

## IS THE VISUAL SYSTEM A BULL-SHITTER?

Daniel Tippens

*In this essay I survey some recent empirical findings in vision science and show how they matter for philosophical issues in the epistemology of perception. First, I draw on some data which suggest that our visual system is a bull-shitter. Typically we call someone a bull-shitter when they don't care about whether what they say is true or false, they just care about some other goal – such as winning the argument. The bull-shitter will say some true things and some false things as long as they satisfy a truth-irrelevant end. Similarly, some empirical work suggests that the visual system, for truth-irrelevant evolutionary purposes, presents us with mostly illusory experiences which, while accurately conveying to us that an object is present, inaccurately attribute some properties to an object. Like the bull-shitter, the visual system presents us with partially accurate and partially inaccurate experiences for truth-irrelevant reasons. I then discuss what we would be justified in believing on the basis of our perceptual experiences, if our visual system is a bull-shitter.*

Let's say that if I have a visual *experience* of a grey elephant, I have a visual *perception* of a grey elephant. What makes my visual perception accurate i.e. veridical? Let's also say that a visual perception of a grey elephant is veridical when the grey elephant is actually in that location in the world and in some sense caused my perception. Simply put, I veridically see something when that thing is actually there and has appropriately caused my perception.

Why does the causal condition matter? It matters because it seems possible that I could be having an

experience of a grey elephant and the grey elephant is actually in that location, but I am on some drug which is actually causing my perception. Intuitively, this isn't a veridical perception despite the fact that it, coincidentally, is accurately representing the grey elephant in that location. I need to be, in some sense, appropriately causally connected to the object I perceive.

Let's also say that I hallucinate (and don't have a veridical visual perception) when I see an object that really isn't there. Here, something other than the object caused my perception, so I came to have a perception of some object that really isn't there. Lastly, let's say I have an illusory visual perception when I see an object that doesn't have all of the properties my perception indicates it has. For example, I have a perception of a grey elephant but that elephant in the world is actually white.

Some have said it is possible that most, or all, of our perceptions are hallucinations; if we are lucky a few are illusory; but *none* are veridical. After all, it is possible that an evil demon is causing all of our hallucinatory perceptions, or that we are just a brain in a vat being probed to have certain experiences. Reasoning from these possibilities, some concluded that we can't know much, or anything, about the external world on the basis of our perceptions. But most of us don't take this radical sceptical position too seriously anymore. We don't spend much time worrying about Descartes's deceitful demon hypothesis or the possibility that we are brains in vats. These possibilities are just too outlandish to be of concern outside an epistemology classroom. These scenarios, for the most part, impact us like the infrequent childhood visits from our cheek-pinching grandparents; they don't disrupt the overall flow of our life, but when we see them, we are transiently disturbed.

One popular belief that this article focuses on, is that the visual system is a kind of truth-teller; most of our visual perceptions are veridical, some are illusory, and a few are hallucinations. Consequently, we tend to think we can trust our truth-telling visual system and permissibly form all sorts of

beliefs about what there is around us on the basis of our visual perceptions. We are *immediately* justified in believing all that is out there on the basis of perception alone, *absent* any defeaters. Let's unpack this: being immediately justified simply means that you need no reasons in addition to your current perception in order to justifiably believe something about the external world. Your perception *by itself* justifies your belief. If I see a grey elephant, then on the basis of that experience alone I am justified in believing that there is a grey elephant there. A defeater is some kind of evidence that would cause you to question the veridicality of your perception. If I know I have just ingested a hallucinogenic drug and perceive a grey elephant, then I am no longer immediately justified in believing that the grey elephant is there on the basis of my perception. The justification given by my perception has been *defeated*.

Call this the common-sense view about which beliefs we are justified in holding on the basis of perception.

