

# Thomas Kuhn: Logic of Discovery or Psychology of Research?

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This article contrasts Kuhnian and Popperian notions of how progress in science occurs. Let's briefly examine Kuhn's account of scientific revolution to reveal what he finds problematic in Popper's account.

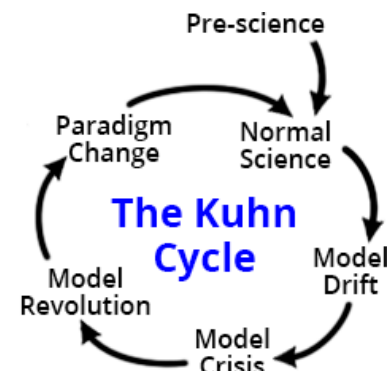
## Kuhn: The Structure of Scientific Revolutions

### Two Types of Sciences

1. Normal science
  - Science under unified **paradigm**:  
A schema of established methods, background assumptions and criteria for success of hypothesis testing.
  - Majority of scientific enterprise
  - Incremental progress
2. Revolutionary science
  - Challenges (an) existing paradigm(s)
  - New paradigm is **incommensurable** (cannot be understood within the old paradigm(s))
  - Rare occurrence
  - Discontinuous progress

### The Copernican Revolution

1. Ptolemaic model prevailed as an explanation for motion of the heavens for a thousand years (**Normal science**)
2. Despite more and more accurate astronomical measurements, increasingly intractable combinations of epicycles and deferents needed to model motions (**Crisis**)
3. Copernicus noticed that the math was simpler by placing the sun at the center (**Revolutionary science**)
  - Called the approach (theory), not the data, into question
    - Empirically no better than Ptolemaic model
  - Rejected Aristotelian epistemology and cosmology as a whole



### What's the Tiff with Popper?

1. Popper points to revolutionary science as the (sole) source of growth in a field
2. **Falsifiability** (ability to make testable predictions that can be wrong) is hallmark of science
  - E.g., astrology is not a science because it is not falsifiable
1. Kuhn says that mature science cannot exist without a paradigm (normal science)
  - Astrology was regularly falsified, but astrology is not a science because it cannot organize itself to systematically solve problems
2. Scientific revolutions begin even in the absence of any evidence for them
  - Falsification *is what follows* from a new paradigm having replaced an old paradigm: it itself is not necessary to inaugurate a new paradigm

*Theory sets criteria for what is data and what is noise. Incommensurability arises because different paradigms will define these differently. And this is the point: empirical/logical evidence for Copernicus or for Einstein or for Bohr came **after** that theory was actually proposed.*