

### 3. Mind unbound

The comedian Alexie Sayle once said that he felt his mind was full. He was scared to learn anything new. Put in anything more and something else will fall out. He was afraid to watch the news in case it made him forget his grandmother's name.

Do our minds have limits? Leaving aside the one in-one out situation (Mr Sayle's fears are unfounded), could it be that minds can be saturated or that some things just won't go in. The latter, by the way, is the premise of Marcus De Sautoy's book *The things we can't know*.

It seems to me, based merely on how often I hear it (from Mr De Sautoy, for example), that the idea is gaining traction. Its creeping into mainstream thought. Its time to address it, and set it right. In my view, it arises out of a misconception of knowledge itself. A better understanding of which will show that (beside the trivial fact of limited time and energy) our minds are not limited and there is nothing we can't know.

Let's begin with the meaning of "knowledge". Let's imagine I assert a belief. I say "I think it will rain tonight". You ask "do you know for sure?" and I reply "No, I don't know for sure, but I think it will".

In this dialogue the word "know" refers to a degree of certainty, which is drawn conceptually from a particular feeling we share. This feeling is the one you would get if I asked you where your hand is. This is something you know with immediate certainty. The word "know" gets its meaning by an extension of this concept (like a metaphor).

It is very important to understand however, that the feeling of where my hand is is *very* different to my opinion about the weather. It is however, the nearest conceptual resemblance available to us, which is why we use the same word for both.

Throughout the history of science it has been necessary to assert a degree of certainty greater than anything mere speculation can offer. Aristotle's physics for example, went beyond that of the Cosmologists because it evolved from the idea of matter in motion. Within a paradigm however, mistakes beget mistakes, and his model eventually succumbed to the discipline of sharp-eyed observation, courtesy of characters like Bacon and Galileo.

The products of the new science were clearly surer than those they superseded, and how else could this be described other than "knowing" (as opposed to what had previously been "thought")? This however, creates a contradiction. The new science was born of a challenge to received knowledge, it was born of and proceeds only through doubt. How can we both know and doubt?

In the pedagogic essay, I discussed how this contradiction evolved. It culminated in two important points. Firstly, in response to the idea that the world we inhabit is a construct of our minds, David Hume suggested that the surety of knowledge may be established when we have a scientific understanding of the mind. Secondly, through the "hypothetico-deductive" method and "falsification" science can achieve high (optimal, not absolute) certainty.

The method has been fruitful. We now have plausible and reliable models of things that the people of generations passed would never have imagined. We know about the genetics of invisibly small bacteria, the behaviour of giant animals that lived 200 million years ago, the shape of the continents they walked on and the composition of stars whose light, emitted way back then, has just now arrived on our planet. We even know quite a lot about our brains and our minds. None of this is as certain as the presence of my hand. Neither is it speculation. It is "knowledge", which an example will help us to understand.

Imagine I find something, a large bone, for example. The discipline of science tells me that it was

not put there by a supernatural being nor does it come from a magic dragon. I guess it belonged to a living or extinct animal. Further observation shows that this bone had the strength and articulation to hold a large sheet of stretched skin. Experimental reconstruction shows that this sheet of skin was large enough to lift a substantial animal into the air. If no alternative hypotheses are left standing, I can reasonably believe that it was part of a wing.

This wing however, may not be exactly like the wing of any other known animal. The one I have in mind is actually an entirely unique structure. Making up a unique word for it would be foolish. It is unhelpful because your audience has no reference point for their imagination.

Using the word “wing” enabled you to form new knowledge about something in the world because you already know what a wing is. The word evoked an idea containing several aspects: a shape, a position, a function, a substance, a structure, etc. The bone I was actually describing shares only two of these things, a substance and a function. That was enough to give you an idea of what it is. You really have no choice but to inaccurately attribute the other aspects, until I qualify my description. The bone I am thinking of is the wing bone of a Pteranodon. It is an elongated finger that extends in an arc from the animal's... let's call it a hand.

Think about this for a while and you will grasp how we normally describe things (if they are beyond concrete experience). The process is akin to how metaphors work in normal language. For this reason I use “metaphoric” to refer to ideas used in this way. Try it with any idea you can think of.

Here's a very easy one. I can currently see a window. I suspect you thought of a square or rectangular hole in a wall with glass. In fact, I can see a window on my computer screen. The idea is drawn by an obvious metaphoric. Windows (on computer screens) are gaps in a background that give visual access to some other information. They share some qualities with the windows that are in walls, enough to communicate the idea. The other aspects of a window, the glass, its texture and temperature, etc., should not be attributed. If you did attribute these things you would be over-stretching the metaphoric.

Once we understand that knowledge is a network of metaphors, we can appreciate how it accumulates. It forms structures that are vulnerable to over-stretching, although awareness of attributions and more knowledge mitigates this. We can add information that refines and sharpens the idea so that it ever more precisely magnifies its target.

Another way to grasp this is to think of our abstract ideas as models made of multiple metaphors. The area where they overlap can trace a unique idea, which may be used as a metaphoric to communicate other qualities. As an example of this, think of an explosion. A sudden rise in temperature, as in a nuclear reaction, produces sudden expansion. Now think of heating water in a pan. Hot water from the bottom rises up, forcing cooler water down, forming continuous convection currents. Combine these two ideas and you can grasp what is happening inside a star. Two metaphors overlap to form a clear idea.

We are not Gods. We have limited time and energy, so clearly we can't literally know everything. Nevertheless, when we get over the idea of knowledge as equivalent to concrete certainty (like knowing where my hand is) and instead understand it as metaphors, we can appreciate how it will evolve indefinitely. It is not a question of lowering standards of certainty, but rather of understanding what knowledge really is.

Modern science, by its refined method and millions of meticulous observations, has gradually built up vast libraries of knowledge. It may seem counter-intuitive (our metaphors of expanding things tend to pop) but it is not limited. Every piece of knowledge provides a metaphoric for another. Each refinement opens up an ever clearer view of the world we live in.