Psychology as science 2: what can we know?

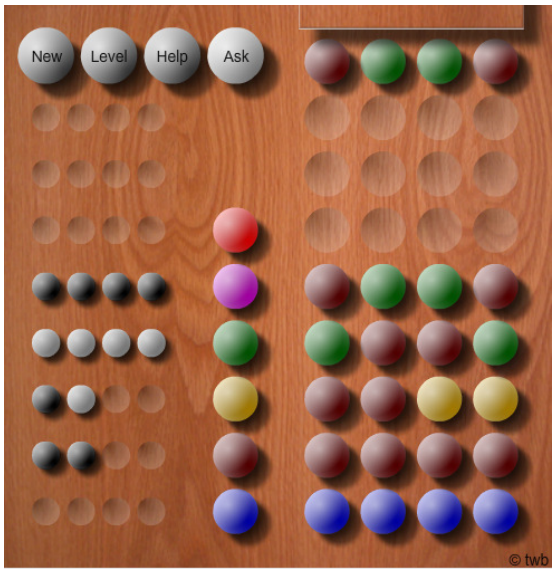
You are learning about...	You are learning how to...
• Epistemology: realism, positivism, objectivism & falliblism and the scientific method	• Examine the philosophical underpinnings of psychology

What can science tell us?

We saw previously that science is a particular way of knowing, in which intuition and authority give way to experience and reason. We also saw that the scientific method for obtaining knowledge involves the testing of hypotheses against empirical observations and has a number of checks and balances, chiefly the peer-review process, that ensure that errors are corrected and fraud avoided. Does it follow from this that the scientific method tells us the 'ultimate truth' about the world?

The 'classical' view: science as truth-seeking

The classical view of science is one in which scientific knowledge aspires to tell the 'ultimate truth' about the world. This view of science is based around a number of theories about the nature of the world and the possibility of knowing it. These theories are known as realism, positivism and objectivism. Realism states that there is a real world 'out there' which has its own inherent order and which exists independently of what people think about it. The realist view positions the scientist as a truth-seeker, whose task is to discover the inherent order of the real world. Positivism states that it is possible to know how the real world is if we collect empirical data about it in a systematic, objective way. Objectivism states that there is a distinction between our thoughts and the things our thoughts are about (so coinciding with realism). It further states that it is possible for our thoughts to correspond exactly to how the real world is. When this happens, we have objective knowledge of the world. Taken together, these theories underpin the view of science as an activity that produces sure knowledge of how the world really is. This knowledge contrasts, for example, with propaganda, in which knowledge is distorted away from a truthful account of the world through the application of biases, usually to serve a political agenda.



Fay (1996) compares the classical view of science to the board game Master Mind. In Master Mind one player takes the part of the code maker, the other takes the part of the code breaker. The code maker selects a combination of four coloured pegs which are hidden from the code breaker. The code breaker's task is to duplicate the colours and positions of these pegs. She starts the game by making a guess as to the colours and positions of the hidden pegs. The code maker responds to this by indicating how correct her guess was: a white peg for each colour correctly guessed and a black peg if both position and colour are correct. This information is used by the code breaker as the basis for her next guess. If she is logical and systematic in how she uses the feedback provided by the code maker, the code breaker gradually 'homes in' on the combination chosen by the code maker. By analogy, the code maker's pegs are the world, the code breaker's guesses are a scientist's theories/hypotheses and the code maker's feedback is empirical evidence. In this view, scientific knowledge moves gradually closer to the 'ultimate truth' of how the world is. The 'game' of science ends when the scientist's theories exactly duplicate the real world. As Fay (1996) puts it:

> *"When the pre-existing order of reality is discovered, one's beliefs replicate this pre-existing order. That is, what one claims to be the case corresponds exactly to what is the case." (p. 203)*

The falliblist view: science as map-making

There are a number of problems with the classical view, but the one we will focus on arises from the way empirical observations are interpreted in the light of hypotheses. The problem, essentially, is that evidence cannot *prove* a theory to be true. To see that this is the case, take the following example:

> *If I have the flu, I have a sore throat.*
> *I have a sore throat.*
> *Therefore I have the flu.*

The conclusion drawn from the first two statements is not necessarily true. Whilst the fact that I have a sore throat *might* indicate I have the flu (so the conclusion is not necessarily false either) there are other circumstances besides the flu that might result in my having a sore throat. Now look at the situation in a scientific test of a theory:

> *If theory X is true, Y will be observed.*
> *Y is observed.*
> *Therefore theory X is true.*

As with the first example, the conclusion does not follow *necessarily* from the first two statements. This is a logical error known as 'affirming the consequent'. What it implies is that evidence cannot tell us that our theories are true, only that they are not false. Or as Albert Einstein (in Calaprice, 2005) put it, "No amount of experimentation can ever prove me right; a single experiment can prove me wrong."

Popper (1959) argued that the acid test of whether a theory was actually scientific was therefore whether or not is could, in principle, be proven wrong. This is the source of many objections to the psychodynamic approach to psychology. A falsificationist like Popper would argue that psychodynamic theories are constructed in such a way that it is impossible to show that they are false. Therefore, they conclude, psychodynamic theories (regardless of whether they are 'actually' true or not) are unscientific.

The logical impossibility of proving that scientific theories are true leads to a rather different view of science. The falliblist view of science accepts that theories can never be accepted as absolutely true. Rather, scientific research is an evolutionary process wherein theories become less bad over time. As evidence is gathered, those theories which are false are rejected and whatever is left is accepted as 'provisionally true' with the proviso that a new theory might come along that does a better job of explaining the evidence. Fay (1996) characterises this approach to science as 'map making'. In cartography, map makers represent terrain using symbols, they do not draw maps that depict terrain with absolute accuracy (for a start, maps are generally much smaller than the terrain they represent). Different cartographers choose different conventions and represent different aspects of the terrain, according to their interests and purposes. Fay argues that scientific theories operate similarly and that they should therefore be judged according to how useful they are for particular purposes rather than for how closely they represent an underlying 'absolute truth'.

Note that it does not follow from this that all theories are equivalent. Some maps are better (more accurate, clearer) than others, and the same is true of competing theories. Science, like cartography, is 'constrained by the facts as they can best be ascertained' (Fay, 1996; p211).