

**REDEFINING ILLUSION AND HALLUCINATION IN LIGHT  
OF NEW CASES<sup>1</sup>**

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**1. Introduction**

In this paper, we present new cases of illusion and hallucination that have not heretofore been identified. We argue that such cases show that the traditional accounts of illusion and hallucination are incorrect because they do not identify all of the cases of non-veridical experience that they need to and they elide important differences between cases. In light of this, we present new and exhaustive definitions of illusion and hallucination.

First, we explicate the traditional accounts of illusion and hallucination. We then proceed to outline cases of pure property experience—that is, experience as of properties, but not as of objects. We suggest that some might find it to be plausible that olfactory experience is of this kind. We argue that, within instances of such pure property experience, one can identify cases of veridical property perception, illusory property perception and hallucinatory property experience. With these distinctions in hand, we re-examine ordinary cases of experiences as of objects having properties. Drawing on the ideas uncovered by considering pure property experience, we bring to light many new cases of illusion and hallucination within ordinary experience as of objects having properties. These consist in different combinations of veridical perception, illusory perception and hallucination of both objects and properties. In order to accept that these new cases of illusion and hallucination exist in ordinary experience as of objects having properties, nothing turns on accepting the idea that there is pure property experience, or that olfactory

experience is an instance of it. Such a conception of experience is simply a tool—a ladder to gain a good vantage point from which one can appreciate that there are these further cases. But this is a ladder that, as Wittgenstein might say, can be thrown away once it is used.

Identifying new instances of illusion and hallucination provides much needed, important data for testing theories of experience and perception—theories that are frequently motivated, and should be judged, by their ability to account for cases of illusion and hallucination.

## 2. The Traditional Accounts of Illusion and Hallucination

Integral to the notions of illusion and hallucination are the notions of worldly objects and properties. Worldly objects and properties exist in physical space, external to, and independently from, the mind of the subject. Such objects and properties will often be external to a person's body, but they need not be, and may include parts and features of a person's body, such as their hand. In this paper, we will suppose that there is a mind-independent reality that includes medium-sized dry goods and the properties that we typically attribute to them—properties such as shape, size, colour, taste and smell.<sup>2</sup> We realize that there are metaphysical disputes concerning whether some of these properties are indeed mind-independent. However, nothing that we say will turn on making assumptions about which particular objects and properties are mind-independent. So long as there are some, our points could be made with examples featuring those objects and properties.

Veridical perception is contrasted with cases of illusion and hallucination. In veridical perception, one perceives the world, and one perceives it as it is. It is wholly accurate perception. One contrast to this is illusion. The fundamental conception of illusion is that it consists in perception of some form, but it also consists in at least some misperception. That is, it is inaccurate or non-veridical in some respect. Another contrast to veridical perception is hallucination. The fundamental idea of hallucination is that does not amount to perception at all, but it bears some similarity to the mental aspects of perception—either it involves an experience subjectively like, or indistinguishable from, the perceptual experience had in veridical perception, or it involves being in a state that the subject cannot tell apart from such an experience. Any account of illusion and hallucination has to respect these fundamental features of illusion and hallucination.<sup>3</sup> However, we take issue with the traditional accounts of illusion and hallucination—accounts that flesh out these fundamental conceptions in a particular way.

The traditional definition of illusion is as follows:

**Trad Illusion:** you perceive a (worldly) object but you misperceive one or more of its properties.

For example, suppose that, under streetlights, your blue car visually appears to you to be purple. You see the car; the car is indeed there.<sup>4</sup> Moreover, suppose that you accurately perceive some of its properties, such as the car's shape and location. Still, you misperceive the colour of the car. Your experience attributes a property to the car that the car does not in fact have. As a result, we say that your experience as of the colour of the car is inaccurate. What you suffer in this case, then, is an illusion with respect to the car's colour. As Smith characterizes it, an illusion is "any perceptual situation in which a physical object is actually perceived, but in which that object perceptually appears other than it really is" (Smith 2002: 23).

Cases of illusion exist in modalities other than vision. For example, suppose that there is a cup before you that is at room temperature. You reach out and grasp the cup. But suppose further that, before doing so, you have had your hand in a bucket of ice for some period of time. As a result, when you grasp the cup, the cup feels hotter to you than room temperature. In this case, you feel the cup that exists before you, but you misperceive its temperature. That is to say, you perceive the cup, but your experience is inaccurate with respect to its temperature. What you suffer in this case, then, is an illusion with respect to the cup's temperature.

Unlike the traditional account of illusion, the traditional account of hallucination is one according to which you do not perceive some worldly object. However, you certainly seem to perceive an object. The traditional definition characterizes a hallucination as follows:

**Trad Hallucination:** you have an experience as of an object and its properties but there is no (worldly) object, and there are no (worldly) properties, that you perceive in virtue of having that experience.

From here on in, we will drop the qualification 'worldly' and leave it as understood. If, at any point, we refer to anything other than worldly objects and worldly properties, we will be explicit about it.

The following is an example of hallucination as traditionally conceived: suppose that, although you seem to see a purple car before you, there is no such car. To put it in Smith's terms, although you seem to perceive a car and its properties, you do not actually perceive a car and its properties. What you suffer in this case, then, is a hallucination of the car.

As with illusion, cases of hallucination exist in sensory modalities other than vision. For example, you might have an experience as of a feather brushing lightly against your skin. But there might be no feather, or any other object, touching your skin. In that case, according to the traditional definition, you do not actually perceive anything and you suffer a hallucination of a feather.

Having set out the traditional notion of hallucination, there are three things to note about Trad Hallucination.

First, we must stress the importance of the qualification ‘in virtue of having that experience’. This is due to the existence of partial hallucinations. In a partial hallucination, not every object that you experience is hallucinatory. One or more objects are actually perceived, and one or more objects are hallucinated. While philosophers typically consider total hallucinations, partial hallucinations are, as a matter of fact, more prevalent. Consider, for example, after-images. If you stare at a patch of colour and then look at a white wall, for example, you will have an experience as of another patch before you. This patch will appear to be the same shape as the original patch; however, it will appear to have a complementary colour. After-images are commonly taken by philosophers to be cases of hallucination because the patch of colour apparently before you is not there. Despite this, they are not cases of total hallucination. When you experience an after-image, it is not (normally) the case that you do not actually see any objects before you. As you look in front of you, you might see furniture or a rug in the foreground, frames on the wall in your peripheral vision, and so on. Similarly, in the case of clinical hallucinations such as those suffered by Parkinson’s patients, subjects may experience hallucinations of loved ones or animals while, at the same time, veridically perceiving the immediate environment in which those things appear to be situated (at least that part of it not occluded by the hallucinated objects).

Secondly, Trad Hallucination says nothing about whether a person knows that they are hallucinating or not. Even though it may be more common to portray instances of hallucination in which a person does not realise that they are hallucinating, it is perfectly possible for someone to realise that they are hallucinating—for example, because the content of their hallucination is bizarre, or because they know that they’ve taken drugs, or because they believe a piece of reliable testimony.

Thirdly, it is also important to note that hallucination, even traditionally conceived, cannot be defined as an experience in which, for some hallucinated object, there is *no* object present with some or all of the properties that you experience the hallucinated object to have. To be sure, it might seem initially tempting to define hallucination in this way. After all, as we have described our example, in which you hallucinate a purple car before you, there *is no* purple car before you. And many examples in the philosophical literature are described in the same way—that is, as cases in which there is no ‘matching’ object before a perceiver. But, as Lewis (1980) points out, there could be cases of veridical hallucination. These are cases in which you have a hallucination of an object with certain properties and, by chance, there is such an object in front of you. You, however, do not see that matching object. For example, suppose that there is a ‘hallucination machine’ that, whenever you are hooked up to it, causes you to have an experience as of a certain type of dog, for example a black Miniature Schnauzer. Suppose further that, on one occasion when you are hooked up to the machine, a

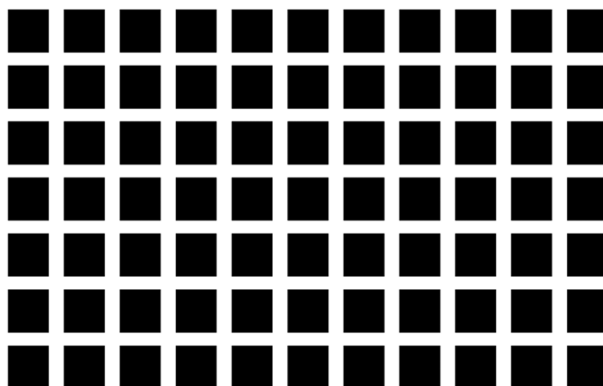


Figure 1. Hermann Grid

black Miniature Schnauzer happens to wander in front of you. You don't see that dog, but you are having a hallucination as of such a dog. Given that there is indeed an object before you that matches the experience caused in you by the machine, such a case of hallucination is veridical. Still, it is a case of hallucination nonetheless—just one in which there *is* in fact an object in the vicinity with the properties that the hallucinated dog appears to have. As a result, hallucination cannot be characterized as an experience in which there is *no* object present with the properties that you experience a hallucinated object to have.

