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KUHN'S MEANING OF SCIENTIFIC REVOLUTION

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In the beginning of the nineteen eighties, Thomas Kuhn's most famous book, *The Structure of Scientific Revolutions*, was published. In this book, he offered a new view of scientific activity. Kuhn argued that science is not a steady achievement of knowledge, but it is rather punctured by a series of scientific revolutions. Many philosophers have seen Kuhn's work as a support of a certain kind of radical historicism in the philosophy of science, wherein any claim or theory that we wished to make would be true only relative to the paradigm in which it was uttered.[1] However Kuhn claims that this analysis is an obvious misinterpretation of his idea. As he claims this, there are sets of facts about his idea on "normal science" which provide alternative analyses to the one offered by critics.

Some critics have opposed some of Kuhn's ideas on scientific revolution, specifically his most controversial assertions which have to do with the process whereby a new paradigm replaces an older paradigm.[2] They argue that here he tends to be too subjective. They back up their claim by stating that data, in its usual sense, cannot create superiority over another set of data. But critics' major criticism of Kuhn's ideas in his book as a whole is that his work is a product of an approval of a certain kind of relativism. Critics do not agree with this relativistic character reflected in *The Structure of Scientific Revolutions,* because they believe that the history and methodology of science get rewritten when there are major paradigm changes, causing the absence of a neutral historical standard.

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[1] Partial restatement of question 1.
[2] P 128, Boyd, Richard, *The philosophy of science,* 1991.

Kuhn claims this criticism of the critics to be a misinterpretation, and there are certainly evidences in his work to support his claim. Before considering the counter-arguments that support Kuhn's theory, it is important to review main concepts behind the nature of Kuhn's scientific revolutions.

According to Kuhn, paradigms are essential to scientific practice, because "no natural history can be interpreted in the absence of at least some implicit body of intertwined theoretical and methodological belief that permits selection, evaluation, and criticism."[3] Kuhn sees paradigms as a criterion that clearly identifies a field as a science. The Fundamental theme of Kuhn's argument is that the typical development of a science is the following transition from one paradigm to another through a radical revolution. During a revolution, a scientist's world is transformed by a new fact or theory.

The second important aspect of Kuhn's theory of the scientific revolutions is a counterview to the popular conception of science. Kuhn argued that contrary to popular conception of science, typical scientists are not "independent thinkers." But they are rather conservative individuals who accept what they have been taught and apply that knowledge to solving the problems in their field. Kuhn uses the term "puzzle-solvers" to describe typical scientists who attempt to discover what they already know. Kuhn argues that a scientist who intends to solve a certain problem according to his current knowledge designs his scientific instruments and directs his thoughts accordingly so that he would achieve what he expects.

During the practice of normal science, the primary goal of scientists is to achieve a result that would further agree with their existing theory. As a result, they tend to ignore research findings that might threaten their paradigm, because it would cause the

[3] Kuhn, Thomas, *The Structure of Scientific Revolutions,* 1983.

development of a new paradigm, which would compete with the old one. Ptolemy's science is an example. The notion that the sun revolves around the earth was so popularized that it was defended for centuries despite the existence of contrary evidence.

These main concepts behind the structure of scientific revolutions could be used to defend against the critics' charges previously mentioned. Opposing philosophers' initial criticism is that data cannot create superiority over data. This is not correct because critics seem to have failed to take the time factor into consideration. As time goes on, technology advances with its typical fast pace. These advancements cause the scientists to be able to build more technologically advanced tools to practice science with, which in turn would push the boundaries of human perception and cause the discovery of new facts. For example before Galileo and the creation of telescope, the vast majority of the typical scientists believed in the Ptolemy's notion of sun's revolving around the earth. However, this notion changed fundamentally and was reversed after the invention of telescope. If humans were to accept the critics' argument, we would still have believed in Ptolemy's theory.

Kuhn's idea could also be defended against the critics' second charge. Critics mention the creation of a new paradigm to replace the old paradigm as a factor that would cause the old paradigm to disappear, hence causing the loss of a "historical standard." Kuhn would not disagree with this statement, but he would rather claim that this would be the whole idea of practicing radical science. By doing radical science, a scientist would detach himself from the historical knowledge that he possesses on a topic. By doing this, he would be able to avoid directing his thoughts during the experiment to agree with a previous theory. Only then he would be able to use the more precise tools

that have recently been invented to examine the problem, with a higher precision, and without a historical model overshadowing the accuracy of the new scientific practice.

In *The structure of Scientific Revolutions*, Kuhn states, "novelty emerges only with difficulty, manifested by resistance, against a background provided by expectation."[4] Despite this, some young scientists who have not so deeply accepted the old theories, such as Newton, Lavoisier, or Einstein, can manage to sweep an old paradigm away and replace it with a new one. Kuhn believes that such scientific revolutions come only after long periods of traditional normal science, because "frameworks must be lived with and explored before they can be broken."[5] Crisis is always hidden in research because every problem that normal science could see as a puzzle can be seen, from a second perspective, as an evidence to a competing theory which seeks to solve the same problem. According to Kuhn, it's these seemingly insignificant crises that trigger the beginning of a paradigm change, which would result in a scientific revolution.

[4] Kuhn, Thomas, *The Structure of Scientific Revolutions,* 1983.
[5] Kuhn, Thomas, *The Structure of Scientific Revolutions,* 1983.