



Patterns and analogies – their relevance and reliability

Whenever we set ourselves the task of explaining something we assemble as much evidence as we can and then search for a pattern in the evidence. Usually what we have are disconnected facts and assumptions. To create an explanation from this we must search for connections between them.

Facts are inert: they don't just offer up a pattern of interconnections that suggest a possible explanation. We have to create it. And we do this by imagining possible connections based on our experience of similar situations elsewhere. But the word 'imagining' may be misleading. It suggests huge leaps of creativity as if from nothing the best minds are able to create complex explanations complete in every detail. This is very rarely the case. Even the finest minds move stealthily from one secure footing to another; connecting one small explanation, about which they feel confident, with another and then with another until they have completed a pattern of ideas that is persuasive.

Analogies

But where do we find these patterns of ideas to create connections between our ideas? In many, if not most, cases these are analogies: patterns of explanation that have worked in other situations that we suspect might work in this. They give us a sufficiently stable pattern that we have used before in different circumstances, which is reliable enough for us to conclude that given one event the other will follow with high probability. We might conclude from the fact that A, B and C all have characteristics x and y, and A and B in addition have characteristic z, that C too will probably have characteristic z.

They may have nothing to do with the problem you are trying to explain. Indeed the most effective usually haven't. We learn from an early age the power of simple parables to explain the most complex ethical problems. And much of the scientific progress over the last three hundred years has developed out of the use of simple analogies. They have provided models and pictures, like waves and billiard balls in the theory of light, out of which to construct scientific theories that have fuelled research and extended our understanding of the world. In Chapter 10 of *How to Write Your Undergraduate Dissertation* I give the example of Darwin and his explanation for the variety of species that he developed from the analogy of industrial development in nineteenth century Britain.

So, in everything we do, when we try to explain something the most natural thing to do is search for a close analogy. We assume that because things resemble each other in some respects they will continue to resemble each other in a further respect and this gives us our inference. The key to understanding the implications of our evidence lies in the way we understand something familiar. By using what we know we can already rely on, analogies give us an invaluable way of extending our knowledge.

Unreliable analogies

However, not all analogies can be relied upon to organise our ideas into a pattern from which we can draw relevant and reliable inferences that will help us explain a problem. The best create causal



connections, which give us sound explanations. But we can easily be tempted to adopt an analogy simply for its ability to give us a powerful and persuasive explanation, when there are in fact no relevant and reliable connections to be made.

Vague associations are often the source of error and oversimplification. Politicians are always eager to exploit our gullibility by using a graphic analogy on which to hang their argument, even though with a little probing it is not difficult to see that it will bear very little weight.

Example: Political analogies

When they hold up a bag of purchases with one hand representing how little the pound or dollar will buy now compared with the bag in the other hand representing what could be bought when they were in power, you know that a great deal is missing from the argument.

Why is each item more expensive? Is it the result of reductions in supply or increased production costs, rather than inflation, which could be associated with the government? And does the comparison take into account the *real* value of a family's income and not just the *money* value, which could mean that, though the pound or dollar buys less, the average family still has the same or a better standard of living?

Many, probably most, analogies just break down at a certain point, so we must be alert as to when this is likely to occur. In Chapter 33 I illustrate this with the following example:

Example: Newton's theory of light

Newton used the analogy of billiard balls to explain the behaviour of light as molecules or particles. Although useful, it reached a point when it became clear that light behaves in ways the analogy could not help us explain. Along with other electromagnetic radiation, it behaves like a wave motion when being propagated and like particles when interacting with matter. So, a conflicting theory appeared, modelled on a different analogy of light as waves travelling through an elastic medium.

Now look at the file 'Analogies' and judge for yourself whether you think the examples I give there are unreliable. If you think they are, list your reasons.