In both Trad Illusion and Trad Hallucination, then, you fall short of accurately perceiving the world. In the illusory case, your experience misattributes one or more properties to a perceived object. In the hallucinatory case, your experience falls short because there is no object and properties that you perceive in virtue of having that experience.

Although the traditional definitions make the distinction between veridical perception, illusion and hallucination fairly straightforward, it must be noted that there are some instances of having a perceptual experience that, in practice, are difficult to classify in these terms. For example, it is often difficult to determine, in a particular case, whether another person is suffering from an illusion and thus having an inaccurate experience, or whether they are having an accurate perceptual experience but, despite that accuracy, forming false beliefs about the world.<sup>5</sup>

Another example of an experience that is difficult to classify occurs when one looks at the Hermann grid (Fig. 1). When one's eyes roam across the grid, one has an experience as of grey patches appearing and disappearing on the white intersections between the black squares. Of course, one realizes quickly that one's experience is not veridical. However, it is not clear what kind of non-veridical experience one is having—illusory or hallucinatory.

Is one inaccurately seeing parts of the white lines as having the property of greyness at their intersections—thus undergoing an illusion? Or is one hallucinating grey patches at those intersections, due to the interaction of the grid with one's visual system? It is difficult to decide what the answers to these two questions are and, thus, what the correct description of this case is.

Part of the difficulty in answering these questions is that it is not clear what to say in general about certain of our experiences of colour. Do we always experience an object—a patch, say—corresponding to each area that we experience as having a different colour? The difficulty in answering this question accounts for the difficulty in classifying one's experience of the Hermann grid as an illusory or hallucinatory one. If we do always experience an object corresponding to each area of distinct colour that we experience, then the Hermann grid is a case of a hallucination. But, again, it is not clear whether that is the right thing to say in response to this question, so the case may be one of illusion. In what follows, we will not try to answer this question, or the associated question about the Hermann grid. Although there are cases, like the Hermann grid, in which what is experienced is difficult to determine, they have no bearing on whether the traditional distinction between illusion and hallucination is itself clear. They simply expose the fact that it might be difficult to determine under which definition every case falls.

### 3. The Framework for the Discussion

Recall that the traditional distinction between illusion and hallucination is as follows:

**Trad Illusion:** you perceive an object but you misperceive one or more of its properties.

**Trad Hallucination:** you have an experience as of an object and its properties but there is no object, and there are no properties, that you perceive in virtue of having that experience.

We have noted that the traditional definitions are clear; Trad Illusion and Trad Hallucination each capture a set of cases in which there is some failure of perception. Still, as we will argue, the traditional definitions do not cover all failures of perception, and they elide importantly different cases.

Before proceeding, we would like to make it clear that, in this paper, we adopt a standard representationalist framework and a causal theory of perception. According to a representationalist account of experience, experiences represent that one's environment is a certain way. How they represent that environment to be is said to be the content of the experience. In representing that the environment is thus and so, experiences represent things like objects, properties, and relations. Nothing turns on our adoption of

representationalism.<sup>6</sup> For those who think that experiences do not represent, but (at least sometimes) *present* the environment in a certain way, our talk of experience representing such and such can be read as either experience presenting such and such, or experience being indistinguishable from an experience that represents such and such.

According to a causal theory of perception, a sufficient condition for veridical perception is that one has an experience that closely ‘matches’ the scene around one, and that this experience is caused in the right way by that scene. It is said to be sufficient, and not necessary, in order to recognize the metaphysical possibility of other forms of perception that involve no experience, such as unconscious perception, and the metaphysical possibility of non-causal disjunctive accounts of perception. However, we will treat the condition as both (nomologically) necessary and sufficient for we will not deal with any cases of unconscious perception, and, by adopting the causal framework, we will suppose that all cases of perception in this world conform to the causal model—even though, in other possible worlds, there could be cases of perception that do not conform to it. In the representationalist framework, a matching experience is one in which one’s experience has representational content, and that content is correct.

One reason for adopting a causal theory of perception is that it is a theory that gives an account of perception in non-perceptual terms. This allows us to usefully employ those other terms to help justify why we think that it is right to classify, as we do, the cases that we will go on to discuss. In other words, it allows us to say something substantive to back up our intuitions about these classifications. If we adopted a disjunctive, naïve realist account of perception, then we would have no further materials with which to work. Such an account just says that one perceives if one bears the perceptual relation to something. Unlike the ‘representationalist plus causal theory’ of perception, then, this account does not attempt to explain perception in non-perceptual terms. Of course, this is not to say that a naïve disjunctivist could not necessarily agree to the differences in the kinds of cases that we will discuss. Indeed, we think that a test of their theory should be, in part, whether they can handle them. It is just that the representationalist framework provides better resources for explaining those differences.

To see that the traditional definitions of illusion and hallucination are not exhaustive, we will consider one account of perception and experience in a modality other than vision—namely, olfaction, and, in particular, orthonasal olfaction.<sup>7</sup> The view of the content of olfactory experience that we will consider holds that olfactory experience does not involve the representation of objects. It simply involves the representation of properties; it is a ‘pure property’ view of olfactory experience. It will not matter for our present purposes whether this is the correct account of the content of olfactory experience—although, given the difference between visual and olfactory experience, it is a plausible *prima facie* view. All that matters for our

purposes is that the pure property view is a possible view of the content of some perceptual experiences. As such, the view is simply a tool employed to reflect more deeply on the nature of illusion and hallucination. Given this, we would like to stress that we will not argue for the pure property view of olfactory experience in this paper and that, in fact, neither of us holds this view of olfactory experience. Macpherson is tempted to hold that in fact olfactory experience includes location and direction information. Batty (2010, 2011) has argued elsewhere that olfactory experience represents that there is something or other ‘here’, or ‘at’ the perceiver, that has certain olfactory properties.

On the standard view of visual experience, visual experience consists in the representation of objects. In the typical visual experience, objects are represented as having certain properties—shapes, colours, sizes, locations, and so on. For example, we may be aware of a small red car to our left and a large black tractor to our right. There are interesting questions about whether all visual experience involves the awareness of objects having properties, and whether other metaphysical categories, such as relations, can also be represented (as seems likely). There are also interesting questions about whether high-level properties, such as kinds like ‘car’ and ‘tractor’, can be represented.<sup>8</sup> These are, however, questions that we need not, and will not, answer here.

As we indicated above, one view of olfactory experience has it that it does not consist in the representation of objects—neither distal nor proximal objects. The phenomenological differences between visual and olfactory experience motivate such a view. Unlike visual experience, olfactory experience does not seem to represent ordinary distal objects—those objects that we commonly think of as odour sources. For example, you might smell a floral scent and your experience might thereby represent that floral scent. But it is plausible to think that your experience does not also represent the object that has that scent—a bunch of flowers, or a jar of perfume, or any other number of objects. After all, scents can be around when their sources are not, or are no longer, present. What’s more, when we do sniff in the vicinity of an odour source, such as brewing coffee, the smell of the coffee does not even seem to occupy more or less determinate locations before us. Rather, the smell is simply present; it pervades, we might say. One might think that this last observation about the phenomenology of olfactory experience supports the view that, in olfactory experience, we don’t even represent that proximal objects—objects such as a group of molecules, the air at our nose, a scent, the location at our nose, or even a bare existential quantifier (a ‘something’)—have certain properties.<sup>9</sup> We simply smell that a property is, or properties are, instantiated.<sup>10</sup>

Although this pure property view of olfactory content is not one that has been defended in the literature, it is certainly one that has been alluded to as the *prima facie* view of olfactory experience. For example, Chalmers (1996: 8) remarks: “[s]mell has little in the way of apparent structure and



often floats free of any apparent object, remaining a primitive presence in our sensory manifold”. Chalmers’ remarks are seconded by Lycan (1996, 2000) who observes that olfactory experience seems merely qualitative. In particular, Lycan claims that “[p]henomenologically speaking, a smell is just a modification of our consciousness, a qualitative condition or event in us” (2000: 281). Although Lycan goes on to argue, on other grounds, that olfactory experience does in fact represent objects, his quote suggests that the view that olfactory experience represents objects is at odds with the phenomenology of olfactory experience. To be sure, unlike the pure property view that we are considering, Lycan suggests that the properties presented in olfactory experience appear to be properties of the experience itself. Nonetheless, we take these quotes to emphasise the minimal content that one might think that olfactory experiences have. Lycan certainly echoes Chalmers’ observations about the lack of apparent structure and, thus, the lack of apparent objects in olfactory experience.

