For how could something unreal conceal something real? Clearly both images, the perceptual and the hallucinatory, must *in themselves* be equally real (or unreal).

Green & McCreery (1975) suggested that the only way round this empirical difficulty posed by the two-process model was to invoke the concept of negative hallucination, that is, the phenomenon of failing to perceive something that one's sensory input would normally lead one to perceive. If one negatively hallucinates that part of the environment which lies immediately behind the ostensible apparitional figure, then the figure would indeed look non-transparent.

One difficulty with such a model is that many hallucinatory images appear to move in relation to their veridically perceived surroundings. In such a situation we would have to suppose that the negative hallucination undergoes a continual transformation so as to constantly retain a coincidence between the its outer boundary and the area of real environment which the (positive) hallucinatory image needs to obscure. If this coincidence is not perfect at all times, some part of the apparitional figure will suddenly appear transparent while the rest continues to appear opaque. And this is a situation which we did not notice being reported in a single one of our 1500 cases.

The second objection to the negative hallucination model is philosophical rather than empirical, and might be called the Occam's razor objection. That is to say, the model seems unnecessarily complicated, and calls for the positing of two distinct processes, positive *and* negative hallucination, or even three if one includes the normal perception which is supposed to be continuing in parallel with both sorts of hallucination. By contrast the model which Green & McCreery (1975) put forward requires the positing of only one process, namely positive hallucination. Thus it dispenses with the need for *both* the other two processes, negative hallucination and normal perception, in accounting for what is going on during an apparently partial hallucinatory experience.

### **3. Metachoric experiences**

#### **3.1. The 'metachoric' model of hallucinations**

Green & McCreery (1975) proposed the term 'metachoric' for those experiences in which the normal perceptual field was completely replaced by a hallucinatory one. Uncontroversial examples of such experiences would be so-called 'out-of-

the-body' experiences, in which the subject seems to see his/her body from outside, and certain lucid dreams, in which the dreamer is aware that he or she is dreaming and which in certain instances apparently meet all the criteria of vividness, detail, etc., which we expect of normal perception.

More controversially, perhaps, an examination of the phenomenology of apparitional experiences occurring to ostensibly normal people led them to the conclusion that possibly all of these were metachoric as well, even if most of the environment appeared to be veridical, and only one element, namely the figure of the apparition, definitely was not.

The metachoric interpretation of apparitional experiences is clearly forced upon us in certain sub-classes of such cases, for example those in which the ostensible lighting of the whole scene is modified during the experience. About a quarter of all the cases reported to us occurred just after the subject had woken up during the night, and in these circumstances it can happen that the subject reports seeing an apparently veridical image of his or her bedroom as if 'lit up' by the apparition, or indeed by some other unidentified source of apparent illumination. In such cases it is clear that the entire visual field is hallucinatory, not just the figure of the apparition.

Green & McCreery (1994) argued that Occam's Razor may be applied in favour of the thesis that *all* apparitional experiences are in fact metachoric. We know for certain that some of these experiences, like those lighting cases described above, must be; we know of no reason why all the rest may not be. Therefore it is simpler to posit a single process, namely the occurrence of a totally hallucinatory field of perception, to explain the entire class of cases, rather than two processes, viz. the metachoric for those instances in which it is forced upon us, and the two-process model in those cases in which it is not. This argument seems especially forceful if one remembers the difficulties involved in the two-process model which we have discussed above.

### **3.2. The metachoric model of normal perception**

Let us now consider the proposition that all normal perception might be considered as metachoric, and not just those hallucinatory experiences where the

interpretation is either desirable or positively forced upon us. What would it mean to suggest that normal perception involved the generation of a hallucinatory image of the world around us?

First of all let us deal with the objection that such a suggestion is meaningless because to conflate perception and hallucination would undermine a useful and necessary form of linguistic usage.

I suggest that this objection is question-begging, since the very question we are considering is whether this linguistic distinction is justified at a philosophical level. Clearly it has its utility, which it is not the purpose of the present paper to deny. To label a percept as 'hallucinatory' is in most everyday contexts simply to signal that we believe that it is non-veridical. This is an empirical assertion, and the term 'hallucination' is a useful short-hand for it. However, we shall argue shortly that veridicality is not a sufficient criterion for marking off hallucinations from perception in a qualitative as opposed to a quantitative way.

The metachoric model of normal perception would assert a continuum between perception and hallucination in the following sense. All forms of perceptual and quasi-perceptual experience would be regarded as determined by an interplay of peripheral and central factors, the main peripheral factor being input from the sense-organs and the central factors being such influences as expectation and memory. Normal perception would occupy a place at one end of the continuum, inasmuch as its content may be presumed to be largely determined by sensory input, but may also be influenced by inference and unconscious memory. Perceptually realistic lucid dreams would occupy the other extreme of the continuum, inasmuch as their content seems to be largely determined by such factors as unconscious (or even conscious) memories of past experience, and more or less conscious wishes on the part of the subject (e.g. for a certain type of holiday). Even in these cases, however, sensory input may sometimes play a minor role, as in the case in which a lucid dreamer apparently incorporated the sound of a clock local to where he was sleeping into a dream of another location (see McCreery 1973, pp.93-5, for a discussion of this case).

