

Paradigm and Ideology

I. Paradigm

1. From the late 1800s the word *paradigm* refers to a thought pattern in any scientific disciplines or other epistemological context.

The best known use of the word in the context of a scientific discipline was by Thomas Kuhn who used it to describe a set of practices in science. Kuhn himself came to prefer the terms *exemplar* and *normal science*, which have more exact meaning.

The formally-defined term ‘groupthink’, and the term ‘mindset’, have very similar meanings that apply to smaller and larger scale examples of disciplined thought.

2. Imre Lakatos defended the presumed rationality of scientific method against the apparent impulsiveness of scientists. This is at odds with the history of science as described by Kuhn, in which scientists defend their doctrines, even when the evidence against them becomes overwhelming.

3. *The Structure of Scientific Revolutions*(1962) by Thomas Kuhn is an analysis of the history of science. Its publication was a landmark event in the sociology of knowledge, and popularized the terms *paradigm* and *paradigm shift*.

Kuhn states that the practice of science comes in three phases.

The first phase, which is undergone only once, is the *pre-scientific phase*, in which there is no consensus on any theory. This phase is characterized by several incompatible and incomplete theories. One theory eventually becomes sufficiently accepted that scientists begin to successfully use it methodically. Other knowledge, such as common terminology, common experimental methods and equipment and, to a greater or lesser degree, a common interpretation of scientific phenomena, develops into a paradigm.

After this occurs, *normal science* begins. Kuhn explains that normal science is what scientists spend most of their careers doing. It can only be performed under a specific paradigm, and its goal is to explain and expand the paradigm. Kuhn explained normal science as a process of *puzzle solving*: armed with knowledge provided by a paradigm, scientists can begin to make

well-founded and trusted assumptions about what they are studying. This may seem to violate long held ideals about objectivity in science, but it is extremely difficult to study anything without making at least a few basic assumptions. The challenge of normal science is to see how well one can apply all one's knowledge and assumptions to a certain problem.

It is important to note that there are advantages and disadvantages to using a paradigm to make assumptions about a particular topic. The advantage is that if all scientists are using similar assumptions, then their methods, terminology, and analyses will all be very homogeneous and easily compared. It allows for greater communication and cooperation between people. However, if many scientists use similar assumptions that are not entirely correct, they may be led astray for a very long time before an anomaly occurs which brings attention to the problem. When this happens there is usually a period of disagreement between scientists, and the theory is modified in an ad hoc way to accommodate experimental evidence that might seem to contradict the original theory.

As *anomalies* — the failures of the current paradigm to take into account observed phenomenon — accumulate, their significance is judged by the practitioners of the discipline. Some may be dismissed as errors in observation, others as only requiring small adjustments to the current paradigm. Eventually, Kuhn claims, the anomalies may become too great for many of the practicing scientists, leading to a loss of faith in the dominant paradigm. This will usher in a *crisis of revolutionary science* in which new paradigms are explored and axioms are re-examined. Eventually a new paradigm is devised which for some has a greater potential for problem solving than the old. A period follows in which there are adherents to both paradigms. In time, the new paradigm may replace the old, and a *paradigm shift* has occurred. One well-known example of paradigm shift is the transition from a Ptolemaic cosmology(Sun revolves around the Earth) to a Copernican one(Earth revolves around the Sun).

II. Comparison between Paradigm and Ideology

A paradigm is a self-contained or closed system of *meanings* within which every problem is explained (or ignored). The paradigm of science is a mechanistic and materialistic world of physical causality (a world of facts and the relationships between facts). One way to approach the meaning of anything is to investigate the causal relationships of which it is a part. The values are associated with purpose. But purpose is absent from the scientific worldview.

An ideology as 'an action-oriented system of beliefs' cannot take shape unless view of the world is backed by values. So an ideology is a self-contained system of *values*.