*Common-sense view:* The visual system is like a truth-teller: most of our perceptions are veridical. Consequently we are immediately justified in believing all that is out there on the basis of perception alone.<sup>1</sup>

The common-sense view is motivated by the fact that it is simple and intuitive. It is the view we adopt when we aren't in epistemology class. Most of us feel we don't need to offer any further reasons for our perceptual beliefs other than what our perceptions *show* us to be the case. The common-sense view, as mentioned before, assumes that the visual system gets our perceptions right most of the time, and then claims that this allows us to be justified in believing propositions about the external world on the basis of our perceptions. In other words, unlike the radical sceptic who sees the visual system as a kind of liar – a system that consistently deceives you by providing you with hallucinations – the common-sense view advocate holds

that we think of the visual system as a kind of truth-teller; a system that reliably attempts to, and mostly succeeds in, yielding veridical perceptions. Consequently we can trust this truth-teller since it provides us with veridical perceptions most of the time; only when we have reason to think it has got things wrong are we no longer justified in believing our perceptions.

However, what if the visual system doesn't give us mostly veridical perceptions as the common-sense view holds, and it also doesn't give us constant hallucinations as the radical sceptical view suggests? What if the visual system gave us mostly *illusory* perceptions? Call this the middle-view. On this middle-view, the visual system would be more akin to a bull-shitter than a liar or truth-teller. Philosopher Harry Frankfurt proposed that what characterizes a bull-shitter is that he will say both true and false things to accomplish some other goal like looking smart or winning an argument. He ultimately doesn't care about telling you what is true or what is false. The visual system is a kind of skewed bull-shitter in this middle-view; our visual system mostly gives us somewhat non-veridical perceptions (illusions), but occasionally tracks what is actually out there. All of this it does to fulfil some other goal: an evolutionary function. The visual system bull-shits.

*Middle-view:* Our visual system is like a bull-shitter: most of our perceptions are illusions. Consequently we are not immediately justified in believing everything about the external world that our perception presents to us.

The middle-view is epistemically less satisfying than the common-sense view; we can't believe as much as we thought we could on the basis of our perceptions. We will discuss later what we are immediately justified in believing on the middle-view, but for now, the middle-view suggests that most of my perceptions are non-veridical, and even worse it looks like the visual system doesn't particularly

care about giving us veridical or non-veridical perceptions at all; it just wants to uphold some evolutionary function. It's as if I am constantly being told things from a known bull-shitter – I always have a defeater for believing what he is saying. Perhaps I can't believe very much on the basis of my perceptions after all!

This is what this article is about: vision science seems to be indicating that our visual system is a kind of bull-shitter – a system that is frequently giving us somewhat non-veridical perceptions in order to achieve some evolutionary goal. Must we then do away with the common-sense view of perception? Or can it still fare well despite the fact that most of our perceptions seem to be illusory? I will argue in the end that we seem to be epistemically stuck between a rock and a hard place in light of the vision science data that we explore. That is, we appear to be forced to choose between what appear to be two unsatisfying accounts of what we can justifiably believe. On the one hand we may be able to say that the vision science data do not force us to endorse the middle-view, but this will come at a severe cost to the common-sense view. On the other hand, if we must endorse the middle-view, then we won't be able to justifiably believe as much as the common-sense view defender thought.

First, we will discuss some distinctions that will allow us to hone in on what kind of illusions I will be talking about. Second, we will explore the vision science data and show why it seems to support the middle-view. Lastly, we will discuss the alternative to the middle-view that is consistent with the data, and show why it seems epistemically unsatisfying as well.

### **Conceptual distinctions**

Before moving on with the meat of the article, we need to recognize an important distinction in cognitive science between what are known as 'low-level properties' and 'high-

level properties'. Let's say you and I are looking at a blue circular object that is a blueberry. You are fortunate enough to have the concept of a blueberry, whereas I am not. When we both see the blue circular object, I see simply a blue circular object while you relish in also seeing this blue circular object as a blueberry. In other words, you have categorized the object as being a blueberry in your perception.

The low-level properties here would be the properties of the object that I, the person lacking the concept of a blueberry, perceive. These are properties such as colour, shape, contrast, and perhaps some relational properties like bigger/smaller than and farther away from. The high-level property here is the property of *being a blueberry* that you perceive. In order to see the object as a blueberry, I need the concept of blueberry.