So-called 'out-of-the-body experiences' occupy an interesting

intermediate position on the proposed continuum. The content of some, which involve an obvious fantasy element, such as ostensible travel to distant countries or even planets, may be largely determined by central factors, as perceptually realistic lucid dreams appear to be. However, others may well be largely determined by sensory input, even though the end-result is a perceptual field whose point of observation is unrealistic. For example, the content of experiences occurring during surgical operations may well be determined to a considerable extent by auditory information, albeit processed at a subliminal level, such as the sounds of surgical equipment being used, or the casual remarks of doctors. Cheek (1959, 1960) reports a number of cases in which patients who had been anaesthetised and were behaviourally unconscious were able to report after recovering consciousness things that had been said by surgical staff during the period of their anaesthesia.

It is also possible that in ecsomatic cases in which the subject is conscious and going about his or her business in the world with eyes open, visual information continues to be processed at an unconscious level, and is used to construct the conscious visual image of the world as if seen from a point other than that occupied by the subject's eyes. Such a hypothesis would help to explain how it is that in such cases the subject may apparently continue to function quite successfully at perceptual-motor tasks that are highly practised, such as driving a car or performing on a musical instrument (see Green 1968b, pp.63-66, for a discussion of some cases that illustrate this phenomenon).

### **3.3. The argument from parsimony**

One advantage of the metachoric model of perception is again that of parsimony. We only have to posit one basic process to model both perception and hallucination. We may see how this parsimony may work to our advantage in a particular context if we consider those cases of hallucinatory experience in which the subject sees, for example, a hallucinatory figure, then looks away from it so that he/she is perceiving nothing that is not there, then looks back to see the hallucinatory figure again. For example, in our book *Apparitions* we quote a case in which a man reading at home looked up to see a hallucinatory figure sitting in

a chair opposite him; he looked away to continue reading his book, and then looked back to see the figure still apparently sitting opposite him. On the dual-process model we would have to suppose in a case such as this that the subject is hallucinating while looking up at the chair opposite, perceiving while reading his book, then hallucinating again when looking up for the second time. This is a relatively complicated scenario, certainly as compared with the metachoric model of perception, according to which only one process is in train throughout the episode, namely the generation of images or 'ideas', but with varying degrees of correspondence to reality. The correspondence is maximal when the subject is reading, but less than maximal when he is perceiving the hallucinatory figure – though probably still considerable since the subject does not mention noticing anything unrealistic about the rest of his environment, such as the colour or shape of the familiar chair in which the apparitional figure was ostensibly sitting.

This case also illustrates an advantage of the metachoric model in relation to hallucinations which we mentioned above, namely that it explains without difficulty the fact that the majority of apparitional figures appear opaque and not transparent. In this instance we would have a problem, on the two-process view, in explaining how the hallucinatory image of the figure came to obscure the normally perceived part of the environment behind it, that is, a figure-shaped portion of the chair. On the metachoric view there is not such difficulty; the entire field of vision may be regarded as hallucinatory so there is no *a priori* reason why the one unveridical element of it, namely the apparitional figure, being of the same 'substance' as the veridical elements, should not as well look opaque as transparent.

### **3.4. The argument from arbitrariness**

In general, the metachoric model of perception obviates the difficulty of having to decide in any given case when perception ends and hallucination begins. If we accept the metachoric model of hallucinatory experience, but retain a different model of perception proper, then we have to answer the question of when the one process stops, say at the start of an apparitional experience, and when the

hallucinatory process begins. Thus to return to the example of the man reading, do we suppose that perception ceased as he looked up and hallucination suddenly began? And if so, at precisely what point? It seems to me that a deliberate consideration of this question makes one aware of the arbitrariness of it. This is reinforced by the fact that most subjects do not notice any discontinuity at the start of a metachoric experience; indeed they may not realise for some moments that anything anomalous has begun to happen. This is true both of apparitional experiences and a considerable proportion of out-of-the-body experiences.

An example of an out-of-the-body experience which illustrates the latter point is one reported in Green (1968b, p.31), in which a girl who was late for a music lesson rushed out of the house and fell on some wet leaves on the pavement. She at first believed the view she had of herself lying prostrate on the ground was just a vivid image of what *might* happen if she fell on the wet leaves, and continued to believe for an appreciable time that she was continuing to run down the road; whereas in fact she really had fallen on the wet leaves and was lying prostrate on the ground. In this and similar cases the apparent lack of any phenomenological discontinuity between the subject's perceptual experience immediately prior to the OBE and his or her quasi-perceptual experience during it is at the least compatible with the view that 'perceptual' and 'quasi-perceptual' here are actually referring to the same process in consciousness, the only difference being a quantitative rather than a qualitative one, namely that of degree of correspondence with reality.

In the case of apparitions, the question of insight is also revealing. We found that more than half of all our subjects, when asked, said that they did not realise immediately that part of what they were perceiving was not really there, and 31% said they did not achieve this insight until after the experience had ended. This finding seems to me to imply two things: (1) that, at least in a considerable proportion of cases, these hallucinatory experiences of the sane are so realistic as to be phenomenologically indistinguishable from normal perception; and (2) that there is no phenomenological discontinuity associated with many of them, particularly not at the beginning, when the non-veridical element first intrudes into the veridical surroundings.

The importance of the phenomenological indistinguishability of some metachoric hallucinations from normal perception is highlighted most acutely perhaps by those cases in which a subject hallucinates a real environment, say his or her bedroom, in an apparently veridical way. For example, let us consider a type of case which is sometimes reported, in which the subject wakes up in a bedroom which is in reality dark but appears lit up in an unexplained way; there is no apparitional figure to be seen, so the scene apparently corresponds to reality, yet must be hallucinatory because would not normally be visible. Such a case would appear to be both hallucinatory and veridical.