Drawing on considerations like these, that olfactory experience lacks the rich kind of content that visual experience enjoys, the pure property view claims that olfactory experience consists simply of the representation of properties. But what are the smell properties that we are aware of? That is a notoriously difficult question to answer.<sup>11</sup> Following work in the case of colour vision, many have attempted to model olfactory quality space.<sup>12</sup> Like the visual case, these models have focused on defining a set of ‘odour primaries’—olfactory equivalents of the ‘unique hues’. One recent attempt has been made by Castro et al. (2013). They argue that the basic olfactory properties are:

- **Fragrant** (e.g., florals and perfumes)
- **Fruity** (all non-citrus fruits)
- **Citrus** (e.g., lemon, lime, orange)
- **Woody and resinous** (e.g., pine or fresh cut grass)
- **Chemical** (e.g., ammonia, bleach)
- **Sweet** (e.g., chocolate, vanilla, caramel)
- **Minty and peppermint** (e.g., eucalyptus and camphor)
- **Toasted and nutty** (e.g., popcorn, peanut butter, almonds)
- **Pungent** (e.g., blue cheese, cigar smoke)
- **Decayed** (e.g., rotting meat, sour milk)

To this date, there is no working consensus on what the basic olfactory properties are. As a result, we do not know if this model is correct. Moreover, there is recent criticism of this whole approach in the literature. For example, Wilson and Stevenson (2006) suggest that, behind the difficulties of modelling olfactory quality space, is a false assumption about olfactory experience. This is the assumption that olfactory experience is analytic—that it has various, basic distinguishable components. In contrast to this assumption,

they observe that olfactory experience is largely synthetic—that is, that the various properties of the odorant stimulus produce a largely irreducible experience. As a result, Wilson and Stevenson suggest abandoning classification schemes that attempt to model olfactory properties in this way. Although it is important to note these challenges, they need not detain us here. We offer the above simply as an example of a recent empirical view, and of the kinds of properties that might be appealed to by a pure property view of olfactory experience. With that in mind, we will suppose for the sake of convenience, that the above classification is correct and use the properties that it proposes in discussing the pure property view of olfactory experience. Nothing about the controversy over the existence, number, or type of odour primaries challenges the initial observations about olfactory phenomenology that we have made; and it does not challenge the claim that olfactory experience represents properties of *some* kind. The controversy, then, does not detract from any motivation for the pure property view. The reader can consider the properties that we discuss as placeholders for whatever properties olfactory experience turns out to represent—lesser or greater in number, as the case may be.

Employing some of the properties of this empirical view, then, we can say more about the pure property view of olfactory experience. On that view, when one smells, one has various experiences that represent different properties. Some of these experiences might represent a single property, such as floral. Other experiences might represent two or more properties, such as floral, fruity and woody. But properties are all that those experiences represent.

#### **4. Distinguishing Veridical Perception, Illusion and Hallucination in Pure Property Olfactory Experiences**

Now that we have the pure property view of olfactory experience on the table, one can plausibly distinguish three different types of olfactory experience. Using the case of the representation of a single olfactory property, namely fruitiness, the experiences are:

- (i) an experience in which one perceives fruitiness accurately;
- (ii) an experience in which one perceives fruitiness inaccurately, as (for example) more intensely fruity than it is;
- (iii) an experience in which one perceives nothing, but one has an experience as of fruitiness when there is no fruity smell around.

As we will show, once the details of these cases are filled in appropriately, (i), (ii) and (iii) are cases of veridical perception, illusion and hallucination, respectively.

Turning to each of the cases, then, (i) is straightforward. It is a case of ordinary veridical perception—albeit the veridical perception of a property. Why should we believe that there can be such a case? One reason is intuition. It seems perfectly possible to conceive of such a case, and especially so in light of the *prima facie* plausibility of the pure property view for olfactory experience. Another reason stems from examining what is required for veridical perception. As we stated above, we adopt the representationalist framework and the causal theory of perception. Recall also that we have set aside cases of unconscious perception, and have adopted a version of the causal theory according to which a nomologically necessary and sufficient condition for veridical perception is that a perceiver has an experience that ‘matches’ the object, and that this experience is caused in the right way by that object. In case (i), we have stipulated that the experience matches the property instantiated in one’s environment. The experience represents fruitiness and there is indeed just that represented fruitiness in the air. So, case (i) is a case of veridical experience. Of course, not only is matching required for perception, an appropriate causal condition is required as well. At this point, then, it is necessary to say something further about what it is for an experience to be caused in the right way. A promising way of spelling this out is given by Lewis (1980). He takes the case of vision as his example, but one can modify this to cover perception more generally. He claims that one’s experience bears appropriate causal relations to the scene experienced if that experience bears a suitable pattern of non-backtracking counterfactual relations to that scene. He explains that what it is for there to be a suitable pattern is that “[t]here 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” (1980: 246).<sup>13</sup> We stipulate that these conditions hold in (i): there is a large class of alternative possible smelly scenarios before the subject’s nose, and there are many mutually exclusive and jointly exhaustive subclasses thereof, such that (1) any smelly scenario in the large class would cause olfactory experience closely matching that scenario, and (2) any two scenarios in different subclasses would cause different olfactory experience. Thus, (i) is a case of veridical perception.

Case (ii) is a case of illusion. As we set it out above, case (ii) is one of an experience in which one perceives fruitiness as more intensely fruity than it actually is. Why is it plausible to believe that it is a case of illusion? Let us elaborate on the case. Suppose that there is a fruity odour in the air and it causes you to have an olfactory experience as of a more intense fruitiness than the fruitiness in the air. Your experience represents the property “intense fruitiness”, rather than the more accurate “moderate fruitiness”. Suppose further that the reason that this happens is because the inside of your nose has been coated with a (non-odorous) chemical that skews the way the receptors

in your nose fire in response to odours in the air. In particular, the coating makes all smells seem a little fruitier than they actually are. It is reasonable to think that such a case counts as a case of perception because the Lewisian conditions on perception discussed above are fulfilled. You are having a closely matching experience—albeit not one that is exactly matching, as one is experiencing slightly more fruitiness than is in the air. And we can stipulate that the casual condition is fulfilled: there is a large class of alternative possible smelly scenarios before your nose, and there are many mutually exclusive and jointly exhaustive subclasses thereof, such that (1) any smelly scenario in the large class would cause olfactory experience closely matching that scenario, and (2) any two scenarios in different subclasses would cause different olfactory experience. Thus, we believe that this is a case of illusion; it is an experience in which you misperceive the fruitiness in the air. You do perceive the fruitiness because you are appropriately sensitive to it and other smells (in the sense that you meet the causal condition), but your perception is an instance of misperception because, due to the chemical coating inside your nose, you experience this smell, as you would others, inaccurately—that is, as more fruity than it actually is.

Case (iii) is a case of hallucination. Suppose now that there is no fruitiness, or indeed any other odour, in the air. In this case, you would not typically experience any smell. As it stands, however, suppose that an evil scientist is stimulating your olfactory cortex with an electrically charged probe. This causes it to fire in the way that it would fire in a normal case of perceiving fruitiness—that is, a case in which your nose is not tampered with, and in which there is a fruity odour in the air. The cortical stimulation caused by the probe, in turn, causes you to experience fruitiness. This is a case of hallucination; it is not a case of perception or even misperception. Unlike case (i) and (ii), your olfactory experience does not closely match the way the world is, and there is no appropriate causal relation between you and your environment. You are not counterfactually sensitive to the odours in your environment. What you experience is dependent on the stimulation of your cortex. Case (iii), then, is a case of hallucination. It is an experience in which one hallucinates fruitiness.

Of course, case (iii) is just one example of a pure property hallucination. One could alter the details of this case so that, by chance, there happened to be a fruity odour in the air when the evil scientist is, by stimulating your cortex, causing you to have an experience of such an odour. This would yield a veridical hallucination. What such a case shows, and what reliance on spelling out the causal connection in terms of counterfactuals entails, is that whether a case is one of veridical perception, illusion or hallucination cannot be determined just by looking at the content of the experience and whether it is accurate. One also has to look at the counterfactual relations that the subject bears to the world. That is, one has to look at what the subject would experience were they to be confronted with other objects and properties.

One might object to the classifications that we have just made. In particular, one might wonder whether case (ii) is really a case of illusion. This is because it might seem tempting to describe case (ii) as one in which there is no closely matching experience. This temptation, the objection urges, is justified if we compare case (ii), and pure property experiences like it, with cases of Trad Illusion. What that comparison reveals, the objector concludes, is that we lack a good criterion for what it is for a pure property experience to closely match a subject's environment.

