10 Empiricism: the use of the senses

Aims

By the end of this chapter students should:

- **be able to notice, in everyday life, those times when their senses are not reliable**
- **understand why perception is an active, not a passive process, and the implications this has for our view of the world**
- **be aware of the often unnoticed role that reason plays in interpreting our sensory information**
- **understand and be able to discuss the basic philosophical problems with empirical knowledge**
- **understand and be able to discuss the meaning of the phrase 'the mental construction of reality'.**

Introductory notes

This chapter is fairly short, not because the topic is uninteresting or easily covered, but because the main areas of interest might be better placed under philosophy and psychology than under Theory of Knowledge. We will note the theoretical problems briefly, leaving more detailed study to philosophy texts, and we will take a brief look at an area that is at the cutting edge of cognitive psychology and neuroscience.

In our search for reliable knowledge and truth we need only see where some of the problems lie and the skeleton of possible solutions to realise that we cannot turn to our senses for certainty. This is because what we sense tells us as much about ourselves as it does about the world.

It is not the intention here to deny that the senses tell us vitally useful information – we would not want to deny the existence of objects and the material world (although a philosophical case can be made for just that). Rather we hope to see why, although our senses allow us to survive and live our daily lives, they may not tell us much about 'ultimate' reality. Our senses have evolved in a way that allows us to get by in the world. This may mean that they are not faithful to the world in anything other than an abstract way. Students often find this a difficult idea to grasp, so a useful analogy can be made with mathematics/science. Suppose we launch a missile, and we want to predict where it will land. The most accurate way of doing this is to measure the initial speed, direction, wind velocity, etc. and to do some calculations. The answer may be something like '100 km on a bearing of 217°'. But is this where it will land? Well, no, this answer is just a few marks on a piece of paper – it merely represents the actual spot. The missile will land somewhere on Earth, and we can decode the symbols '100 km on a bearing of 217°' to realise where it will land. The symbols '100 km on a bearing of 217°' (and all the mathematical working needed to calculate it) are related to the answer, very closely, but they are completely different from the actual place where the missile lands. There is a crucial difference between the real place and the representation of the real place. Similarly, we suggest that our brains make 'calculations' about the real world of people, objects and events, and that these 'calculations' allow us to interact with them, but that the mental representation of these people, objects and events may be utterly different to the 'real' people, objects and events.

Of all the topics in this course, this is the one which generates the most varied reaction from students. Some simply don't see that these ideas are remotely interesting while others who really 'feel' the problems may have an existential crisis! I shall never forget the reaction of one not-especially-able student who had just grasped the central problem – his hands went to his face, his eyes went wide and he whispered, 'But . . . but that means it might all be wrong!' The trick to getting this reaction is, as ever, to ground the lesson in vivid and concrete examples.

I never end this topic on anything but a positive note. We must use our senses – it is impossible not to do so. We need to be aware of the difficulties and pitfalls

not so that we reject empiricism but so that we are better able to avoid making mistakes. As far as living our lives goes, we can be fairly confident that our senses have evolved to 'work' for us. It may be that they cannot give us 'truth' but if they keep us alive in a world of very dangerous objects then we should rest content.

Plato's cave

This is a good concrete way to start the topic, and you can return to it at the end as a possible conclusion.

Invite the students to imagine a thought experiment with you. Tell them to imagine that they are in a cave, and that they are facing into the cave, looking away from the entrance, so they can't see out. They are actually sitting down, facing a wall and behind them is a fire, so that all they can see are the shadows on the wall. And it's worse than that, because in fact they are chained there, along with their fellow prisoners, and although they can talk to them, they can't turn around; the shadows are all they can see. If that isn't bad enough, it turns out that they have been chained there all their lives. They have never known anything else. Now ask them: under these circumstances what would you know about reality?

It is possible to do a simulation here with some students and some lights and shadows. Position a stage light to shine onto a wall and arrange for some students to look only at the wall while others do a play/mime, casting shadows on the wall. The students looking at the shadows must figure out what is happening in the play/mime. Make it difficult!