It might be argued that some difference of brain activity may in principle be found between the subject who is normally perceiving his or her bedroom and one who is merely hallucinating it, even if no phenomenological difference can be identified between the two experiences. Certainly we would expect differences at the more peripheral stages of perceptual processing; at the least there must be differences at the extreme periphery, since no sensory input is arriving at the eye in the darkened room and we would therefore not expect to find normal activity in the retina. However, it seems much more questionable whether we should expect to find differences at the most central level. It is assumed by many models of the mind-brain relationship that there is at least a one-to-one correspondence between particular states of consciousness (including perceptual states) and particular brain states, whatever may or may not be the causal relationship between them. We may call this assumption of one-to-one mapping the assumption of psycho-physical parallelism. It would appear to violate this assumption to suggest that one may experience in the dark a state which is phenomenologically indistinguishable from that of normally perceiving one's bedroom, but without this being accompanied by the usual brain state which would occur if the room was lit up in the way it appears to be.

However, let us suppose for the sake of argument that we were to find an empirical difference between the brain state associated with perceiving the room normally while the room was properly illuminated, and the brain state associated with hallucinating an identical scene so realistically that the two experiences were phenomenologically indistinguishable. It seems to me we would still have

no more than an empirical difference, not a basis on which to make a philosophical distinction between the content of consciousness in hallucination and perception.

There is a sense in which, if the two experiences seem the same to the subject, then they are the same. The difference between them lies, not in the experiences themselves, but in their causal antecedents. That is to say, they are not qualitatively different types of experience, justifying us in thinking in terms of two qualitatively distinct processes in consciousness, perception and hallucination, but just two instances of intrinsically the same process, but with a different mix of causal precursors.

This is not to propose a case of multiple determination. I am not suggesting that the same perceptual state can be associated with two different causes. On the contrary, if one wishes to regard the simultaneously existing brain state as the cause of a given perceptual state, then I have already suggested just the opposite above: namely that we should *expect* to find the same central brain state associated with a given perceptual state, whether it be veridical or hallucinatory. I am merely suggesting that this final brain state may itself have various different causal antecedents. This seems to me no more controversial than suggesting in any other context that different causal chains may end up in identical final results.

## **4. Veridicality**

### **4.1. The veridicality criterion**

We may also approach the philosophical distinction between perception and hallucination from another angle, by considering the criteria which are normally used to mark off hallucinations from normal perception and whether they stand scrutiny as justifying a qualitative distinction between the contents of consciousness in the two cases.

Perhaps the most commonly mooted criterion concerns the supposed veridicality of normal perception, and, by contrast, the alleged non-veridicality of hallucinations. For example, Dreyer (1952) defines a hallucination as: ‘an

experience having the character of sense perception, but without relevant or adequate sensory stimulation [...]

This criterion of veridicality may be questioned on two counts. First, we may question in what sense normal perception may be counted as veridical; and secondly, we may consider whether there are not certain forms of hallucinatory experience which are as equally entitled to the term 'veridical' as most forms of normal perception.

To consider the supposed veridicality of normal perception first: I suggest that its assumption depends on an implicit appeal to the 'direct realism' model of normal perception. We *have the feeling* of being in direct contact with reality when we are perceiving. However, the same may be said of many hallucinatory experiences. As we have already pointed out, they may be phenomenologically indistinguishable from normal perception.

Moreover, there are numerous philosophical objections to the direct realism model, which it is not necessary to rehearse here. I would merely draw attention to the argument from illusion, and cite the case of someone who is suffering from jaundice and perceives the whole world as tinged with yellow. The veridicality criterion seems to require us to make some distinction between such a person and someone not so suffering, if only a quantitative one. Certainly the jaundice-sufferer's perceptions are not as veridical as those of a non-sufferer. If total veridicality were the criterion of perception and any degree of non-veridicality were a sign of hallucination, then we would have to say that someone who was suffering from jaundice, and saw the whole world as tinged with yellow, was hallucinating rather than perceiving the world.

I presume most people would find this an unacceptable conclusion. If pressed to give a reason, they might argue something like this: 'True, the jaundice sufferer is not perceiving the world as it really is, but then none of us do; we know that our sense-data are only a *representation* of what is "out there". The jaundice sufferer's representations are a less good guide in some respects than a well person's, but they are still conveying useful information to him or her on most matters. Therefore the distinction between his or her perceptions and those of a well person's is only one of degree not of kind.'

It seems clear from this that in order to defend the perceptual status of the jaundice-sufferers sense-data we have to abandon the model of direct realism. However, if we adopt a representational theory of the kind we are arguing for, then certain classes of hallucination seem almost as entitled to be labelled 'veridical' as normal perception. We shall consider one of these classes now. If these hallucinatory experiences are accepted as largely veridical, then this would seem to reduce the distinction between veridical hallucinations and normal perception to one of degree rather than one of kind, similar to the distinction between more and less veridical normal perception, as illustrated by the jaundice case.

#### **4.2. Veridical hallucinations**

Perhaps the most notable instances of the phenomenon of veridical hallucination occur in the form of certain so-called 'out-of-the-body experiences', in which the subject seems to perceive his or her environment from some position which is not that of his or her physical body. Clearly this unrealism as to point of view makes the experience by definition hallucinatory; nevertheless there are many instances in which no other discrepancy between what is hallucinated and what would be genuinely perceived from the point of view in question ever comes to light.

