

## Origins: Epistemology

Before you accept the hypothetico-deductive method as the best way to gain knowledge about the world, there are at least two important philosophical questions *about knowledge* that you should answer for yourself.

The first question concerns the nature of reality: What is real, what exists, and therefore what is out there that we can gain *knowledge* of in the first place? The philosophical field that deals with these types of problems is called **ontology**: The study of being.

The second question concerns the way in which knowledge can be **acquired**. Assuming there is a reality out there that is in principle knowable, then what knowledge of reality is accessible to us and how do we access it?

The field of philosophy that is concerned with these types of problems is called **epistemology**, the study or theory of knowledge.

I'll start with the last questions first. Assuming there is a reality out there that is knowable, how do we obtain this knowledge? Well there are many different *epistemological* views; I'll just discuss the two most important views here.

First there's **rationalism**. Rationalists hold that knowledge is gained through reason. Using our mind's capability for logical, rational thought, we can deduce truths about the world without having to resort to experience.

Philosophers like *Plato* and *Descartes* coupled rationalism with the idea that at least some of the abstract concepts about the structure of nature are *innate*, we were born with them.

That means our mind simply has the capability of understanding these concepts because we already know them. We just have to "remember" or "recognize" them by using our reason.

**Empiricism** opposes this view. According to the empiricist view, sensory experience is the most important way, according to some strict empiricists even the only way, to obtain knowledge about the world.

*Aristotle* is considered the first empiricist. He thought that the foundational truths about nature come from sensory experience. We can obtain more knowledge through deductive reasoning, but observation is the basis of all our knowledge.

Aristotle didn't believe in innate ideas, in fact he coined the term "***tabula rasa***" to indicate everyone is born as blank slate: our knowledge is not predefined, the mind is open to any idea.

Of course Aristotle wasn't a radical empiricist. He didn't object to rational thought entering into the mix and he wasn't worried about using abstract, not directly observable concepts.

I guess *Galileo* can be considered a moderate empiricist. He put a lot of emphasis on observation and experimentation but he also relied heavily on logical reasoning. Galileo in fact famously said that the book of nature is written in the language of mathematics. He had no problem using thought experiments and included references to "unobservables" in his hypotheses.

Later empiricist such as *Bacon*, but especially *Hume* and the *logical positivists* were very strict empiricists, maintaining that *only* sensory experience could lead to true knowledge about the world. They considered statements about unobservable, universal properties that cannot be observed directly, to be meaningless.

The contemporary flavor of empiricism, is *Van Fraassen's* **constructive empiricism**. It emphasizes the role of sensory experience in both inductive and deductive methods, but it allows for theoretical terms that don't have physical, directly observable counterparts.

In constructive empiricism, the aim is to come up with empirically adequate explanations, which can be considered 'true' – they accurately describe the world - as far as the observables go.

A constructive empiricist would say that the truth or falsity as far as the *unobservables* go, simply cannot be determined. This recognizes that knowledge is provisional because it always remains possible that new contradictory evidence will be found someday.