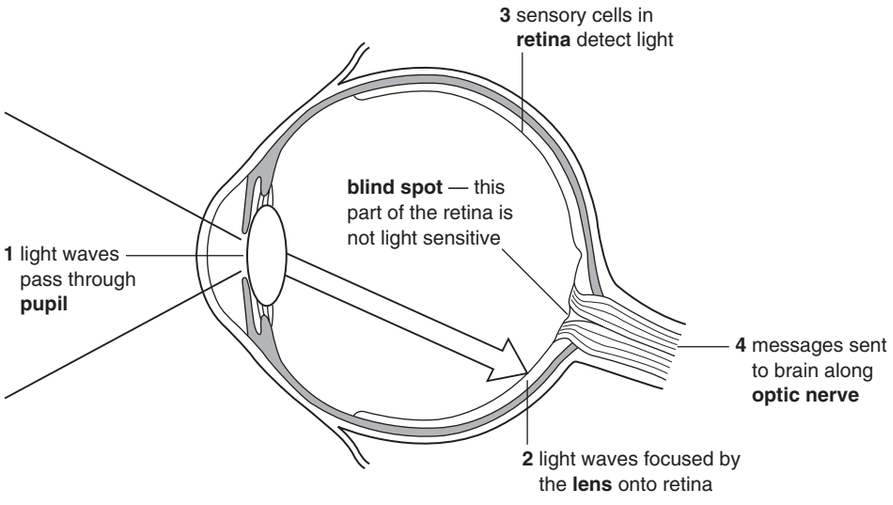
Presentation: a scientific approach

As the ideas in this topic are so abstract, there is the danger of leaving students behind. The scientific entry, rather than the more traditional sense data approach, seems to win some credibility from students.

The slides referred to in this presentation are available from: Optical Illusions: Slides and Commentary, Maths Products Plus, PO Box 64, San Carlos, California 94070, USA. However, plenty of other illusions will do just as well.

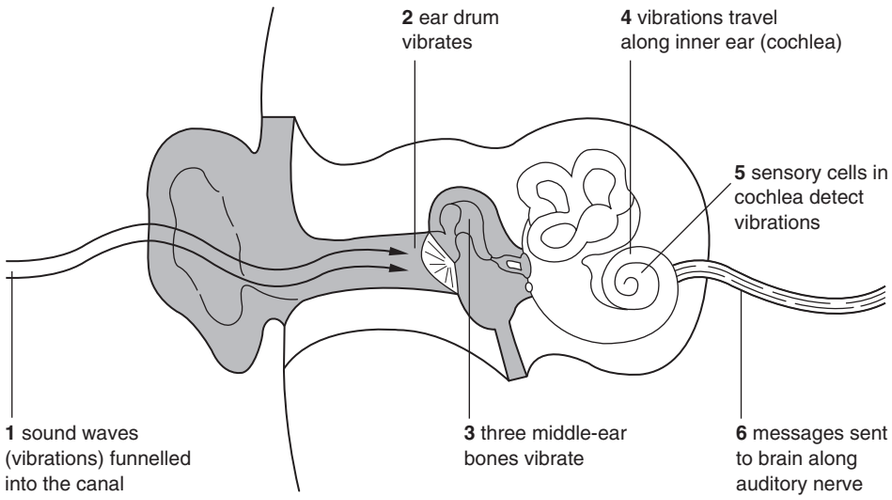
Below is the full text of a possible presentation. The OHTs you will need can be found on pages 80–1 of this book.

OHT1: Anatomical diagram of the human eye



This is a picture of the eye, and here's how it works. All you biologists know this far better than I do – light enters the eye, it is focused on the retina, converted into electrical impulses and then these impulses are sent to the brain. Do you know about the impulses? What's happening is this: the cells here are sending impulses – blip-blip-blip-blip (*quite slowly*) – and the gap between the blips is pretty much the only thing that changes. So when you see something exciting, like the colour blue for example, the blips get faster – blip-blip-blip-blip (*faster*). And these blips get sent to the brain to decode.

OHT2: Anatomical diagram of the human ear



This is a picture of the ear, and here's how it works. It's actually quite similar to the eye in principle. A sound wave comes in here; it knocks the bones around; they pass the wobble into the inner ear; the shock waves get converted to electrical impulses in the cochlea. And guess what? The cells here are sending impulses – blip-blip-blip-blip (*quite slowly*) – and the gaps between the blips is pretty much the only thing that changes. So when you hear something exciting, like music for example, the blips get faster – blip-blip-blip-blip (*faster*). And these blips get sent to the brain to decode.