We do not need for our present purpose to analyse in detail how this degree of veridicality comes about. Suffice it to say that we do not need to invoke any special, as yet not understood, process such as a putative faculty of 'extrasensory perception' to explain such cases. When a patient who has been ostensibly under general anaesthesia subsequently reports having perceived the surgical operation he or she has undergone in apparently accurate detail from some position near the ceiling of the operating theatre, we need for the sake of the present argument only assume the operation of such factors as the transposition of information from one modality to another; for example, the incorporation of auditory information in the form of casual remarks by the operating team, noises of machinery, and so forth, into a visual representation of the scene. We have already cited the studies of Cheek (1959; 1960), which

suggest that people can process more auditory information under behavioural anaesthesia than might at first sight appear likely. Whatever the mechanism or mechanisms at work, the result seems often to be a largely veridical representation of the scene in hallucinatory form.

If we mentally abandon our customary and unconscious naïve realism, that is, the illusion that we are in direct contact with the world when we perceive it, then it becomes easier to see how a hallucination could be veridical in just the same way as our perceptions are supposed to be. The hallucinatory percept need only contain or embody certain information, however acquired, in order to convey this information to consciousness in a useful manner, just as our normal perceptions embody or represent information about the world in a compact and useful way. It is said that a picture tells a thousand words; and a visual image may contain within it an amount of information about the world that would require so many words they would take minutes to recite. Nevertheless the image is still just a representation of information about the world rather than a part of the world itself.

Indeed I am suggesting that our normal visual percepts may be regarded as belonging on a continuum with veridical hallucinations of the type we have just described. I am arguing that in perception, as in veridical hallucination, what we directly experience is a subjective representation of the world rather than the world itself. In perception this representation is presumed (not always correctly) to be more complete and accurate than in veridical hallucination, but I maintain that this distinction is quantitative rather than qualitative, and that the *vehicle* for information about the world is the same in both cases, namely what the empiricists would have called an ‘idea’ or image, which is made of the same ‘substance’ in both cases.

## **5. Hallucinations determined by sensory input**

Another criterion of hallucination which is sometimes mooted is that hallucinatory percepts are not ‘justified’ by sensory input. However, as we have pointed out above, it is not clear that some forms of hallucinatory experience are *not* largely determined by sensory input. Indeed in the case of some out-of-the-

body experiences it may be that everything about the content except the percipient's ostensible point of view is in fact strictly determined by sensory input just as our normal perceptions are assumed to be. These are the cases in which the subject continues to go about his or her normal business, with eyes open, and sometimes performing complicated perceptual-motor tasks such as riding a motorcycle or playing a musical instrument.

In other cases of out-of-the-body experience the relationship between relevant sensory input and the resulting quasi-perceptual experience may be more indirect, as in those cases in which, we suggested above, auditory information is 'mapped across' into ostensibly visual experience. However, this indirectness does not invalidate the suggestion that sensory input is playing a role in the determination of the quasi-perceptual content of these 'cross-modal' cases, just as it may do in those cases that occur with the subject's eyes open.

## **6. The ostensible viewpoint**

Another criterion which might be mooted for distinguishing perception and metachoric hallucination is the viewpoint of the subject. During perception this is by definition coincident with the spatial position of his or her eyes. During an out-of-the-body experience of the visual kind the viewpoint is by definition not so coincident.

However, there are other sorts of metachoric hallucinatory experience in which this distinction does not hold. Consider, for example, the following experience reported by the physicist Ernst Mach:

A peculiar phenomenon that I have experienced frequently for some years is the following. I awaken and lie still with my eyes closed. Before me I see the bedspread with all its little folds, and my hands in all their detail, lying on it motionless and solid-looking. If I open my eyes I find it is quite dark in the room, or perhaps light, but the bedspread and my hands are disposed quite differently from the way in which they appeared to me. (Mach 1900, p.130; this passage translated by Green 1968a)

The type of experience described by Mach is clearly hallucinatory, since his eyes are closed, and may also be described as metachoric, since it would appear from this account that a complete field of view met his 'gaze' before he opened them, not just an isolated image, say that of his hands. Nevertheless his

viewpoint was perfectly normal; that is, it appears to have coincided with that of his normal gaze when he eventually opened his eyes to see the scene properly.

Another type of case which is of relevance in the present context is that in which an apparitional experience is closely followed by an ‘out-of-the-body’ one. For example, Green & McCreery (1975, pp.26-27) quote two independently reported cases in which the subjects, both of whom were lying down at the start of the experience, first saw an apparitional figure from the ‘correct’ position, that is, the one occupied by their physical body at the time; but the subjects then seemed to leave their body and see the same scene, *including the apparitional figure*, from the ‘wrong’ position, i.e. one that did not correspond to the position their physical body occupied at the time, which continued to be on the bed.

Now we have already suggested that the purely apparitional phase at the start of an experience such as this *may* be metachoric, even when most of the environment appears to be perceived normally; moreover, the ecsomatic phase *must* be because of the anomalous viewpoint. It therefore seems simpler, on grounds of economy of hypotheses, to suppose that the entire experience is metachoric, even at the start, rather than to suppose that we have one type of hallucinatory experience to consider in the apparitional phase, namely a dual-process one, and another in the ecsomatic phase, namely a single-process, metachoric one. If this conclusion is accepted, then we have in this type of case a further example of how one can have a metachoric experience in which the viewpoint is perfectly conventional, at least for part of its course, since the experience starts with the subject seeming to see the scene, including the figure of the apparition, from the position of their physical body.

Another type of case which illustrates the same point is that which Green & McCreery (1975, 1994) have called ‘waking dreams’. In these cases the subject’s real field of vision in the waking state and with eyes open is completely replaced for a short period by a hallucinatory one, which to a greater or lesser extent fails to correspond to reality. For example, a street scene may be replaced with one which ostensibly represents things as they were in Victorian times; or a normally-lit scene of the landscape outside a hotel may appear suddenly darkened and with non-existent figures superimposed upon it (Green & McCreery 1994,

p.57). In cases such as these the replacement scene is viewed from the same position as the real scene would be had the subject continued to perceive it normally.

