

The Logical Fallacy in Kelly's Interpretation of the Success of Kuhn's Theory of Scientific Revolution

In "The Logic of Success," Kevin Kelly asserts that the "principal tension" in Thomas Kuhn's work, *The Structure of Scientific Revolutions*, is that there is nothing that "rationally compels" scientific revolutions to occur and yet the occurrence of the revolution is "ultimately inevitable"(Kelly 27). He asserts that Kuhn's theory of scientific change is one that succeeds *in spite of* social circumstances, cognitive limitations, and individual rationality (Kelly 28).

However, Kelly's assertion is mistaken in that he fails to see that the success of Kuhn's theory is actually principally dependent upon these three factors rather than confronted by them. Social circumstances, cognitive limitations, and individual rationality actually provide the framework that allows scientific revolutions to be possible and successful. These three factors are indispensable in that they provide the method and the motivation for which successful scientific revolutions can occur; namely, through recognition of anomaly, resistance to change of the paradigm, and the individual scientist's rationality. In failing to acknowledge this significant flaw in his article, Kelly's initial assertion that there is nothing to rationally compel the occurrence of scientific revolutions can be regarded as illogical.

Although Kelly states that social circumstances are one of the factors that provide resistance to the emergence of scientific revolutions, it can be clearly seen that social circumstances also provide the medium through which a revolution commences. These social circumstances act as one of three important factors that compel a scientific revolution to occur. Kelly himself gives the example of scientists who adhere to the current paradigm conducting experiments in order to "receive tribal rewards for flattering their research program with precise confirmation." These research programs will fund the scientist's experiments, in order to further confirm the accuracy of the paradigm, and the "collective resources" that they provide will

eventually allow the scientist to “generate the deep anomalies” necessary for a scientific revolution to begin (Kelly 28). The social structure of the scientific community is an important factor that compels the discovery of the anomaly, which will possibly lead to a scientific revolution. Therefore, the social circumstances that have been put in place by the existing paradigm will create the very situation required for a paradigm shift to occur. Without the expected results anticipated by the paradigm and the related motives of the research program, the experiments necessary to discover anomalies within the paradigm would never be able to occur due to the scientist’s lack of resources. These social circumstances reveal that by seeking to confirm the existing paradigm with extensive resources provided by their research program, scientists instead stumble upon the anomalies that act as the prelude to a scientific revolution. The scientist can only recognize the anomaly if the proper social circumstances give rise to his ability to discover that anomaly and it reasonably follows that these social circumstances provide a significant component of what compels the scientific revolution into existence.

Kelly also posits that cognitive limitations serve as roadblocks on the path to scientific revolution. However, further investigation reveals that it is these very cognitive limitations that provide resistance to novelty, thereby ensuring that the scientific revolution is a successful one that leads closer to truth rather than tangentially veering away from it. As Kuhn states:

“By ensuring that the paradigm will not be too easily surrendered, resistance guarantees that scientists will not be lightly distracted and that the anomalies that lead to paradigm change will penetrate existing knowledge to the core.” (Kuhn 65)

The cognitive limitations of the scientist are put in place by that existing paradigm which dictates his or her expectations for an experimental result. When these expectations are not met, the scientist begins to recognize the anomaly that might lead to a paradigm shift. However, every

anomaly cannot and should not be the beginning of a scientific revolution; this is ensured by the shackles placed on the scientist by the cognitive limitations resulting from his expectations. Furthermore, he has a vested interest in meeting his expectations and confirming the existing paradigm to his research program due to the social circumstances discussed above. These cognitive limitations then guarantee that only the anomalies that will “penetrate existing knowledge to the core” are pursued by the scientist, ensuring that a successful rather than unwarranted scientific revolution occurs. Kuhn himself stated that:

“...Novelty ordinarily emerges only for the man who, knowing with precision what he should expect, is able to recognize that something has gone wrong.” (Kuhn 65)

The cognitive limitations placed on the scientist do not, at first glance, seem to be a rational factor in compelling the scientific revolution but by probing deeper into the nature of these revolutions, it is clear that cognitive limitations play a substantial role in the paradigm shift. Without the cognitive limitations of the scientist, as Kuhn pointed out, the novelty of the anomaly would be much more difficult to recognize, which ensures that the *successful* scientific revolution will occur. The expectations that the existing paradigm projects onto the scientist creates these cognitive limitations that ensure that once an anomaly is discovered, the scientist will recognize it and probe deeper into the nature of that anomaly.

The individual rationality that Kelly categorizes as a limitation on scientific revolution is actually one of the necessary components of the revolution. The individual rationality of the scientist is the field on which the existing paradigm and the anomaly do battle with one another. The scientist’s rationality is one that, as can be seen from the above paragraph, is limited by expectations. The scientist might rationally, but not correctly, expect a certain outcome from an experiment and will be duly surprised if an anomaly presents itself during that experiment. The

individual rationality of the scientist might be inclined to place its confidence upon the existing paradigm but that confidence will be ultimately worn down by the existence of the anomaly.

Sooner or later, the individual rationality of the scientist will not allow itself to adhere to a paradigm that cannot explain the anomaly. Therefore, it is the individual rationality of the scientist that is absolutely necessary to determine the accuracy of the existing paradigm and the relevancy of the presented anomaly. Furthermore, while the scientist may perform experiments that set out to conform to the expectation put forth by the present paradigm, these expectations will not fulfill the challenge that that scientist's individual rationality secretly yearns for. As Kuhn states in *The Structure of Scientific Revolutions*;

“What then challenges [the individual scientist] is the conviction that, if only he is skillful enough, he will succeed in solving a puzzle that no one before has solved or solved so well.” (Kuhn 38)

The scientist is also motivated by the desire to discover the novel and the unexpected and to achieve greatness from such discovery. Finding these anomalies is perceived to be a challenge to the scientist's skillfulness in his profession. His rationality seeks to uphold the current order and confirm the existing paradigm as well as challenge himself by “solving a puzzle” that no other scientist has been able to solve. The individual rationality of the scientist is a necessary and logical component in the discovery of anomalies that lead to scientific revolution. It is this rationality that willfully compels the revolution into existence. His rationality, and the motives that stem from that rationality, play a significant role in the occurrence of scientific revolutions.

The three factors that Kelly states to be barriers against the emergence of the scientific revolution are actually some of the most important factors that logically compel the scientific revolution to occur. Without social circumstances, cognitive limitations, and individual

rationality, the successful scientific revolution would have a much more difficult time asserting itself into the world. The motivations, expectations, and circumstances that these three factors create are imperative to the discovery of anomalies, the paradigm shift, and the emergence of the successful scientific revolution. They logically compel the successful scientific revolution to occur by providing discovery, resistance, and rationality. Therefore, Kelly's "logic of success" is more of a failure in providing a theory for the truly successful scientific revolution.

Works Cited

Kelly, Kevin. "The Logic of Success." Philosophy of Science Today. 2003.

Kuhn, Thomas. The Structure of Scientific Revolutions. 3rd ed. Chicago: University of Chicago Press, 1996.