In fact, the other senses are pretty similar. Some physical thing gets converted to blip-blip-blip-blip. And all these blip-blip-blips get sent to the brain for decoding. If you think about it that might seem a little strange. What have blip-blip-blips got to do with smells and colours? They seem poor imitations of the real thing don't they? One might almost call them shadows of their original states, like shadows on a cave wall perhaps?

Do a demonstration: get one student to be the brain, standing in the middle of four others, one of whom is the ear, one the eye, etc. The students are stimulated (shine a torch at one, speak to another, touch another, etc.) and they call out blip-blip-blip to the brain. The point is simply to get over the enormity of the task that faces the brain.

I hope you agree that before the blips have reached the brain there is no sensation of any sort. If you doubt it, imagine that we do an extraordinarily stupid experiment; we snip our optic nerves, auditory nerves and all our other nerves just before they reach the brain. What would happen? Well, ethics aside, there's no point in doing the experiment because afterwards we would have absolutely no way of communicating with anybody. We would be totally deaf, dumb, blind, and unable to perceive our bodies or anything else. In fact, the whole world might as well not exist for the person who had undergone this procedure. So it is here in the brain that all these blip-blip-blips are synthesised into our conscious experience of the world. That is so remarkable! If you think about it in detail, this is a simply astonishing fact – you only have contact with 'the outside world' through your senses, which send 'you' digital impulses. Your brain constructs the world out of this data.

Your whole world is made up of blip-blip-blips. The colour of my shirt? Blip-blip-blip. The sound of my voice? Blip-blip-blip. The feeling of jumping into a cool swimming pool? Blip-blip-blip. (How the brain constructs the world from mere blips is one of the great unanswered questions of twentieth-century science and philosophy, and is very poorly understood.) But let me ask: what do you know about the real world?

How could you find out? If you read a book, your eyes just send you some more blips. If you ask somebody and they reply, your ears just send you some more blips. Anything you do to find out will just result in more blip-blip-blips. So you are alone with your blips. Pretty depressing, isn't it?

But hang on a minute, how can this be? I mean, it all works, doesn't it? We do all see the same world, don't we? We agree on things, don't we?

Well, tell me, how do you know? How do you know we all see the same world when you only really know blips? Let me give you a specific example. You

would all agree that the sky is blue. What that means is that when I ask you what the colour is, you all say 'blue'. But how do you know that your experience of 'blue' is the same as each other's? Can you be sure that if you could see somebody else's 'blue' (which of course you never can, since then it would be your blue) you wouldn't call it 'green'? Language gets in the way here (and we will see this over and over again). Anyway, this colour business is one for you to discuss later. I know some of you will have thought of it before. If you have, then try to apply the same argument to other sensations – smell is perhaps the most obvious one, but this idea can be applied to all of them. It's pretty disturbing.

I want to move on to a few practical examples which approach the same point from a different angle. These are very simple examples, which it is tempting to dismiss, especially if you have seen them before, so think carefully. We can learn a lot from these.

Show a series of optical illusions/ambiguous figures that indicate how much we construct the world; how much the brain concocts a plausible story that goes beyond the visual sense data input, for example, Necker Cube figure, rabbit/duck figure, parallel lines illusion.

So we have several possible interpretations of these illusions. To take this idea to its extreme, is there another interpretation possible for your entire world, maybe one that you haven't yet figured out? Maybe one that is beyond humans entirely. Maybe we will never know the real world. Or maybe all our interpretations are completely different and we just think they are the same because we use the same words.

I think that this is completely possible, and I'll take just a couple of minutes to present to you the strongest evidence I know. Have any of you any brothers, sisters or cousins who are much younger than you? Do you remember them as new-borns? As tiny little bundles? What do you think they know about the world?

Well, it is clear that the babies know, at the very least, how to learn, but apart from this they seem to know little about the world. When they are born, although their eyes and ears are well developed, they have yet to learn how to perceive things. What do I mean by that? How can we *learn* to perceive things? Well, if you wave your hand in front of a new-born, it is thought that although the light hits the baby's eyes, and the blip-blip-blips are getting to the brain, the baby doesn't understand that the blips mean that there is an object in the world. All the brain knows is that it is getting some blips. This stage quickly passes and the baby begins to learn that blips are correlated to what we call objects. At this stage, she is very interested in coloured things, and if you hold her hand in front of her and put something in it then she will look at it with what appears to be interest. Certainly her attention stays fixed for a while. But if you leave her hand at her side and put the object in her hand, where she can't see it, then she doesn't bring it up to her face to examine it. Her brain doesn't yet realise that the blip-blip-blips from her hand mean that there is something there. So it seems that the baby is living in what has been called 'a shimmering world of perception'. She has all this sensory input, but doesn't know what to *make* of it. Notice, what to make of it. We *make* sense of the blip-blip-blips.