### **7. Type 2 false awakenings**

So far we have discussed two possible criteria for distinguishing in a qualitative way between perception and hallucination, namely veridicality and preservation of viewpoint. We have argued that there are hallucinatory experiences which appear to meet each of these criteria, considered separately. However, as Howard Robinson (2000) points out, perception meets both of these criteria simultaneously, whereas the examples we have discussed so far only meet one of them at a time. Thus some out-of-the-body experiences appear to be veridical and some apparitional experiences preserve viewpoint, but OBEs violate the viewpoint criterion and apparitional experiences violate veridicality. What we need in order to maintain our thesis of continuity between perception and hallucination is an example of a type of hallucinatory experience which meets both criteria simultaneously. I believe we have such an example in the form of the Type 2 false awakening.

This type of hallucinatory experience was first identified and named by Green (1968a) and examples of the type may be found both in that book and in McCreery (1975) and Green & McCreery (1994). It consists in the subject seeming to wake up in his or her bedroom; the psychological ‘atmosphere’ in the room may be abnormal, that is to say, the subject may describe it as stressed, stormy or uncanny; but the surroundings appear to be veridical, in that the room may appear no different than it would if the subject had woken up normally. Viewpoint is preserved, as the subject appears to be looking at the scene from the normal position in the bed.

Both the criteria we have been discussing may subsequently be violated as the experience develops; for example, in some cases the Type 2 false awakening is the precursor of an apparition appearing, and in others it leads to an out-of-the-body experience. But some cases display neither of these features and therefore remain apparently veridical and preservative of viewpoint throughout.

Even in those cases in which apparitional or escomatic experiences ensue, there may be a phase at the beginning of the experience in which both apparent veridicality and normality of viewpoint are maintained simultaneously.

It might be wondered how it can be established that experiences of this type are hallucinatory, given that they may remain apparently veridical throughout, including maintaining a veridical viewpoint. In fact subjects may have considerable difficulty in establishing that a given experience is indeed hallucinatory, particularly if they have little or no prior experience of the state, and if they subsequently fall asleep again without passing into a normal waking state. However, in many cases there is a subsequent waking state and the subject may be alerted to the fact that what they have just experienced is hallucinatory by experiencing a process of waking up properly, including opening their eyes.

Incidentally, this difficulty in some cases of achieving insight into the condition seems to me an argument in favour of the veridicality of the experiences; that is to say, if it is difficult for the subject to find any discrepancy, either at the time or in retrospect, between the room as 'seen' in the Type 2 false awakening and the room as subsequently viewed in the waking state, then almost by definition the experience is to that extent veridical, i.e. correspondent to reality.

Type 2 false awakenings can be distinguished from what Green (1968a) called Type 1 experiences with regard to both veridicality and viewpoint. In a Type 1 false awakening, which appears to be the commoner type, the subject may have the experience of seeming to wake up in the wrong location, i.e. not in the bedroom he or she is occupying at the time; in such a case, therefore, non-veridicality follows necessarily from the failure of viewpoint: the subject 'wakes' to see a scene other than that of his or her actual bedroom.

Mach's experience quoted above appears to be in some respects closer to a Type 1 false awakening than a Type 2. It was similar to a Type 2 experience in that he appeared to wake in his own bedroom; but there is no suggestion that he experienced an uncanny atmosphere on waking, and of course the experience was non-veridical, as on opening his eyes his hands were not where he had previously 'seen' them to be.

It might be objected that the sense of something ‘uncanny’ happening, which is liable to accompany a Type 2 false awakening, is a sufficient criterion to distinguish it from normal perception. However, it appears that there are waking perceptual states which may be accompanied by a very similar feeling. I am referring to the ‘primary delusional experience’, characterised by Jaspers (1923, 1963) for example as follows:

Patients feel uncanny and that there is something suspicious afoot. Everything gets a *new meaning*. The environment is somehow different – not to a gross degree – perception is unaltered in itself but there is some change which envelopes everything with a subtle, pervasive and strangely uncertain light. A living-room which formerly was felt as neutral or friendly now becomes dominated by some indefinable atmosphere. Something seems in the air which the patient cannot account for, a distrustful, uncomfortable, uncanny tension invades him [...]. (p.98)

This description is remarkably similar to the description given by Green (1968a) of the feeling which is liable to accompany the Type 2 false awakening:

The subject appears to wake up in a realistic manner, but to an atmosphere of suspense...his surroundings may appear normal, and he may gradually become aware of something uncanny in the atmosphere. (p.121)<sup>1</sup>

It might be objected that the subject of a primary delusional experience is in an abnormal psychological state at the time and that his or her perceptions while in it are therefore not entitled to qualify as normal perceptions. However, I do not think this argument is can be sustained. There are experiences which are liable to occur to normal people in which there are apparently equally dramatic alterations in consciousness. I am referring, for example, to cases in which normal people experience feelings of derealisation during crises, such as car accidents, or muggings; or so-called ‘mystical’ experiences, in which people may experience feelings of heightened significance about what are perceiving at the time. We may indeed think that such people are temporarily deluded, but we do not think of them as hallucinating. I think the distinction between hallucination

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<sup>1</sup> McCreery (1997) has suggested that this similarity may not be coincidental, but may be evidence for the theory put forward in that other context, namely that psychotic phenomena represent the intrusion into waking consciousness of processes normally associated with Stage 1 sleep. It may be, in other words, that the primary delusional experience is closely related to the Type 2 false awakening experience.

and delusion should be maintained, both in such cases and in the case of the primary delusional experience. Indeed the distinction is implicit in certain theories of psychosis, in which it is supposed that the hallucinatory phenomena of psychosis are a confabulation by the brain to rationalise and make endurable the primary delusional experience, which would otherwise remain inexplicable and tormenting to the subject.

