

## **Kuhn and Popper: Finding a Synthesis in the Discord**

Two of the most influential scientific historians of the 20<sup>th</sup> century, Thomas Kuhn and Karl Popper, can hardly be said to have overtly agreed with each other's theories. However, the two are not as far apart as they contended. In fact, analyzing Kuhn and Popper's differences reveals a number of similarities. Furthermore, by combining some of the central holdings of both, a synthesis on scientific progression can be formed. While Kuhn and Popper rightly point out weaknesses in the other's work, both exaggerate and misread central contentions, creating conflict in areas of relative agreement. Employing the insight of Wes Sharrock, Rupert Read, and Pat Hutcheon, an analysis of the Kuhn-Popper conflict will be made - with particular attention to similarities and differences between their theories - and ultimately a synthesis put forth which reconciles the differences between the two scientific historians.

On July 13, 1965 two representatives of distinct schools of scientific thought, Karl Popper and Thomas Kuhn, debated at the University of London in England. An ardent proponent of positivism, Popper maintained many traditional views of scientific progression. The younger Kuhn came with revolutionary new ideas about scientific progression, which he lay out in his later book *The Structure of Scientific Revolutions*.

While on the surface Kuhn and Popper seem to offer contradictory theories, closer examination reveals many similarities. This is particularly

true for the foundations of both men's ideas. Kuhn and Popper both explicitly state that science is an accumulation of facts and these facts form the basis for scientific theories. Both emphasize how falsification is necessary in science, Kuhn in respect to proving the predictive power of a paradigm and Popper as the fundamental requirement for all scientific theories.

Furthermore, both men agree that science does not discover "truths" about the world, but instead only offers a best explanation for an event. This explanation, the theorists maintain, is accepted until another, better explanation replaces it, but no explanation is "absolute truth." These three basic ideas - the accumulation of facts and evidence, falsification, and science as an explanatory tool - are shared as core elements of both conceptions of science.

Building on these core similarities, Kuhn and Popper's major assertions are actually not as disparate as the debate would lead one to believe. Ostensibly, Kuhn and Popper differ dramatically on the nature of the change from an old theory to a new one. Kuhn calls this a paradigm shift a jump from stuttering progress in a field to a new theory for organizing experimentation. On the other hand, Popper asserts a linear accumulation of fact with a "survival of the fittest" model for the adoption of a new theory. While these appear to be distinct conceptions, they only differ in emphasis. For Kuhn, a pre-paradigmatic state consists of many theories on a subject all of which fail to adequately explain all of the evidence. Eventually, a new theory arises which sufficiently explains the evidence, and this becomes a paradigm. This

process is indistinguishable from a survival of the fittest theory method proposed by Popper. What is a paradigm but the “fittest” of the competing theories?

In a related area, Kuhn and Popper’s ideas are far more similar than they appear, but they do maintain a degree of distinction. After the paradigm is established, Kuhn says that science will progress rapidly, working off the paradigm. While differing in historical emphasis, this idea is not entirely dissimilar from the linear model proposed by Popper.

The linear model clashes most with Kuhn’s ideas right before and after the paradigm shift where progress goes from a plateau to rapid advancement. Where Kuhn highlights the paradigm shift, Popper merely sees the shift as the next step in the linear line. While it may seem like a big jump, this is both a matter of emphasis (what makes this change more defining than the small one that enabled this change to be possible?) and perspective (under what timeframe does progress appear to plateau or advance rapidly?). When considering the entire body of science “rapidly” becomes a very relative term. This difference in perspective is analogous to a person looking at three structures of differing heights. If the structures are ten, 20, and 30 feet tall, up close there is an obvious gap in height between the three (Kuhn’s perspective). However, if the observer is 1000 feet away, the difference seems less pronounced and more gradual (Popper’s perspective). In the end, on one of the issues of major contention, the two theorists are not

dissimilar in their assessments of scientific progression, though small dissimilarities remain.

There are, however areas in which more significant differences between Kuhn and Popper. One such distinction comes with the testing of a theory. Kuhn says that scientific tests provide evidence for “increasing verisimilitude” or increasing power to correctly explain human events. Popper emphasized the opposite – a good theory was one that forbids certain events from happening and then survived experiments that attempted to prove it false. While this may seem a minor distinction (how does proving something right in an area differ significantly from not proving it wrong in a similar area?), the criteria of falsification actually allows science to be distinguished from ideologies like Marxism, which might fit under Kuhn’s definition of paradigm, yet is not science in the same sense.

Probably the greatest disagreement between the two philosophers is over the implications of Kuhn’s theory. Kuhn defines normal science (which is the work of almost all scientists) as a kind of puzzle solving toward the finding of fact, matching fact with theory, and articulation of theory. Popper says that this definition of normal scientists as puzzle solvers is a recommendation to scientists to be dogmatic, subservient, and unquestioning – “a person one ought to feel sorry for.” Along this vein, Popper views Kuhn as negatively characterizing the scientist and harming any will she may have to think outside of the current paradigm. However, on both these points Popper misreads Kuhn. First, Kuhn does not “recommend”

normal science, but merely states that it constitutes the large majority of scientific activity. Furthermore, a scientist following a paradigm is not lacking in freethinking. In fact, paradigm articulation is progression of science into unknown areas, even if it is not a fundamental change. And it is not like every scientist can found the theory the creates a new paradigm, this happens to one scientists in a million and certainly would not be possible without the extensive background supplied by numerous other scientists engaged in normal science. Therefore, we can see that Kuhn's theory is not a negative characterization of scientists, but merely offers an explanation for the progression of science that he observes.

In light of the evidence of similarities between the two theorists, Kuhn and Popper converge enough to be synthesized into one theory of scientific progression. For this synthesis, we will accept Kuhn's ideas as the baseline and then make modifications according to appropriate criticisms by Popper, as Kuhn offers a more complete picture of science. This synthesis must highlight, in particular, areas of intersection between the two, for those agreed upon points would appear most integral. Thus, the synthesis accepts the accumulation of scientific fact over time, which gives rise to theories that we may call paradigms. Science also does not seek truth, but the best explanation for observed phenomena. From this point it is evident that the verisimilitude of any theory can never be fully proven. Here our synthesis defers to Popper's definition of falsification, which not only recognizes that theories cannot be fully proven true, but also helps distinguish scientific

theories from ideologies. Evidence for many theories can be found, but it is unique to *scientific* theories that evidence to disprove the theory can be found. On the other hand, we must defer to Kuhn's characterization of scientific history as plateaus and jumps. While the linear model is decent general pattern, Kuhn's explanation more accurately reflects the spurts of progress that different fields experience, especially after the adoption of a new theory. In the end, the synthesis is quite simple: the logic and ideas of Kuhn's theory (most of which concurs with Popper's ideas at least in general principle) are maintained, with the added Popperian distinction of scientific theory as necessarily falsifiable.

For Popper and Kuhn, their 1965 debate was far more contentious than their differences merited. For the most part, minor sticking points were exaggerated, creating discord where agreement was possible. Specifically, the basis of both Kuhn and Popper's theories was the same - scientific theory leads to the finding of fact in a steady accumulating and revising process. More substantial differences were either due to misreading (as with Popper's problem with the implications of "normal science") or distinctions in similar ideas (as with the testing of theories). By implementing a simple synthesis, which incorporates Popper's key assertion about falsification into Kuhn's basic design, a symbiosis is readily achievable.