If we consider Trad Illusion, we can see what this objection demands of a closely matching experience. In cases of Trad Illusion, the objector might say that what is required for a closely matching experience is the exact match of many of the properties of an object, and the failure to match of certain others—those that one is said to misperceive in a case of Trad Illusion. To see that this is so, think back to the example of Trad Illusion that we gave above: one undergoes an illusion in which one sees a car and its shape, but one misperceives the colour of the car. In particular, one experiences it as purple when it is in fact blue. Here, one is experiencing the car accurately, let us suppose, in all respects except for colour. So the closely matching requirement can be captured in that way. Moreover, the objector might claim, there seems to be no requirement that the colour that one has an experience as of (purple, in our example) is close to the actual colour of the car (blue, in our example). The illusory colour experience could have been an experience as of any colour, bar the actual colour of the car. In such a case, the objector might conclude, we should nonetheless be happy to say that the experience is a closely matching one.

But, as the objection continues, when one considers a pure property experience, this option for spelling out what a closely matching experience is is not available, for only properties are experienced. Because no objects are experienced, we cannot determine whether an experience closely matches the world by looking to whether some properties of an object are accurately represented. Similarly, in Trad Illusion cases, we allow that an illusory property can be very different from the actual property that an object has. Unlike what we claim holds of case (ii), there is no requirement that the illusory property is similar to the actual property instantiated—and which, in the Trad Illusion case, an object has. If that is true, then one might object that we are not in a position to decide whether case (ii) is a case of illusion or hallucination, for we are missing a good criterion for what it is for a pure property experience to be a close, but not exact, match to an actual property.

Now one might think that we can respond to this objection in the following way: While we cannot determine whether pure property experiences closely match the way the world is by looking at whether they represent an object as having some of the properties that it in fact has, we can use other features of pure property experiences in a way similar to how the traditional view of illusion uses objects. For example, note that the experience that we

described in case (ii) is one of intense fruitiness. One might think that what such an experience represents is that a property—fruitiness—has another property—a second order property of being intense. Given this, one might think that we could decide what a matching experience is by looking at which second-order properties a first-order property is represented as having, and by claiming that an experience is matching if a first-order property is represented as having some, or enough, of the second-order properties that it in fact has.

However, we do not think that this is the right response to make. One reason is that we think that it is important to have an account of matching that applies to experiences that simply represent first-order properties, and not only to ones that represent first-order properties as having other, second-order properties. We want a theory that is general, applying to all of the experiences that there could be. Another reason is that we want an account of matching that allows that an experience might be matching even if all of the properties that it represents are misperceived. We will now explain why.

There could be Trad Illusion cases in which all of the properties of an object are misperceived. Seeing this points the way to developing an account of what it is for an experience to be closely matching. Lewis mentions this kind of case of illusion in passing. He considers a case in which one has an experience that does not match the scene before the eyes but in which there is a systematic mismatch between the experience and the world (1980: 241). As an example of such a case, suppose, for the sake of argument, that the properties of things that we see are simply their locations, shapes and colours. Given this, now consider a case in which you have distorting sunglasses permanently affixed to your eyes—glasses that consistently make the scene before your eyes look a little darker than it actually is, a little more to the right than it actually is, and a little shorter than it actually is. That is, suppose that your glasses cause it to be the case that there is a systematic mismatch between the colour, location, and shape represented in your visual experience and the colour, location and shape of objects in your environment.<sup>14</sup> It is plausible to think that, in this case, you perceive the various scenes before your eyes. For, although your experiences do not exactly match those scenes, there is a systematic mismatch.<sup>15</sup> This ensures a suitable pattern of counterfactual dependence between your experiences and the scenes before your eyes. To quote Lewis again: “[t]here 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” (1980: 246).

Although it is one in which there is no apparent object, case (ii) is a case of this kind. This is because there is a systematic mismatch between your olfactory experiences and the odour in the air, which ensures that there

is a suitable pattern of counterfactual dependence between your experiences and the scene. Moreover, there is not any old systematic mismatch. In both the sunglasses case and case (ii), there is a systematic mismatch of the sort which makes it possible for you to form some correct judgments about your environment solely on the basis of your experiences. (We specify 'solely on the basis of your experiences' in order to rule out making such judgments on the basis of one's experience together with the knowledge of which patterns of counterfactual sensitivity hold between your experiences and the world.) In the olfactory case, you are in a position to say whether the fruity odour fluctuates in intensity, by how much, and whether there is any odour at all; and in the sunglasses case, you are able to say, among other things, whether there are any coloured objects present, and to what extent objects differ in colour. Thus, we argue that what is required in order for there to be a closely matching experience is for there to be a suitable pattern of counterfactual dependence between the experience and the environment and, in addition, that one be able to form some correct judgments about the environment solely on the basis of one's experience. This allows cases in which there are small systematic changes to one's perception, as there are in the distorting sunglasses case, to count as cases of illusion; but it also allows for quite large systematic changes to one's perception to count as illusions. For example, it would allow a case of systematic colour inversion to count as a case of illusion.

Someone might now object to this definition on the grounds that it is too liberal. The worry is that the definition entails that too many cases of systematic mismatch are cases of illusion—including cases that, intuitively, are not ones of illusion. For example, suppose that, when one is faced with different colours, one has systematically mismatching experiences as of different smells. One might think that, intuitively, these experiences should not be thought of as closely matching. Given this, the case should not count as one of illusion. However, contrary to this intuition, an objector might claim that our definition rules that some such cases are cases of illusion—cases in which there is a systematic mismatch that allows one to make some, *even very minimal*, accurate judgments. For example, suppose that different saturation levels of redness cause someone to have experiences of different intensities of floralness in the air in such a way that a mildly saturated red causes an experience of mild floralness and increasing levels of saturation of red cause experiences of increasing intensities of floralness. In such a situation, that person's olfactory experiences would allow for accurate judgments of the form, *a* is more similar to *b* than *c*. As a result, this case would be one of illusion according to our definition. The worry is that this case should not be so characterised.

Our response to this objection is to admit, as Lewis does, that, on this conception of illusory perception, a close match can admit of degree. This is reflected by the fact that, in different cases, there will be more, or fewer, accurate judgments that subjects will be able to make about the world

solely on the basis of their experience. Thus, the line between perception and misperception, on the one hand, and hallucination, on the other, is not a sharp one. A small skewing of perception, a systematic colour inversion, and experiences of smell in response to colour, all lie on a continuum of cases—the former two being closer to veridical perception and clearly illusory, and the latter lying further away.

We predict that people's intuitions will vary about whether systematically experiencing smells in response to colour in such a way as to allow one to make accurate, merely relative, minimal judgements of the kind that we have just discussed should count as cases of (illusory) perception or as cases of no perception at all (hallucination). While the objector is right that some people will not count them as cases of perception, we think that other people will count them as such. We think that such cases are on the cusp between illusion and hallucination. This is because, while there are some true judgements that can be made about the environment by subjects on the basis of those experiences alone, they are very limited judgments—limited to only relative similarity judgments. We think it is a strength of our theory that it predicts and explains why this type of case has these features.<sup>16</sup>

All of this reasoning explains why we hold that case (ii) is a case of illusory perception of a property.

On this account of illusion, as just articulated, we can grant that the original objector is right in thinking that similarity of properties is not required for cases of illusion. However, we have provided an alternative account of what it is for someone to have a closely matching experience—one that does not rely on conceiving of experience as always of an object and some of its properties. In consequence, we think that the traditional account of illusion is incorrect because it does not account for pure property experience. Moreover, in cases of experiences as of an object having properties, it elides an important difference between cases that should be properly classified as property illusion, and cases that should be properly classified as property hallucination. This is because Trad Illusion does not distinguish between cases that meet the matching condition that we specify here, and cases that do not. This is a point to which we will return in section five.

Finally, case (iii) is a case of hallucination, and not illusion, because the conditions required for perception are not met. There is no appropriate causal relationship between one's olfactory experience and the odours in the air. And the conditions just laid out for matching, or close matching, are not in place. Therefore, it is a hallucination.

We have shown, then, that, in cases in which there is pure property experience, there can be veridical perception, illusion and hallucination.<sup>17</sup> Because they do not cover all cases, it follows that the traditional definitions of illusion and hallucination cannot be right. As we have shown, there can be cases of illusion without the perception of some object, and there can be cases of hallucination without the experience as of an object. As a result,



we conclude that we need new definitions of illusion and hallucination to include these cases.