## **8. Experimental data**

### **8.1. Top-down processes in perception**

There is considerable evidence from the empirical study of perception for the importance of what psychologists call ‘top-down’ processes, i.e. purely central influences on the phenomenological outcome of perceiving. Our argument in this section will be that all such processes are evidence for a representative theory of perception, as against the hypothesis of direct realism, and that they support the argument for continuity between hallucination and perception.

Let us consider, for a start, an example given by Professor Daniel Dennett in a lecture given to the Department of Experimental Psychology in Oxford (5 March 1992). He showed a slide of a picture by Bellotto, a pupil of Canaletto, which appeared to show a number of people on a bridge. Dennett remarked that he was shocked to find on close inspection of this picture that the ‘people’ were just blobs of paint, and that there was not a hand, arm, leg or hat to be seen. He concluded from this that it is very unlikely that the brain is ‘doing lots of micro-art’. In other words, the ‘perception’ of a number of people in this picture should be considered as largely illusory, in the sense that we have a general impression of there being a number of people – we might call this the propositional state of the brain at the time – but there is no true sense in which there are a number of individualised representations of particular people in the brain while we look at the picture from a distance.

I would wish to give a different interpretation of this phenomenon. I suggest that there may indeed have been any number of micro-images of particularised people in a given observer’s perception of the picture, prompted by

the sensory input (the blobs of paint) and conditioned by the observer's whole past experience of perceiving in similar contexts (the central factors of memory and expectancy, etc.); because we may regard these micro-images as hallucinatory, and yet made of the same 'stuff' as the visual scene as a whole which contains the picture as one of its elements. If we think of the phenomenological field of perception as a subjective construct in the same sense as an out-of-the-body experience or a waking dream is a subjective construct, there is no particular difficulty in conceiving how we might have a hallucination of people on a bridge when confronted with the particular blobs of paint contained in the Bellotto picture. I would argue that what is unusual about our perceptual experience when confronted by this picture is that part of our phenomenology (that relating to the figures on the bridge) is less determined by input than the rest. In other words, it lies further towards the lucid dream end of the continuum we posited above.

The psychological and physiological study of perception has uncovered many examples of how the brain 'fills in' for gaps in sensory input by the generation of what we would call plausible hallucinatory elements to fit the perceptual surroundings. Perhaps the simplest and best-known example of this type of process is provided by the so-called 'blind spot' on the retina, resulting from the fact that there are no receptors in the place where the optic nerve leaves the eye. This area of functional blindness is often demonstrated in psychological textbooks on perception by getting the reader to close one eye, fixate a target spot, and move the page back and forth until a second spot some distance away on the page is seen to disappear. However, as one such textbook puts it: 'Think about what happened when the spot in the demonstration disappeared. The place where the spot used to be wasn't replaced by a "hole" or by "nothingness"; it was filled in by the white page.' (Goldstein 1996, p.50) It seems to me that the perceived area of white page at the place where the spot would be seen were there no blind spot is fully entitled to be called a hallucination, consisting as it does of a perception for which there is no justifying stimulus and which does not correspond to reality at the place portrayed.

At this point it might wondered if, granted that we would prefer to posit

one process rather than two, that process might not be perception rather than hallucination. However, to do this would be to admit that perception is something that can proceed in the absence of input which ‘justifies’ it; whereas a percept in want of suitable input to justify it is precisely the conventional definition of a hallucination, as we saw above. If something that fits that definition is to be classed as perception, then the distinction between hallucination and perception has been eroded; which is the very point that we are attempting to establish.

## **8.2. Experimental ‘blind spots’**

The filling-in process which may be presumed to underlie our failure to perceive nothing in the place corresponding to our blind spot has been actively investigated by Ramachandran & Gregory (1991). They developed a method for inducing experimental scotomata, by getting the subject to fixate a spot 6° to the right or left of a homogeneous grey square, which was displayed against a contrasting background of ‘dynamic twinkling noise’. They found that ‘after a brief period of steady fixation [the subjects] reported that the square vanished completely and was filled in by the surrounding twinkle.’ The method exploits the fact that an image stabilized in relation to the retina soon disappears. Ramachandran (1992) suggests that ‘the fading of the square is probably caused by overstimulation and fatigue of neurons that signal the presence of the square. Such fading does not normally occur, because the eye usually moves around, preventing overstimulation.’

Ramachandran & Gregory’s experiments seem to support the idea that the content of a filled-in area is determined, at least in part, by extrapolation from the content of the surrounding area. For example, when they projected a single red ring onto the retina so that it just surrounded the natural blind spot created by the optic nerve, ‘the red colour filled in the blind spot so that the stimulus looked like a homogeneous red disk rather than a ring.’ On the other hand when they projected several concentric red rings round the blind spot, then ‘the blind spot appeared filled with rings instead of a homogeneous red [...]’

Ramachandran & Gregory’s experiments may also be used to reinforce an argument put forward above in connection with apparitional experiences. I

suggested that there was certain arbitrariness in suggesting a sharp dividing line between perception and hallucination at a particular place in the visual field when part of it is apparently being perceived normally and part hallucinated. Ramachandran & Gregory observed that ‘the filling-in process often appeared gradual; after the [grey] square’s borders faded, the twinkle filled in from the outside to inside slowly, taking 2 or 3 seconds.’ They suggest that one possibility concerning the neural mechanism underlying the filling-in phenomenon is that ‘filling-in simply reflects the activity of higher extrastriate neurons whose large receptive fields may straddle the boundaries of the grey square. Once the neurons that signal the square’s border become fatigued, the signals from the surround may get misattributed to the region corresponding to the scotoma.’

