

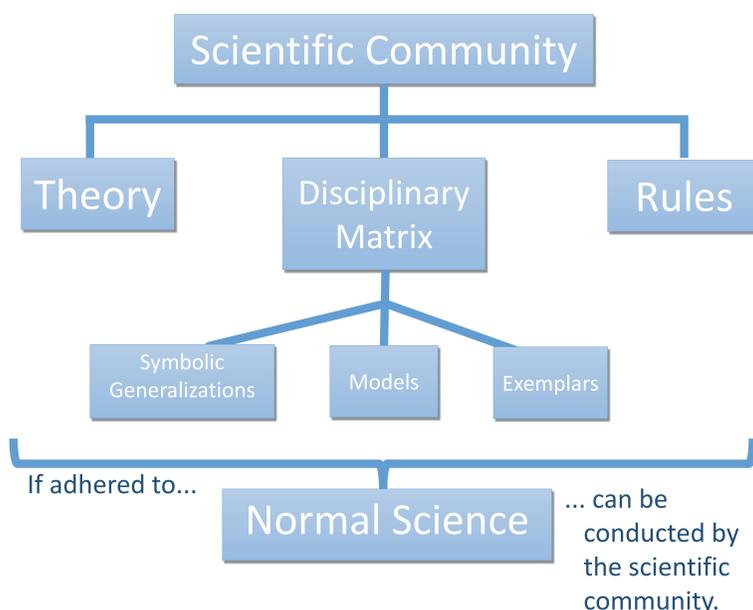
INTRODUCTION

The predominant scientific theories of a given era are largely responsible for informing the general conception of reality in that era. However, what occurs when observation contradicts this conception of reality and cannot be ignored? If one assumes that the observations are indeed accurate, only a new theory can rectify the conflict. With this new theory comes a new conception of reality and a new standard operation of science – or, in the still relevant terminology of Thomas S. Kuhn, theory change is incited by scientific revolution to produce a new normal science.

Although Kuhn wrote extensively during the mid-twentieth century regarding theory change, he remains an important figure in the social sciences; his ideas are both discussed and debated, referenced and refuted (Kuukkanen 2009, Niaz 2009). Kuhn established a semi-hierarchical schema to describe the truly counter-cultural and revolutionary process of theory change. His single schema can be usefully separated into the static case and the dynamic case.

STATIC: WITHIN A GIVEN NORMAL

THE STANDARD OPERATION OF SCIENCE FOR A GIVEN ERA



Scientific Community – a collection of individuals that pursue “a set of shared goals” by common methods (Kuhn 1977)

Theory – an explanation of observed phenomena; comprises a system of relevant concepts and entities

Rules – the forms of evidence and methods of data collection considered to be legitimate

Disciplinary Matrix – contains discrete aspects particular to a given discipline, particularly the following:

- **Symbolic Generalizations** – the simplified and standardized notations employed by the community; often comprise pictorial representations of whole systems
- **Models** – a conceptual or computational approximation of a system that provides insight into its mechanism; often possesses some visual element
- **Exemplars** – a problem-solution that not only constitutes a concrete achievement but also is usable as a guide by which to solve other problems