It is for this reason that philosophers have spoken of 'the rabble of the senses' and the 'bloomin' buzzin' confusion'. The world does not come neatly pre-packaged into things, objects, ideas and so on. To some extent, we learn how to interpret the given sense data. We impose our choice of categories on it so that we can make sense of the rabble and bring order to the confusion. Our choice of category may say as much about us as it does about the real world. Perhaps it does not. This is a difficult question.

Back to some practical examples. How reliable are your senses? What influences how reliable they are? I would like you to count the number of 'F's in this overhead.

OHT3

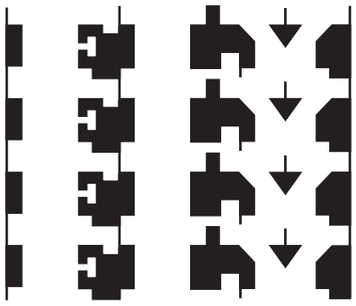
Finished files are the results of years of scientific study combined with the experience of many years.

Well, how many did you get? The answer is six and why do you think so many of you missed out the 'f's in 'of'? Language again; your brain was thinking 'v' because 'of' sounds like 'ov', whereas the 'f' in the other cases sounds like 'f'. So even though you were looking for a trick, your brain did a dirty on you again. **Language** influences how we interpret our senses. [*At this point you need a coloured OHT of a rainbow*.]

Here is a picture of a rainbow. How many colours are in the spectrum? Yes, you all know ROYGBIV. But as some of you no doubt realised, there are an awful lot of shades here. Why did you say seven? Because language and **culture** told you so. You have been told that the answer is seven. To be fair, the structure of the human eye, that is, our **biology**, probably has something to do with it, too. (Why don't we see ultra-violet, like bees do, or infrared, like *Predator*?)

Now, the final example. What does this say? [*You can make this more effective by showing bits first – such as the 'arrows' pointing down on the right-hand side*.]

OHT4: Fly



This is difficult because you expected the writing to be in black. **Experience** told you that it was likely – after all, all the other overheads had black letters. So if you didn't get it immediately, imagine what your brain must have been doing. It was looking at the blip-blip-blips and thinking to itself, 'This is no good; I can't figure it out; I'll have to try it a different way'. It used **reason** – another factor in the list of influences. It's a little like breaking a code – you try one key, one interpretation, and if it doesn't work you try another. You keep going until you crack it. You start with the interpretation you think is most common (in this case, black writing and white background) and then you try other, different interpretations if that doesn't seem to work. The brain is always doing that, but usually it does it so well and so quickly that we don't even realise that the whole world is written in code. Still less do we question whether or not we have actually cracked the code with the right interpretation!

Experience is extremely important. What has happened to us, especially early in life, will dramatically influence how we perceive future events. You are probably aware that childhood trauma can affect the rest of a victim's life. Here's an example. In the 1920s, two married psychologists (married to each other that is) made a huge noise behind their baby's head every time they gave him a cuddly toy. Cuddly toy . . . BANG! After a while, when they showed the baby a cuddly toy, he experienced fright and started to cry without the noise. Pretty sick. This effect lasted into adulthood – his perception of cuddly toys gave him the experience of fright, and he couldn't get rid of the experience.

How does this relate to us? Well, in relation to the cave, I hope you can see that the idea is that we, or at least our brains, are tied up inside the cave, which is our head, and that just as the cave dwellers knew only shadows, so all our brains know is blip-blip-blip. Just as black and white, two-dimensional shadows are very poor imitations of the real world of colour and three-dimensional objects but the cave dwellers don't realise that, so it could be that the real world is far far more than we will ever know.

I hope these ideas have given you some food for thought. Taken to their logical conclusion, they are very disturbing. Those of you who are interested can pursue this in any introduction to philosophy. For now, let us end with two profound questions:

- Do we have the right interpretation of our senses?
- How can we know?