Now, one might object to this line of reasoning by claiming that the traditional definitions of illusion and hallucination were only ever meant to apply to experiences as of objects having properties—whether those experiences occur in a modality in which there is only ever perception of objects having properties or whether they occur in a modality in which there is sometimes pure property perception. Similarly, one might also claim that we have not yet established that there are any cases of pure property experience. If that's right, then we have not established that new definitions of illusion and hallucination are required.

We think that such an objection would be wrongheaded. First, we think that the possibility of pure property perception has been established, and that definitions of illusion and hallucination ought to reflect cases of possible illusion and hallucination—even if there are no actual cases. Secondly, and more crucially, once one has appreciated that there can be a distinction between illusion and hallucination within possible cases of pure property experience, one can come to see that there are also cases of property illusion and property hallucination within cases that would be traditionally classified as perceptual and within those that would be traditionally classified as hallucinatory—that is, cases in which we do experience objects as having properties. Likewise, there are cases not just of object hallucination, but also object illusion. Finally, there are interesting cases involving the attribution of the perceived properties of one object to another perceived or hallucinated object. Thus, even if one rejects the actuality, or even the possibility, of pure property experience, there are additional cases of property illusion and property hallucination, and object illusion and object hallucination, that need to be accounted for. And, in order to account for these additional cases, both Trad Illusion and Trad Hallucination have to be rejected in favour of new definitions.

In section five, we spell out what these cases are.

## **5. A Taxonomy of Illusions and Hallucinations Within Experiences as of Objects Having Properties**

The following is a list of all of the kinds of veridical perception, illusion and hallucination that are possible within experiences as of an object having a property:

- (iv) perception of an object and veridical perception of one of its properties, experienced as a property of the object;
- (v) perception of an object and illusory perception of one of its properties, experienced as a property of the object;
- (vi) perception of an object and hallucination of a property, experienced as a property of the object;

- (vii) perception of an object and veridical perception of the property of a second object, experienced as a property of the first object;
- (viii) perception of an object and illusory perception of the property of a second object, experienced as a property of the first object;
- (ix) hallucination of an object and veridical perception of the property of some object, experienced as a property of the hallucinated object;
- (x) hallucination of an object and illusory perception of the property of some object, experienced as a property of the hallucinated object;
- (xi) hallucination of an object and hallucination of a property, experienced as a property of the hallucinated object.

As we will see, in each of the cases (iv)–(viii), the perception of the object could be either veridical or illusory.

We will argue for the possibility of (iv)–(xi) by presenting examples of each. Although we believe that we could do so in any modality that involved some cases of experiencing objects as having properties, we choose to present these examples in the modality of vision. Nothing turns on the fact that our cases are visual. It simply provides the most perspicuous examples as it is the modality with which most people are used to considering perception. In discussion of such cases, we omit the detailed discussion of what counts as an appropriate causal connection, and a matching, or closely matching, experience that we included when discussing cases (i)–(iii). But the reader should take that discussion to apply to the cases below, *mutatis mutandis*.

We will start with cases (iv)–(viii) and with discussion of versions of these cases in which there is ordinary veridical perception of the object. We will leave off that qualification below for ease of explication, but the reader should understand the cases in this way. Once we have described those versions of the cases, we will then explain how these cases could involve illusory object perception.

Case (iv) is a normal case of veridical perception. We do not think that we have to argue for the existence of such cases. However, adapting a previous example, here is a straightforward example: you veridically perceive a car of a certain blue colour, shape and location. Working within the representational framework, and with the causal theory of perception, this would be a case in which you have an experience as of a blue car with a certain shape and location, and there is a car with those properties in your environment. So, you have an exactly matching experience. Moreover, in such a case, there would be the appropriate kind of causal relation—that is, the appropriate form of counterfactual dependence—between the car and its properties, and your experience as of it and its properties. This is the counterfactual dependence that we explicated in section four.

Cases (v) and (vi) are not normally distinguished. Trad Illusion and Trad Hallucination certainly don't distinguish between them; but we argue that

they should be distinguished. Consider an example of (vi) first. Suppose that you experience objects and all of their visible properties accurately except for their colour. The colour that you experience objects as having is totally random—perhaps because the parts of your brain that process colour are damaged. Because of this, you are not responsive to which colour objects have. You experience them as having some colour, but, again, which colour you do is completely random. Suppose that, in these circumstances, you are looking at a car and experience it accurately except for the fact that you experience it as purple when it is in fact blue. We think that this is a case of object perception, but property hallucination. In this case, you have a matching experience as of the car and all of its visible properties, bar its colour. And there is an appropriate causal relationship between that experience and those visible properties, bar the colour of the car. Because your experiences of colour are random, there is no counterfactual dependence of your experience as of colour on the colours of things in your environment. Thus, you have a veridical experience as of the car and its other visible properties, but you hallucinate the colour of the car. We hold that this can be clearly distinguished from case (v).

The following is an example of (v): You experience objects and all of their visible properties accurately except for the fact that which colour you experience them as having is systematically skewed. You experience objects as the same amount slightly lighter, the same amount slightly more saturated, and the same amount slightly shifted in hue in a particular direction around the colour wheel than the actual colours of the objects that lie in front of you. Again, suppose that, in these circumstances, you are looking at a blue car and experience it accurately except for the fact that you experience it as light blue when it is in fact dark blue. We think that this is a case of object perception, but property illusion. In this case, you have a matching experience as of the car and all of its visible properties, bar its colour. And there is an appropriate causal relationship between the experience and those visible properties, bar the colour of the car. Thus you have a veridical experience as of the car and its other visible properties. But, unlike the previous example, you are undergoing an illusion with respect to the colour of the car. Unlike the previous case, you are sensitive to the colours of things—just not in a way that gives you veridical experiences of their colours. Your experience is counterfactually dependent on the colours of the object before you, but it is systematically skewed, so that there is never a perfect match between your experience and the colours of objects in the world. Still, there is a close match. For, in addition to your counterfactual sensitivity, you can come to know some facts about the colours of objects solely based on your experience—such as which objects are lighter and darker, which are more or less saturated, which are closer and which are further apart in hue.<sup>18</sup>

It is interesting to note that, on this conception of illusion, there can be veridical illusion. Here is an example: suppose your vision is systematically

skewed in such a way that you see everything as slightly darker than it really is. (Perhaps you have had dark lenses inserted into your eyes.) You look at a stimulus that would, in most people, cause a colour illusion—a stimulus that most people would see as having a colour that was slightly lighter than it really is. The illusory qualities of this stimulus might perfectly cancel out the skewing effects of your vision. If it did, your experience would represent the colour accurately, but you would be having an illusory experience of it. We take this outcome to be a positive feature of our theory. In just the way that hallucination can be veridical by chance, so too, we argue, illusion can be veridical by chance. There is a pleasing symmetry to this result. It further emphasizes the point that we stressed earlier—namely, whether a case is one of veridical perception, illusion or hallucination cannot be determined simply by looking at the content of the experience and whether it is accurate. One also has to look at the counterfactual relations that the subject bears to the world. That is, one has to look at what the subject would experience were they to be confronted with a range of other objects and properties.

We therefore hold that (v) is a case of property illusion, while (vi) is a case of property hallucination. The traditional definitions of illusion and hallucination would count both of these cases as cases of illusion. We believe that this does not accurately describe them, so the traditional definitions need to be replaced.

One should note that it seems perfectly possible for there to be mixed cases in which some of the properties of a perceived object are experienced in a veridical manner, some in an illusory manner and some in a hallucinatory manner.

It is an interesting question whether one could have experiences—experiences unlike the examples just given of (v) and (vi)—in which all of the properties of a perceived object that are experienced are experienced in an illusory, or a hallucinatory, fashion. The case in which all of the properties are illusory would be one in which there is a systematic skewing of all of the properties—location, colour, shape, and so on. In fact, that case is not too difficult to conceive of; we described one such case in section 4, when we gave the distorting sunglasses example. A case in which all of the properties are hallucinatory is much harder. It would have to be a case in which you have an experience as of some object being present when, and only when, there is some object present; but, in such a case, your experience as of its properties would be totally random. You would not be sensitive in any way to the properties that the object has, bar its presence. You would be a mere ‘object detector’—but in such a way that you would not detect any of the object’s properties. Given the ‘representationalist plus causal’ theory of perception, the question of whether there could be such a case turns on whether one could give a satisfactory account of what, in such circumstances, it would be for one’s experience to match an object and be appropriately caused by that object. Providing such an account would certainly be a difficult task.

Cases (vii) and (viii) mirror cases (iv) and (v) in an important way. In all cases, you perceive an object as having a certain property. In (iv) and (vii), perception of the property is veridical; in (v) and (viii), the perception of that property is illusory. How the cases importantly differ is that, in cases (vii) and (viii), the property that one veridically perceives (as in vii) or illusorily perceives (as in viii) belongs to a second object; it does not belong to the object that one in fact perceives, as in cases (iv) and (v).