Two points may be made in this connection. The first is that, regardless of whether this particular explanation should turn out to be correct, if *some* such explanation of the phenomenon is true, and there is continuity between the neural mechanisms underlying perception and those underlying hallucination, then it would seem impossible to draw a qualitative distinction between them in terms of contemporaneous brain events. The second point to be made is that, if there is physiological continuity of the kind proposed by Ramachandran & Gregory, then we might just as well say that the hallucinatory part of the image corresponding to the scotoma is determined by input as say it about the perceptual part. The only difference is one of degree: the input is related more indirectly, and less ‘correctly’, to the ‘perception’ of the blind spot area.

One variant of Ramachandran & Gregory’s experiments is of particular interest in the present context. They presented the grey square in a stationary surround of type-written letters: either English, Latin or ‘nonsense’ text. They report: ‘The filling in of text was especially striking and was reported by all four subjects, although, needless to say, none of them could actually read the text within the filled-in region.’ While this latter finding may seem unsurprising at first sight, it is interesting to consider that there is no *a priori* necessity about it. It might have been found that at least some subjects ‘confabulated’ meaningful text to fill the gap when appropriate. Needless to say this would have not corresponded to reality, since *ex hypothesi* there was not real text in the

corresponding position. However, the only reason for the Ramachandran & Gregory's subjects being unable to 'read' meaningful text at that point would seem to be an empirical one, namely that the brain adopts a strategy of least effort in this situation, generating a fill-in which *looks as if* it is meaningful text but which does not bear close scrutiny.

In this respect the fill-ins in this particular variant of Ramachandran & Gregory's experiments would seem closely to resemble the hallucinatory environment in some lucid dreams. Several habitual lucid dreamers have independently reported attempting to read plausible-looking text in a lucid dream and have found it did not bear close scrutiny. Oliver Fox (1962), for example, reported that print in his lucid dreams 'seems clear enough until one tries to read it.' Similar problems have been reported in connection with 'reading' print in other hallucinatory contexts such as hypnagogic imagery and mescaline hallucinations (cf. Green & McCreery 1994, pp.108-9).

On the other hand the brain is clearly capable of generating meaningful hallucinatory print in principle. Moers-Messmer (1938) reports reading a newspaper in a lucid dream 'without difficulty', though it is interesting to note that he experienced difficulties when he experimented with reading individual words in the same 'text' in reverse order. There would seem to be no reason in principle why the brain should not generate meaningful text in artificially generated scotomata of the Ramachandran & Gregory type, and it would be interesting to know whether there are individual differences in this area; i.e. if the pool of subjects used were to be widened, might particular individuals be found who did report being able to read individual words within the filled-in area.

### **8.3. Other examples of perceptual 'filling-in'**

Another example of 'filling-in' by the visual system is provided by colour perception. There are none of the receptors particularly sensitive to the wavelengths corresponding to blue light at the centre of the fovea, the area of the retina which has the greatest spatial acuity. Nevertheless we do not see a gap of any kind when we look at a cloudless blue sky occupying the entire visual field.

Examples of filling-in processes are also to be found in the field of

audition. A notable example is provided by the phenomenon known as the missing fundamental. Complex sounds, such as those produced by the human voice or a musical instrument, may be analysed into component sine waves, of which the one with the lowest frequency is called the fundamental frequency. Thus the fundamental frequency of the tone A above middle C on a musical instrument is 440 Hertz, the first harmonic or overtone is 880 Hz and so on. The relative amplitude or strength of these overtones or higher harmonics is what determines the timbre of different musical instruments. Now if the harmonics of a sound are present but the fundamental frequency is missing, the ear nevertheless hears the sound as if the fundamental was present. This perceptual phenomenon is exploited by such common devices as the telephone. As one textbook puts it: 'The range of frequencies reproduced in a telephone is approximately 300-3000 Hz. However, the fundamental frequency for most men is around 150 Hz. Because you fill in the missing fundamental, you don't hear your male friends speaking in a falsetto [...]' (Matlin & Foley 1997, p.309).

The perceptual phenomenon of filling-in may be likened to the intellectual phenomenon of confabulation. This has been defined as 'filling in gaps in memory caused by brain dysfunction with made-up and often improbable stories which the subject accepts as true' (Davison and Neale 1978, p.636). Confabulation is characteristic of organic brain dysfunctions such as Korsakow's syndrome, which can result from prolonged alcohol abuse. The main difference between the two phenomena, it could be argued, is that in perceptual filling-in the gaps are filled in in the most plausible way possible, whereas in Korsakow's syndrome, as the definition implied, the fictitious insertions are often intrinsically implausible. For example, Davison and Neale write (p.420): 'Shortly after dinner a patient with Korsakoff's psychosis may be asked what he had for the evening meal. Unable to recall the details, [...a] patient in a mental institution may state that he has just finished a meal of Beef Wellington with a delightful sauce containing truffles, apparently not recognizing the extreme improbability of being served such a meal.' On the other hand, there is an interesting parallel to be drawn between the intellectual and perceptual sorts of filling-in on the phenomenological level. The Korsakow patient apparently lacks insight; that is

to say, he or she is unable to distinguish subjectively between the genuine bits of memory and the confabulations in between them. In an analogous way we are all unaware of which parts of our perceptual world are fully justified by input at a given time, and which parts consist to a greater or lesser degree of filling-in.