Phylogenetically this distinction does some work; creatures other than humans have perceptions, but many of them might only enjoy perception of low-level properties and not high-level properties. They see colours and shapes, but not properties like *being a blueberry*. On some understandings of low-level properties, we might be able to say that babies temporarily visit the camp named 'low-level perceivers only'. They see, but they don't see as.

For the remainder of this article when I talk about perceptual illusions, I will be talking about illusions of low-level properties only. Illusions that play on properties like colour, shape, contrast, spatial frequency, and some relational properties (all to be explained later). You might think this isn't concerning since it's possible that we can be undergoing mostly illusions of low-level properties, while still safely yielding mostly veridical perception of high-level properties. But since the foundation upon which we accurately or inaccurately categorize objects depends upon the low-level properties we perceive, we ought to be concerned about whether or not our low-level property foundation is mostly illusory.

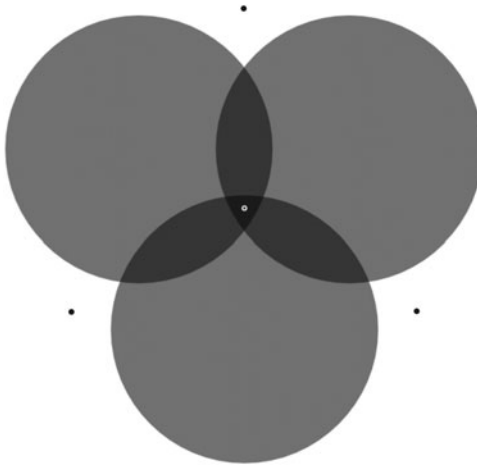
## Attentional illusion

When you hold up a magnifying glass to an ant, you come to see many more details of the ant. You can now discriminate the mandibles from the head, and the head from the thorax. Alternating between holding up your magnifying glass to the ant and retracting it will lead to alternating visual perceptions of the ant: detailed ... not detailed ... big ... small ... and so on.

Relational properties such as bigger than and smaller than (relative to other objects) are clearly changing. Are you experiencing an illusion when you hold up the magnifying glass? When you take it away? Are both visual perceptions of the ant veridical? Let's call this puzzle the *magnification puzzle*, and this effect the *magnification effect*.

You might shrug off this puzzle since it doesn't make us doubt the claim that *most* of our visual perceptions are veridical. Perhaps just the ones that involve magnifying glasses ... perhaps. But what if I were to suggest to you that most, if not all, of our perceptions admit of the same magnification effect even when we are not looking through a magnifying glass?

Perturbingly, some have argued that the very act of selectively attending to a certain object or property has this very magnification effect; the amplification, exaggeration, or distortion of some properties of an object. There are two types of selective attention that we should note; endogenous and exogenous attention. Exogenous attention (also known as bottom-up attention) is when your attention is caused by an external stimulus. If you hear a loud boom, the sound causes you to attend to the boom. Endogenous attention (also known as top-down attention) is when you voluntarily shift your attention from one thing, or place, to another. Here is a simple illusion created by Peter Tse which helps to illustrate the phenomenon of endogenous attention and the magnification effect of attention.



Fixate your eyes on any one of the dots. Keeping your eyes fixed, shift your attention around from circle to circle. When you do this, you are endogenously attending to different circles. After shifting your attention from one circle to another, did the shade of grey that constitutes the attended circle darken? If it did, you have experienced an illustration of the magnification effect. If you couldn't get the effect, I ask that you to try again or assume that it is a real effect for now, as it has been replicated in many studies. Attentional magnification of many different low-level properties has been shown.

This is just an *illustration* of the magnification effect, though, as it only works in certain background conditions. Technically this would only permit us to believe that in *some* conditions our attention has the magnification effect, in a similar way to how some conditions for obtaining a magnification effect are looking at an object through a magnifying glass. However, there are other studies that show condition-independent examples of attentional illusions. Psychologist and neuroscientist Marisa Carrasco of NYU



has published many condition-independent examples of this effect.