Here is an example of (vii): suppose that every time you see an object in the centre of the left-hand side of your visual field, you perceive it accurately—except for its colour. The colour that your experience attributes to the object is the colour of the object at the centre of the right-hand side of your visual field. To illustrate, suppose that there is a blue car at the centre of the left-hand side of your visual field and a red tomato at the centre of the right-hand side of your visual field. If your vision were as just described, you would experience the car as red. You would be suitably counterfactually sensitive to the car and its visible properties, bar its colour, and suitably counterfactually sensitive to the colour of the tomato. But you would incorrectly experience the colour of the tomato as belonging to the car—thus undergoing an illusion. This a different form of illusion to the ones that we have consider so far.

One can give an example of (viii) by considering a case just like the one we have just described for (vii), except that you systematically illusorily misperceive the colour of the right-hand object and attribute it to the left-hand object. For example, suppose again that there is a blue car at the centre of the left-hand side of your visual field and a bright red tomato at the centre of the right-hand side of your visual field. Suppose further that you systematically perceive all colours of right-hand side objects to be a darker than they actually are. You would then incorrectly experience the misperceived colour of the tomato as belonging to the car—thus undergoing a double illusion. There is both the illusion of the colour of the tomato and its illusory attribution to the car.

Real life case of cases (vii) and (viii) can be found in the empirical literature on disturbances of vision. There they are called ‘failures of binding’ or ‘illusory conjunctions’.<sup>19</sup> We deem it a major merit of our theory that it predicts, and makes logical space for, the existence of such cases.

We noted earlier that all of the cases (iv)–(viii) could come in two varieties: veridical object perception and illusory object perception. We have illustrated the nature of these cases so far only with cases of veridical object perception. We turn now to explaining how cases (iv)–(viii) could involve illusory object perception.

Recall that, thus far, our account of veridical and illusory perception turns on the idea that, in both cases, there is a suitable pattern of counterfactual dependence between the experience and the environment, and that one is able to form some correct judgments about the environment

on the basis of one's experience. The difference is that veridical perception allows one to be able to form wholly accurate judgments; in illusion some judgments will be false. We can apply this idea to object perception. I can be a better or worse object detector. If I am a perfect object detector, then I will detect objects when, and only when, there are some, and not when there are none. Of course, we do not insist that someone must be a perfect object detector in order to count as able to see objects; we can allow that there are a few mistakes. But consider someone who has systematically skewed object perception. For example, consider someone who systematically experiences two objects as present for every object that is really present in front of them. Such a person would have double vision.

Most of us have double vision when we look at objects very close to our eyes. We are not typically tempted to think that there are two objects present because each looks a bit transparent and we usually know what is going on. That is, we know that we have double vision in such cases. But now imagine an idealised version of double vision, in which you experience every object to have as much reality as those suitably located not too close to your eyes typically seem to have. What should we say about those experiences? One might think that experiencing one of the objects you seem to see in front of you amounts to perception of the actual object in front of you, while experiencing the other does not. However, that view is problematic. In the case of idealized double vision, how would one choose which experience of an apparent object amounted to perception of the object, and which did not? There seems no way to choose which is which. Therefore, we think that it is more plausible to say that the experience of each object amounts to perception of the object. You are seeing the object twice (c.f. Lowe 2008).

Now suppose that view of double vision is correct. In idealized double vision, there could be a suitable pattern of counterfactual dependence between the experience and the environment—but it would be one that is systematically skewed. On the basis of one's experience alone, one would form many incorrect judgments as to the number of objects present. But one would be able to form some correct judgments about the environment on the basis of one's experience—namely, that there are some objects present and that, in some instances, there are twice as many to one's right than to one's left. According to the criteria previously laid down for illusion, idealised double vision is illusory perception—illusory object perception.

Thus, we hold that there can be both veridical object perception and illusory object perception—double vision being just one example of the latter. Of course, in double vision, one will necessarily have illusory perception of some of the properties of at least one of the objects one sees—namely, its location. Still, that is not the reason to think that there is illusory *object* perception in such a case. The illusory nature of the object perception lies in one's being a systematically skewed object perceiver. With this notion of

illusory object perception in hand, we claim that cases (iv)–(viii) come in two varieties: veridical object perception and illusory object perception. By considering the attribution of properties in cases of idealised double vision, the reader can adjust the examples of (iv)–(viii) given previously to arrive at ones in which there is illusory object perception.

We now turn to giving examples of cases (ix)–(xi).

Recall that (ix) involves hallucination of an object and the veridical perception of the property of some object, experienced as a property of the hallucinated object. For an example of (ix), suppose that, at certain times, you visually hallucinate one, and only one, object at the centre of your visual field. At all other times, you experience nothing. These hallucinations are caused by a machine attached to your visual cortex. It is designed to cause them in you at random intervals. When you so hallucinate, none of the properties that you experience the hallucinated object as having—typical visible properties such as shape and location—are in any way dependent on the objects in front of you in your environment—except one. The colour of the object that you hallucinate is determined by the colour of whatever surface is actually in front of you, at the centre of your visual field. So, if you hallucinate a pig in the centre of your visual field, when in fact there is a purple house in front of you, you experience the pig to be purple. Your hallucination of the pig is not counterfactually sensitive to whether there is an object in front of you, for you have experiences as of objects at random. But when you have such an experience, it matches perfectly, and is counterfactually sensitive to, the colour of the object lying at the centre of your visual field. Thus, we claim, you hallucinate an object but you veridically perceive the colour property in front of you. You experience that colour property as belonging to the hallucinated object.<sup>20</sup>

Case (x), recall, is the hallucination of an object and illusory perception of the property of some object, experienced as being a property of the hallucinated object. An example of (x) is exactly like the above example of (ix), except for the fact that the colours that you experience hallucinated objects to have depend on the systematically skewed perception of the colour of whatever surface is actually in front of you, at the centre of your visual field. For example, suppose that you experience all colours to be, to the same degree, slightly lighter than the actual colours of the object that lies in front of you, at the centre of your visual field. In this case, your hallucination of an object, a horse, say, is not counterfactually sensitive to whether there is an object in front of you, but is counterfactually sensitive to the colour—and only the colour—of the object lying in the centre of your visual field. The colour you experience does not perfectly match the colour of the object in front of you, but it is close to, and systematically varies with, the colour of that object. Moreover, were the colour of the object in the world in front of you to change, your experience would do so too, and you would be able to determine by means of your experience whether that colour was getting

lighter or darker, more or less saturated, or changing in hue. Thus, we claim that, in this case, you hallucinate an object. But you see, in an illusory way, the colour property in front of you, and you experience that property as belonging to the hallucinated object.

Finally, recall that case (xi) is one in which there is hallucination of an object and hallucination of a property of that object. This is simply a case of hallucination, traditionally conceived: you hallucinate an object and the properties that it seems to have. Neither your experience as of the object, nor your experience as of its properties, is counterfactually sensitive to the objects and properties in the world in front of you. Our previous example of Trad Hallucination, from section 3, serves as an example of this case. Recall that, in that example, you hallucinate a purple car before you, but there is no car, and no instantiation of purple, before you. In this case, neither your experience as of the car, nor your experience as of the purpleness, is counterfactually sensitive to the objects and properties in your environment.

In sum, cases (ix)–(xi) show that there can be properties that are experienced as belonging to a hallucinated object that are veridically perceived, illusorily perceived, or hallucinated. It is important to note that there could be a variety of mixed cases in which some of the apparent properties of a hallucinated object are veridically perceived, some illusorily perceived, and some hallucinated. Cases (iv)–(viii) show that the same is true of a perceived object. There could be mixed cases in which some of the apparent properties of perceived objects (either veridically or illusorily perceived) are veridically perceived, some illusorily perceived, and some hallucinated.