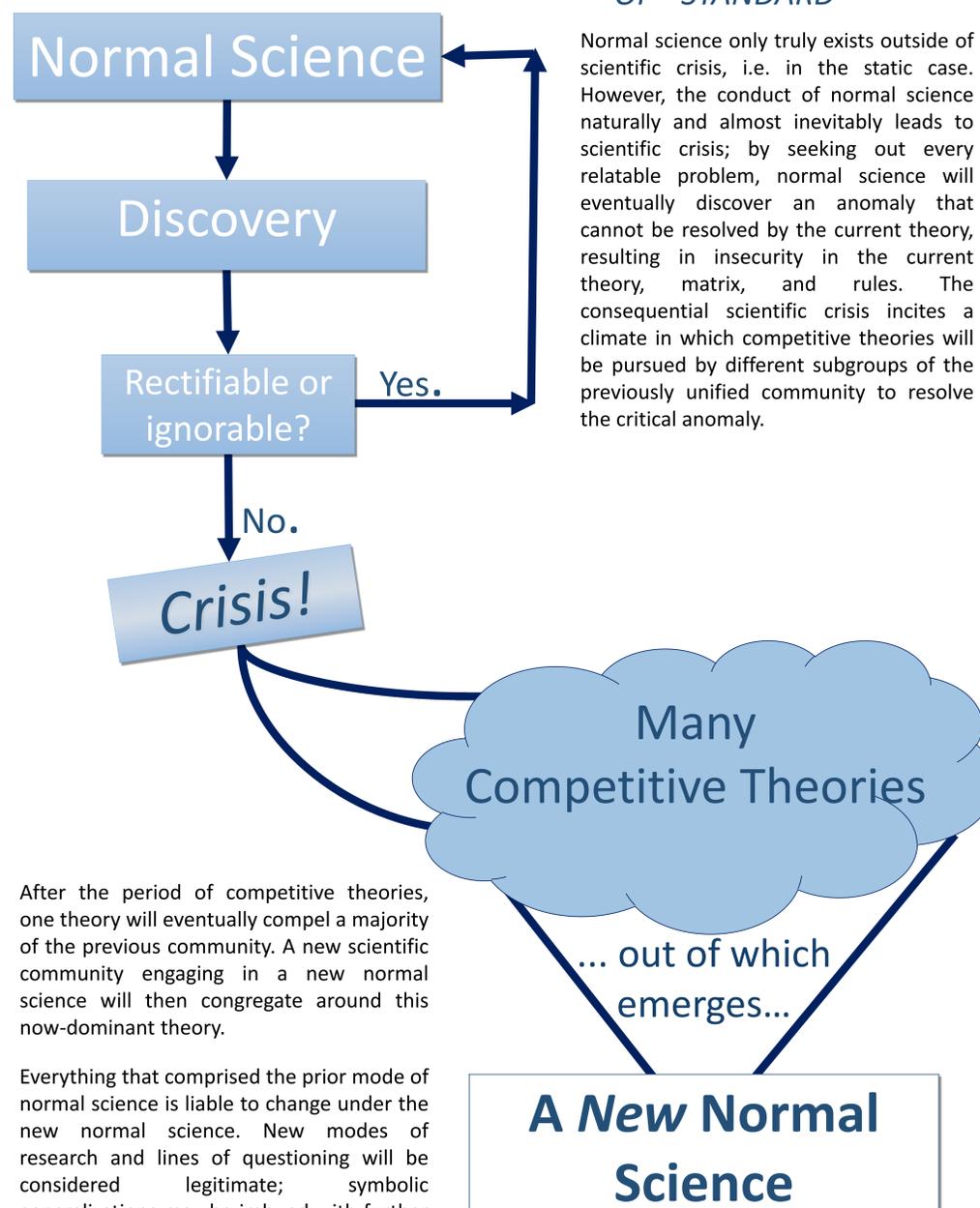
Normal Science – the general “shared goal” of a scientific community to solve all relatable problems according to the community’s theory, rules, etc.

Theory Change by Scientific Revolution: An Assessment of Kuhnian Revolutions

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DYNAMIC: TO A NEW NORMAL

THE TRANSITION BETWEEN DEFINITIONS
OF “STANDARD”



Normal science only truly exists outside of scientific crisis, i.e. in the static case. However, the conduct of normal science naturally and almost inevitably leads to scientific crisis; by seeking out every relatable problem, normal science will eventually discover an anomaly that cannot be resolved by the current theory, resulting in insecurity in the current theory, matrix, and rules. The consequential scientific crisis incites a climate in which competitive theories will be pursued by different subgroups of the previously unified community to resolve the critical anomaly.

After the period of competitive theories, one theory will eventually compel a majority of the previous community. A new scientific community engaging in a new normal science will then congregate around this now-dominant theory.

Everything that comprised the prior mode of normal science is liable to change under the new normal science. New modes of research and lines of questioning will be considered legitimate; symbolic generalizations may be imbued with further physical interpretations; and the standard set of problem-solutions will be expanded to include new, revolutionary problem-solutions.

... comprising a new theory, rules, disciplinary matrix, etc.

THE DESIRABILITY OF NORMAL

WHY THE FAILURE OF NORMAL SCIENCE IS SUCCESS

Almost paradoxically, the ultimate result of normal science is a change in theory and the rather chaotic transition to a new form of normal science. In seeking to explore every problem relatable to the normal-scientific theory, the scientist will inevitably encounter a problem which his theory is incapable of addressing. Note that the death of normal science is highly beneficial: whatever theory that will reign in the subsequent period of normal science must exhibit some potential to explain the crisis-inciting phenomenon. Therefore, the “failed” theory is ultimately a victory; it was not discarded because it was incapable of scientific deduction, but rather because its radical success in scientific deduction led to a revolutionary observation and reconsideration of reality.

FURTHER STUDY

Given that Kuhn’s philosophy and legacy are still relevant in today’s social scientific climate, applying his conception of theory change to recent developments would prove beneficial to current and future students of his work. In fact, this is a thoroughly Kuhnian pursuit: to apply a theory to an increasingly larger body of relevant problems is the practical embodiment of the Kuhnian institution of normal science. Contemporary revolutions will be selected on either their novelty or the popular or professional insistence of their being revolutionary; in each case, the potential revolution considered will be assessed in light of Kuhn’s schema. The Kuhnian assessment of the event can then be compared to the popular and professional conceptions of the event to illuminate a trend in the contemporary usage of Kuhn’s theory.

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