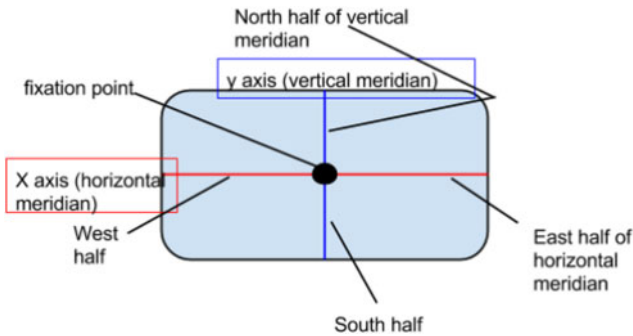
You might think that some comfort can come from the fact that this illusion only arises in endogenous attention, and perhaps the magnification effect doesn't beleaguer exogenous attention. But unfortunately, the situation isn't that comfortable. In a recent review of attention research conducted in the past twenty-five years, Marisa Carrasco tells us that this is not the case. Though it looks like exogenous and endogenous attention may have different (though somewhat overlapping) underlying neural systems, they have many similarities. One of these similarities is that some of their magnification effects overlap. Attending, generally speaking, induces magnification illusions.

### Visual field illusions

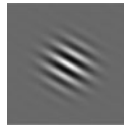
What about peripheral vision? Someone could still hold that most of what we perceive outside attended areas of our visual field is veridical, thereby rescuing our folk intuitions from the siege of empirical studies. The evidence against this claim is also strong. We turn now to 'eccentricity' studies. These studies try to uncover differences in performance of certain tasks when relevant stimuli are presented at different parts of your visual field. For example, they might ask if subjects can better identify where the tip of a pencil is when it is placed in one part of the peripheral vision vs another.

It turns out that some work has shown that certain low-level properties actually *appear* differently to subjects in varying places in their visual field (much like the magnification effect described above). Imagine that your visual field was cut up by an  $x$  and  $y$  axis and labelled in the following way:

Eccentricity studies have shown that we perceive some low-level properties with greater sensitivity in the south half of the vertical meridian as opposed to the north half.



The image shown below depicts what is known as a Gabor patch. A Gabor patch just is a patch that is seen because it has a different contrast (differences between light and dark) than the background it resides in; it might be simpler to think of it as a contrast patch.



Let's say I have two Gabor patches, one has a 20% contrast and the other has a 40% contrast. I place the 20% Gabor patch in front of you on the south half of your vertical meridian and the 40% patch on the north half of your vertical meridian. Assuming you have a normal visual system, studies have shown that you will report that the patches appear to have the *same* contrast. The south patch, then, is being magnified so that it appears to have the same contrast as the north patch. This difference in sensitivity to certain properties in the south vs the north half of the vertical meridian is known as the 'vertical meridian asymmetry'.

Differences also appear in what is known as the 'horizontal-vertical anisotropy'. This is characterized by differences in what subjects report seeing along the horizontal meridian vs the vertical meridian. Some low-level properties are magnified more along the horizontal meridian as opposed to the vertical meridian.

Many think these effects should be explained evolutionarily. It is likely, for instance, that we had more threats concerning our ancestors in the south half of their vertical meridian as opposed to the north half. Anyway, it looks like the assault on veridical perception doesn't stop with the head-on attack from attentional magnification illusions; we are flanked by peripheral illusions as well. The claim that most of our perceptions are illusory has a bit of an empirical army to back it.

### **Perception: bull-shitter or truth-teller?**

The common-sense view thinks our visual system is a kind of truth teller: reliably attempting to provide us with the way the world actually is. The sceptic thought it was possible that our visual system is a kind of liar: constantly deceiving us with hallucinations. The evidence presented seems to support the middle-view; that the visual system is like a bull-shitter, and consequently we can't believe as much as we thought on the basis of our perceptions.

Assuming this middle-view, what can we justifiably believe on the basis of our perceptions? Well, if I know that most of my perceptions are illusory, then I *always* have a defeater for my perceptions. It's as if I know that I am always under the effects of an illusion-engendering drug! However, unlike hallucinations, illusions are *partially* accurate. We said that illusions are characterized by misattribution of *properties* to some *object*, but they aren't defined by misattribution of an *object* to the *world* like hallucinations. Since we aren't hallucinating, we can still be immediately justified on the basis of our perception that there is an

external world, and that there is some object in front of us; we just have a constant defeater for our beliefs about the properties of the object. So, assuming that the visual system is a kind of bull-shitter and not a truth-teller, the middle-view advocates the following:

1. Most of what we perceive are illusions.
2. I have good reason to believe that my current perception is illusory (from 1).
3. If I have good reason to believe that my current perception is illusory, then I have a defeater for believing what the properties of the objects are.
4. I ought only to believe that I perceive some object.