## 6. Defining Illusion and Hallucination

We have argued that there can be cases of veridical property perception, property illusion, and property hallucination in cases in which (i) one is accurately or illusorily perceiving an object in the world and in cases in which (ii) one is not doing so—i.e., cases in which one is hallucinating an object. As a result, one does not have to accept that there is, or even could be, pure property experience in order to accept that the traditional accounts of illusion and hallucination need to be revised. It is open to one to think of the pure property view of experience as simply a thought experiment used in order to appreciate that there are further cases of illusion and hallucination that the traditional distinction does not cover or elides. Nonetheless, we believe that such cases of pure property experience are possible—although we admit that we are unsure about whether there are any actual cases. Therefore, we hold that the definitions of illusion and hallucination ought to take this possibility into account.<sup>21</sup>



Recall that the notion of illusion is the notion of misperception. This idea is encoded in the traditional account of illusion as follows:

**Trad Illusion:** you perceive an object but you misperceive one or more of its properties.

In light of the arguments in this paper, we believe that that this traditional account of illusion needs to be replaced with the following:

**Comprehensive Illusion: Either:**

- (1a) you misperceive a property that is not experienced as belonging to any object, or
- (1b) you veridically perceive an object and misperceive one of its properties, experienced as a property of the object, or
- (1c) you veridically perceive an object and veridically perceive the property of a second object, and experience that property illusorily as a property of the first object, or
- (1d) you veridically perceive an object and illusorily perceive the property of a second object, and experience that property illusorily as a property of the first object (yielding a double illusion), or
- (1e) you illusorily perceive an object and veridically perceive one of its properties, experienced as a property of the object, or
- (1f) you illusorily perceive an object and illusorily perceive one of its properties, experienced as a property of the object (yielding a double illusion), or
- (1g) you illusorily perceive an object and hallucinate a property, experienced as a property of the object (yielding an intermingled illusion and hallucination), or
- (1h) you illusorily perceive an object and veridically perceive the property of a second object, and experience that property illusorily as a property of the first object (yielding a double illusion), or
- (1i) you illusorily perceive an object and illusorily perceive the property of a second object, and experience that property illusorily as a property of the first object (yielding a triple illusion), or
- (1j) you hallucinate an object and veridically perceive a property of an object, and experience that property illusorily as a property of the hallucinated object (yielding an intermingled illusion and hallucination), or
- (1k) you hallucinate an object and illusorily perceive a property of an object, and experience that property illusorily as a property of the hallucinated object (yielding an intermingled double illusion and hallucination).

Similarly, recall the traditional account of hallucination:

**Trad Hallucination:** you have an experience as of an object and its properties but there is no object, and there are no properties, that you perceive in virtue of having that experience.

We believe that it needs to be replaced with a new account:

**Comprehensive Hallucination:** Either:

- (2a) you hallucinate a property that is not experienced as belonging to any object, or
- (2b) you veridically perceive an object and hallucinate a property, experienced as a property of the object, or
- (2c) you illusorily perceive an object and hallucinate a property, experienced as a property of the object (yielding an intermingled illusion and hallucination), or
- (2d) you hallucinate an object and hallucinate a property, experienced as a property of the hallucinated object, (yielding a double hallucination), or
- (2e) you hallucinate an object and veridically perceive the property of an object, and experience that property illusorily as a property of the hallucinated object, or (yielding an intermingled illusion and hallucination), or
- (2f) you hallucinate an object and illusorily perceive the property of an object, and experience that property illusorily as a property of the hallucinated object (yielding an intermingled double illusion and hallucination).

All of these cases of illusion and hallucination are conveniently presented in tables 1 and 2.<sup>22</sup> Note that, as previously mentioned, any instance of experience may involve one or more of these types of illusion or hallucination. Moreover, the illusory perception of objects and properties, and the hallucination of objects and properties, may be veridical.

Table 1. Veridical perception, illusory perception, and hallucination in pure property experience. References numbers cite clauses in the comprehensive definitions of illusion and hallucination

Pure Property Experience		
Veridical perception of a property	Illusory perception of a property	Hallucinatory perception of a property
√ (completely veridical)	√ (1a)	√ (2a)

Table 2. Veridical perception, illusory perception and hallucination in experience as of objects having properties. References numbers cite clauses in the comprehensive definitions of illusion and hallucination

<b>Experience as of an Object, o, Having Properties</b>			
	Veridical perception of o	Illusory perception of o	Hallucinatory experience of o
Veridical perception of one of o's properties experienced as belonging to o	√ (completely veridical)	√ (1e)	? (2g)
Illusory perception of one of o's properties experienced as belonging to o	√ (1b)	√ (1f)	? (1l) + ? (2h)
Hallucination of a property experienced as belonging to o	√ (2b)	√ (1g) + (2c)	√ (2d)
Veridical perception of another object's property experienced illusorily as belonging to o	√ (1c)	√ (1h)	√ (1j) + (2e)
Illusory perception of another object's property experienced illusorily as belonging to o	√ (1d)	√ (1i)	√ (1k) + (2f)

One might wonder from looking at table 2 whether there could be cases of a hallucinatory experience of an object, o, and veridical (or illusory) perception of one of o's properties experienced as belonging to o. We can set out these potential cases formally thus:

(2g) you hallucinate an object, and veridically perceive a property of that object, and experience that property as a property of the hallucinated object; or

(1l/2h) you hallucinate an object, and illusorily perceive a property of that object, and illusorily experience that property as a property of the hallucinated object (yielding an intermingled double illusion and hallucination).

If there are such cases, they must be experiences of particular individuals. Thus, in part, whether one thinks that there are such cases will depend on whether one thinks that perceptual experiences can be experiences as of particular individuals. A variant of case (ix) might be a case of (2g)<sup>23</sup>. For example, imagine the following scenario: at certain times, you visually hallucinate Michaelangelo's Statue of David at the centre of the left-hand side of your visual field. At all other times, you accurately perceive the world. These hallucinations are caused by a machine attached to your visual cortex. It is designed to cause the hallucinations in you at random intervals. When you so hallucinate, none of the properties that you experience the hallucinated David as having—typical visible properties such as shape and location—are in any way dependent on the objects in front of you in your environment—except one. The colour of the David that you hallucinate is determined by the colour of whatever surface is actually in the centre of the right-hand side of your visual field. So, if you hallucinate David on the left-hand side of your visual field when there is an orange cat in the centre of the right-hand side of your visual field, you experience David as orange. If you hallucinate David on the left-hand side of your visual field when there is a pink poodle in the centre of the right-hand side of your visual field, you experience David as pink. The existence of your hallucinatory experience of David is not counterfactually sensitive to the objects or properties in front of you, for you have experiences as of David at random. But when you have such a hallucination, the colour of David matches perfectly, and is counterfactually sensitive to, the colour of the object lying at the centre of the right-hand side of your visual field. So far, this is a standard case of (ix), in which there is hallucination of an object and veridical perception of the property of some object, experienced as the property of the hallucinated object.

Now imagine that on one occasion when you hallucinate David on the left-hand side of your visual field, the Statue of David, which is white, happens to be in the centre of the right-hand side of your visual field. As a result, you hallucinate David as white, because there is a white object at the centre of the right-hand side of your visual field. Is this a case of a hallucinatory experience of an object, *o*, and veridical perception of one of *o*'s properties experienced as belonging to *o*?

This depends on what we take *o* to be. If we take *o* to be the marble statue, David, then yes. You have a hallucination of David (*o*) and, in having that experience, you experience it to have a property—white—that you veridically perceive David (*o*), which is in the centre of the right-hand side of your visual field, to have. However, if we take it that *o* is not the marble statue, David, but rather the hallucinated apparent object of your experience—a merely hallucinated David—then the answer is no. In this case, call the marble statue David *o*\*. You have an experience of hallucinated David (*o*), and David (*o*) is (hallucinatorily) experienced by you to have a property, namely, marble David's (*o*\*)s whiteness.

What should one take the object of a hallucination to be? This will depend on what one's theory of perception is. On the one hand, some naïve realists might argue that, in (at least some cases of) hallucination one becomes aware of (perhaps previously experienced) worldly objects. Likewise, some representationalists might argue that if a hallucinatory experience is as of an individual worldly object, then that worldly object literally is the content of the experience and the object that one is aware of when hallucinating. On the other hand, other representationalists might argue that the object of hallucination is something other than the real worldly object—a mere intentional object or some such. Finally, sense-data theorists (of the representative realist kind) will likely argue that the object of hallucination is other than a real worldly object—a mental particular.

We will not argue for any version of these theories of perception. We are content with laying out the relations between the commitments of different theories of perception and the types of illusion and hallucination that those commitments are compatible with. We leave it to the reader to decide whether to endorse these cases—(2g) and (11/2h)—or not.

## **7. Conclusion**

At the beginning of this paper, we supposed that olfactory experience consists of pure property experience. Consideration of such a form of experience showed us that there is a distinction between experiences of pure properties that are veridical, illusory, and hallucinatory. That is, in addition to accurate property perception, there are both property illusions and property hallucinations. In turn, we went on to argue that the notions of property illusion and property hallucination are not restricted to experiences of pure properties. The pure property case led us to reconsider the form of experience more familiar to us: perception of objects having properties. We argued that, in these sorts of experiences, there are many different forms of illusion and hallucination of both objects and properties—many more than have been considered to date.