#### **8.4 Negative hallucinations**

The examples discussed in the previous section might all be said to illustrate the principle that peripheral processes are not a necessary condition of perception. The disjunction between events at the periphery and subjective experience suggests that events at the periphery may not be a sufficient condition of perception either.

Perhaps the most obvious illustration of this latter possibility is the phenomenon of negative hallucination under hypnosis. This consists of the subject apparently failing to perceive, in response to suggestion from the experimenter, something he or she ‘ought’ to perceive, given the nature of the contemporary sensory input.

It has to be admitted that this phenomenon, like that of hypnosis itself, is still controversial, in the sense of being subject to various conflicting interpretations. Orne (1962), for example, describes the subject’s behaviour thus: ‘In this situation the subject is asked *not* to see an object that is in the room, for example, a chair, and he will respond verbally as though the chair were not present. Yet, when asked to walk about the room he does not walk into the chair, but rather avoids physical contact with it.’ In at least some cases, therefore, it appears that there is a disjunction between verbal and motor behaviour. Orne’s interpretation of the situation is to say that ‘at some level they are aware of the chair.’

However, we do not necessarily have to abandon the hypothesis that perception is failing to match up in the normal way with sensory input in this situation. A similar disjunction between verbal and motor behaviour is observable in connection with the phenomenon of blindsight (Weiskrantz 1980). In this situation the subject may assert that he or she can see nothing, but nevertheless act as if a certain amount of sensory information was being

processed in a usable form. For example, the subject may perform better than chance when forced to ‘guess’ whether a stimulus is present or absent in the scotoma (blind area) of his or her visual field, and may express surprise at this result, having initially professed the task to be impossible. The discrepancy between verbal and motor behaviour in this situation has apparently not, by and large, led philosophers to express scepticism about the absence of normal perception in such cases.

It is also worth mentioning that Orne maintains that the behaviour of subjects who are faking in the hypnotic situation is different from that of genuine ones. He says that the former ‘will walk into the chair, and give as their reason the fact that they were not supposed to have seen the chair and that walking around it would be an indication of seeing it.’

In this paper we have considered various types of evidence that the relationship between sensory input and perception is not a simple one, and certainly not simple enough to be compatible within any direct realism theory of perception. We might sum up the implications of the empirical observations discussed in this paper by saying that the data suggest sensory input is neither a necessary nor sufficient condition of perception.

## **9. Practical implications of the model**

There are at least two areas of practical importance in which the present perspective on perception might be of relevance. One is the question of the reliability of testimony in the legal context, and the other concerns the reliability of perception in accident situations.

To take the latter topic first. It is sometimes asserted by a car driver apparently responsible for injury to another person, say a pedestrian, a cyclist, or even another car driver, ‘I just didn’t see him/her coming.’ I think we would be somewhat less inclined to treat such claims with scepticism if the present view of perception were accepted. On this view the end-product in consciousness is the same in both perception and hallucination, namely a percept or ‘idea’ in the eighteenth century empiricist sense. This end-product can have varying degrees of connection with sensory input in both the perceptual and the hallucinatory

cases, as discussed above. We have also noted that the two types of experience, perception and hallucination, can be phenomenologically indistinguishable from each other. We have presented evidence, first, for a loosening or uncoupling of the close connection between input and percept presupposed by naïve realism, and second for a closer phenomenological relationship between perception and hallucination than is usually assumed. In light of these observations, I feel it becomes a more plausible hypothesis that the ‘guilty’ party is reporting a literal truth when they report what is in effect a negative hallucination in certain accident situations.

In the case of legal testimony, there is a considerable literature on the difficulty of finding agreement between the accounts of two or more people who are witnesses to the same event. On the naïve view of perception, according to which there is a necessary connection between the nature of the input and the nature of the percept, such discrepancies are hard to explain, given that the input is by definition very similar for each witness. Resort is had to such hypotheses as faulty memory, or even deliberate deception. If we accept the version of representationalism proposed in this paper, with its suggestion that there are many cases in which there is a radical uncoupling of input and percept, then there is nothing intrinsically implausible in the idea of two or more people having very similar sensory inputs but very different perceptual outputs.

## **10. Conclusion: Relationship of the model to other theories of perception**

It may help to clarify the nature of the present argument to consider its relationship to other theories of perception. Such theories may be said to fall into two main categories, the philosophical and the psychological. When philosophers talk about theories of perception they are referring to such models as naïve realism or the representative theory. Psychologists, on the other hand, term as theories the computational model of David Marr (1982) for example, or the perception-as-hypotheses model of Richard Gregory (1973).

The present argument may be said to be a philosophical one, insofar as it is in direct contradiction to the philosophical theory of direct realism, and at least compatible with the competing philosophical theory of perception as

representation.

On the psychological level, the present thesis is both derived from a consideration of certain psychological phenomena, such as those discussed above, and at the same time seeks to explain them. As to whether it is more compatible with a top-down or a bottom-up approach to the psychology of perception, I would suggest it is essentially neutral in this regard. It is possible to imagine normal perception as being as determined by input as may be desired – i.e. as bottom-up as one wishes – and still hold to the view that the subjective content of such perception is of a piece with hallucination, inasmuch as made of the same ‘substance’, and as such qualitatively distinct from the input and not to be philosophically reduced to it. At the same time, the present theory is quite compatible with a top-down approach; indeed it offers us a potentially fruitful way of thinking of those phenomena which are most suggestive of top-down processes.

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