This is the middle-view. On this view, the set of beliefs that we are permitted to form on the basis of perception is smaller than the set of beliefs we previously could form on the common-sense view. Since most of our perceptions are illusions, we can only justifiably believe that there is some object in front of us, but we have to remain agnostic about its properties.

Can we be airlifted out of this middle-view and justifiably believe things about the properties of objects? Perhaps, but we have to answer the magnification puzzle mentioned earlier. When we exaggerate the properties of certain objects via attention and in our peripheral vision, are these exaggerations really illusions? If we can answer in the negative, then we can still hold that most of our perceptions are veridical, and that we can justifiably believe more than what the middle-view says we can.

One way to answer in the negative is to appeal to a view the philosopher and cognitive scientist Ned Block has offered about how our visual system represents (or presents in perception) properties in our visual field. He claims that our perceptions represent properties of objects in an *intervallic*, or *ranged* way. For example, let's say you have

two Gabor patches in your visual field of equal contrast (say 40%). The peripheral vision patch looks more blurry in your peripheral vision than the attentive vision patch. For Block, this means that your visual system is presenting each individual patch as falling within different ranges. The blurry peripheral patch is presented as having, say, a contrast between 30% and 50%, and your attentive patch is being presented as having a contrast between 35% and 45%. The peripheral patch is less precisely presented than the attentive patch (since it is presented as falling within a wider range); however, both are veridical since the actual contrast of the patch falls within both of their ranges, specifically, 40% falls within both 35%–45% and 30%–50%. Just as it is true that the number 50 falls between the numbers 1 and 100, so too each patch is being represented as falling between the contrast interval that we indicated, so both are veridical. Since both are veridical, then where we thought we had illusions, we actually have veridical perceptions. So, most of our perceptions are veridical after all.

I think Block's view, or something like it, is right. Many of us thought that our visual system presents us with precise perceptions; perceptions that tell us *exactly* how the world is. But why should we expect our visual system to provide us with such precision? The brain is a chaotic place of neuronal activity; it makes sense that it might simply give us ranged perceptions. We were epistemically selfish to think otherwise.

This effectively negates premise 1 of the argument that the middle-view defended earlier. Most of our perceptions are not illusory, but we still have to ask if this is epistemically satisfying. Even though I can form beliefs about both objects and what their properties are, we still have a smaller set of beliefs that we can hold on the basis of our perceptions. I can only believe that there is some object out there and its properties fall within some range that my visual system represents. I have heard others voice this complaint to Block when they say things like, 'we don't

want to know what is *roughly* out there, we want to know what is *really* out there!

On this view the visual system is not like a bull-shitter since it still attempts to give us veridical perceptions. It is more like a well-intentioned but slightly ill-informed interlocutor; one who will answer your question 'what time is it?' with 'somewhere around two-thirty'. You can trust his answer, but his answer isn't as satisfying as you would like.

My suspicion is that Block isn't as concerned with the epistemological worries that arise from his account of the intervallic veridicality of perception; he is primarily occupied with first solving the metaphysical problem about how we could be having mostly veridical perceptions *at all*. At any rate, I feel the tug of the epistemic dissatisfaction that the intervallic account of veridicality generates, but perhaps I am just being selfish. Unfortunately, it's not as if rejecting that the visual system is like a well-intentioned interlocutor and adopting the view that the visual system is like a bull-shitter helps you expand how much you can justifiably believe on the basis of perception. So it looks like we are stuck between a Block and a hard place. Reason enough for me, at least, to shed a few epistemic tears.

*Daniel Tippens, BA in Philosophy, is a research technician affiliated with New York University and an assistant editor for the Scientia Salon webzine.*