Working within a standard representationalist framework and with a causal theory of perception, we have suggested that, whether an object is veridically perceived, illusorily perceived, or hallucinated, or whether a property is accurately perceived, misperceived or hallucinated depends on (1) whether the experience matches, closely matches, or fails to match an object or property before you, and (2) whether there is a suitable pattern of counterfactual dependence of the experience as of that object or property on the objects and properties before you. Moreover, we have given a novel account of what closely matching consists in, namely in an experience that has a suitable pattern of counterfactual dependence on the world and is such that, on the basis of that experience alone, one can come to make some true

judgments about the world. In light of this, we have argued that the distinction between closely matching and failing to match is not a sharp one, and admits of degrees.

We have laid out in detail all of the new cases of illusion and hallucination that we believe to exist. These new cases of illusion and hallucination deserve systematic study to establish whether different theories of perception and perceptual experience—in particular, theories such as disjunctivism and naïve realism—can give good accounts of them. We predict that the double and triple illusion cases, and the mixed illusion and hallucinatory cases, will be the hardest cases for those theories to account for.

## Notes

1. Macpherson's work on this paper was supported by a grant from the Arts and Humanities Research Council (grant number AH/L007053/1). Thanks to Craig French, Jack Lyons, Paul Noordhof, and Matthew Nudds for comments on an earlier version of this paper.
2. In what follows, we will use 'smell' in its nominal position to refer to an olfactory property, or a property presented in olfactory experience.
3. Further details of accounts of illusion and hallucination are given in Macpherson (2013).
4. Throughout this paper, we will use 'see' as a success term—to denote instances of visual perception, as opposed to hallucination.
5. See Macpherson (2012) for further discussion of this issue.
6. As should now be clear, our use of 'representationalism' and 'representationalist' will refer only to the view that experiences represent. It does not refer to any view about the relation between phenomenal character and representational content—as the term is also used in the literature.
7. Orthonasal olfaction is smelling by means of drawing in air through the nose. Retronasal olfaction involves air passing from the mouth and throat, back through the nose, in the opposite direction from orthonasal olfaction. Retronasal olfaction often interacts with taste to produce what people sometimes call flavour experiences. There is some reason to think that either alone, or in tandem with taste perception, retronasal olfaction often involves attributing various flavour properties to locations in the mouth, even though the detection of properties by means of retronasal olfaction takes place in the nose. Whether orthonasal olfaction, retronasal olfaction, and flavour are one, two, or three different senses is an interesting issue, but one that need not detain us here. We wish only to discuss orthonasal olfaction and its content, and future references to 'olfaction' should be taken to refer to it. For a discussion of orthonasal and retronasal olfaction, and the relationship between them, see Rozin (1982) and Smith (2015).
8. See Macpherson and Hawley (2011).
9. Others may hold that the properties represented in olfactory experience are represented as instantiated at locations. It is an interesting question whether olfactory experiences can represent different locations—such as straight ahead, or to the left or right—or whether they represent just one location—such as

'here'—or no location at all. (If either of the two latter views is correct, then further locational or directional information gained from smell is simply inferred from a number of sequential olfactory experiences, perhaps had as one's nose moves through space.) The view that all that is represented in olfactory experience is that a property is, or properties are, instantiated 'here' is a feature-placing view. According to this view, 'here' is treated as an object, or proto-object, and to which experience assigns the property, or properties. See Clark (2000). The pure property view that we are considering in this paper is different in that all that olfactory experiences are said to represent is properties, not properties at locations.

10. There are in fact two separate accounts that one could give of pure property experiences. The first is that pure property experiences represent only a property, or set of properties, so that, for example, the content of a pure property experience is simply floralness. In addition, on this account, the attitude that constitutes perceptual experience is the attitude of holding it to be true that the content of the experience is instantiated. This is the view that we will adopt. The second account is that the content of pure property experiences is that a property, or set of properties, is instantiated, while the attitude that constitutes perceptual experience is the attitude of holding that the content is true. This second account could itself come in two varieties. According to the first, the content of pure property experience is that a property—conceived of as a universal—is instantiated. We believe that what we say about illusion and hallucination in this paper could be easily tweaked in order to account for this view. According to the second, the content of pure property experience is that a trope—an ontologically unstructured abstract particular—is instantiated. If one holds that only tropes are represented in experience, then one really conceives of experiences of pure properties as experiences of individuals. If one holds this view, then one must look to later in the paper, to what we say about experiences of objects, in order to determine what one should hold experiences of illusion and hallucination to be on our account. We leave this task to advocates, if there are any, of the view. Likewise, if one holds that experiences typically described as experiences of objects having properties involve the representation of tropes, then, again, one must examine what we say about experiences of objects later in the paper to determine how to adapt what we say about illusion and hallucination in order to account for that view. Again, we leave this undertaking to those, if any, that advocate this view of experience.
11. For discussion of the difficulty in answering this question, see, for example, Harper et al. (1968), MacDonald (1922), Moncrieff (1967), and Wilson and Stevenson (2006).
12. The most famous of the primary systems are Henning's (1916) 'odour prism', Crocker and Henderson's (1927) numerical similarity orderings and Amoore's (1952, 1963, 1970) stereochemical theory of olfactory processing. According to Henning, there were six olfactory primaries: (i) fragrant, (ii) ethereal or fruity, (iii) resinous, (iv) spicy, (v) putrid, and (vi) burned. According to Crocker and Henderson, the number of primaries was only four: fragrant, acid, burnt and caprylic. Amoore compiled a list of common labels used to describe olfactory stimuli in the literature. The most common of these came to denote his seven

primaries: (a) ethereal, (b) camphoraceous, (c) musky, (d) floral, (e) minty, (f) pungent and (g) putrid.

13. There are various challenges to this theory. In the same paper that we have cited (Lewis 1980), Lewis himself describes what he calls the ‘censor case’, which challenges his theory. He explains away that case, leaving his analysis unchanged. Also Tye (1982) refines the theory in response to criticism. We will ignore the amendments made to cover complicated cases, focusing only on any amendments required to cover the cases that we discuss in this paper.
14. Of course, one might point out that our typical visual experiences of objects represent much more than their locations, shapes, and colours. For example, as the statement of our example indicates, they, plausibly, typically represent relational properties, such as being to the left of, or being above. This is true, but we simplify harmlessly here. In line with how we describe this case, one can certainly imagine experiences that represent more limited things than our typical visual experiences do, but that meet the criteria that we specify. Or one can imagine typical visual experiences more distorted with respect to reality than the experience that we describe here.
15. In what follows, we will ignore the issue of whether, after a certain period of wearing such glasses, your experience would return to representing the world accurately. We will simply assume that the changes one experiences when one puts on the glasses remain.
16. Macpherson (2007) claims that cases of synaesthesia, unlike cases of cross-modal illusions, all involve hallucination. If one conceived of a form of synaesthesia that involved closely matching experiences, in the sense outlined here, then those experiences should, contra Macpherson (2007), be thought of as on the cusp between illusion and hallucination, rather than straightforwardly as cases of hallucination. Thanks to Casey O’Callaghan for drawing this connection to our notice. Note that O’Callaghan (forthcoming: footnote 13) claims that one would have to develop a notion of property hallucination in order to plausibly support Macpherson’s (2007) claim. That is one of the undertakings of this paper.
17. Note that we were supposing that olfaction is a whole modality that solely involves pure property perception—where all that is perceived are properties. However, in order for the argument to go through, one only needs there to be a suitable class of experiences that consist of the experience as of properties alone, some of which can be classified into veridical perceptual, illusory and hallucinatory cases.
18. Detailed discussion of what makes for a close enough match occurred in section four. We intend that those considerations apply in these cases as well.
19. See, for example, Treisman and Schmidt (1982).
20. One might complain that you are not suitably counterfactually sensitive to colour in this case because you are only sensitive when you randomly hallucinate. But this would not be right, as Lewis’s (1980: 244) consideration of the ‘loose wire’ case shows us. Suppose that one has a prosthetic eye that has a loose wire. This wire flops around and gives one veridical experience only when the wire happens to touch a vital connector. If everything else in the eye and brain is working as it is supposed to, one sees during that time. What this shows is that the range of cases across which we should assess whether there is a match of experience to



the scene before the eyes is not a range of actual cases spread out in time, but a range of counterfactual alternatives to the scene under consideration. However, considering how someone's perceptual system has worked over time is often a good guide to figuring out how it would work in a counterfactual situation. That is why we have often introduced various cases of illusion and hallucination by specifying how someone's perceptual system has worked over time and have then stipulated that this reflects how it would work in counterfactual situations.

21. Those that disagree should simply strike clause (a) from the comprehensive account of illusion and from the comprehensive account of hallucination that we give below.
22. Some of the cases listed as cases of illusion are also listed as cases of hallucination as they contain both. These cases are indicated in table 2.
23. On the basis of what follows we leave the reader to construct a case of (2h) for themselves.

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