Relativism and the Social Construction of Science: Kuhn, Lakatos, Feyerabend

Theories as structures: Kuhn and Lakatos
Science and Ideology: Feyerabend
Science and Pseudoscience: Thagaard
Theories as Structures: Lakatos and Kuhn
Lakatos and Kuhn

- Inductivist and falsificationist accounts of science fail to take account of the complexity of scientific theories and their development.
- Both L. and K. demand that philosophical accounts should stand up to criticism based on the history of science.
- Kuhn assigns an important role to the sociological and psychological aspects of scientific communities.
- L. and K. differ with respect to “rationalist” /”relativist” attitudes.
Theories as Structures

Theories should be seen as organised structures because:

1. history shows that theories do possess that structure
2. a coherent structure is needed to allow concepts to have a precise meaning
3. science needs to grow (open ended structures stimulates progress)
Theories as Structures

Observations, experiments and apparatus

Scientific Laws and Theories

Nature Processes And Objects
Kuhn: Paradigms and Scientific Revolutions

- Progression of Science
  - Pre-Science
  - Normal Science
  - Crisis—Revolution
  - New Normal Science
  - New Crisis

- Paradigm: *a framework of general theoretical assumptions, laws, and results and techniques for their application*

Paradigms

- Framework conformed to by the scientific community
- Open-ended structure enables normal science
- Co-ordinates and directs the PUZZLE SOLVING activity of scientists
- Existence of such a paradigm distinguishes science from non-science
- Have a concrete historical situation
Scientific Revolution

- Arises in response to the accumulation of anomalies and stresses that cannot be resolved within the framework of the paradigm

  - *Psychological* - Gestalt switch
  - *Sociological* - education, publication, shift amongst the community
  - *Epistemological, methodological* - scientists regard different questions as important; do different things
  - *Ontological* - scientists see the world differently; regard the world as made of different things
Phlogiston and Oxygen

Priestly and Lavosier – both “discovered” oxygen; only Lavosier saw it as oxygen; for Priestly it was “dephlogistated air”
Case Study: Plate Tectonics

Theories as Structures (MNSES9100) Deborah Oughton
History

- 1915 - Alfred Wegener argued that the continents have «drifted» to their present positions from some other supercontinent Pangaea
- 1937 - Alexander du Toit published own version of Wegener’s thesis (Laurasia and Gondwana)
History

- 1962 - Harry H. Hess tectonic plate theory of continents moving around the globe
- 1963 - Fred Vine and Drummond Matthews magnetism of rocks
- Mid 1960s - adopted by the geological community
Is the Revolution Kuhnian? (Michael Ruse)

Sociological and Psychological Factors
- Greeted with hostility; textbooks rewritten; young age of revolutionists (apart from Hess); many geologists seemed to have a “conversion experience”

Epistemological and Ontological Factors
- Did the geological revolution cause a change in rules and methods of geology? - No
- Did the data in some way change (or it’s interpretation)? - No
Research Programmes

- **Hard Core**: Basic assumptions underlying a research programme
- **Protective Belt**: auxiliary hypothesis, initial conditions, etc. Protects the **Hard Core** from falsification
- **Negative Heuristic**: the hard core must not be modified or rejected
- **Positive Heuristic**: rough guidelines as to how the research programme might be developed

Scientific Progress

- Initially a development on ideas
- Observational testing comes rather late
- Confirmation not falsification measures the success of a research programme
- By then the hard core and protective belt have been developed

Merit of Different Theories

- Coherence and outline of a definite research programme
- Discovery of novel phenomena (progressive)
Problems

- How to choose between different research programmes?
- How to know when a research programme has degenerated?
- Assumes that science is superior rather than proves it

Lakatos’ methodology -- “a verbal ornament, as a memorial to happier times when it was still thought possible to run a complex and often catastrophic business like science by following a few simple and ‘rational’ rules” (Feyerabend)
Rationalism and Relativism

**Rationalist/Realist** - believes there is some universal criterion by which a good scientific theory can be judged (e.g. inductivism, falsificationist, coherence and progression of a research programme)

**Relativist** - denies this; any criterion will be relative to both the individual and the community
The slippery slope...

“Lakatos aimed to give a rationalist account of science; Kuhn denied that he aimed to give a relativist account of science but gave one nevertheless” Chalmers
Consequences of Relativism

“If ‘science’ (the relativist might well be inclined to use quotation marks) is highly regarded in our society, then this is to be understood by analysing our society, and not simply by analysing the nature of science” (Chalmers)

“Man is the measure of all things” Protagoras

“There is no standard higher than the assent of the scientific community” Kuhn
Science, Pseudoscience and Ideology

Cases: Creationism, Astrology, Alternative medicine, Climate change debate

Literature: Thagard; Feyerabend, Lakatos; Kitcher,
Science and Ideology

Feyerabend’s anarchistic view of science
Creationism debate

Literature:
Feyerabend; "How to defend society against science"
Kitchner, "Believing where we cannot prove"
Chalmers
Paul Feyerabend

Against Method (1975)

- Wants to defend society against ideologies
- Suggests that 17th and 18th century science was an instrument of liberation (breaks hold the comprehensive system of thought) and enlightenment (made man question inherited beliefs)
- Claims that modern science has deteriorated into a «stupid religion»

«Science, with all its reductionism and materialism, has deprived man of his special status—only an idea of culture that excludes science can restore man’s dignity» (Nietsche)
Feyerabend on Science and Religion

- Scientific «facts» are taught at a very early age and in the same way religious «facts» were taught a century ago.
- Science doesn’t receive the criticism that society gets even at elementary level.
- The judgement of the scientists is received in much the same way as the bishop and cardinal was accepted.
- Science has become as oppressive as the ideologies it once had to fight. Heretics in science are sanctioned.

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Feyerabend’s Argument

Two common arguments to defend the exceptionalist position that science has in society today:
1) That science has found the correct *method* for achieving results
2) That there are many *results* to prove the excellence of the method
Feyerabend’s Argument

Feyerabend:
1) There is no such method

Popper: rigid standards.. “would eliminate science”

Kuhn:” too vague to give rise to anything but hot air”

Lakatos: “offers words that sound like a methodology: he does not offer a methodology”

Sta. Karl Popper (1902-1994)

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Feyerabend’s Argument

Feyerabend:
1) There is no such method
2) Only holds if it can be taken for granted that nothing else has produced results

"Science is just one of many ideologies that propel society and it should be treated as such"

Chinese astromony
Against Method

"Anything goes"

"... or everything stays" (Chalmers)
“Anything Goes”

“ A truth that reigns without checks and balances is a tyrant who must be overthrown, and any falsehood that can help us in the overthrow of this tyrant is to be welcomed”

“Three cheers to the fundamentalists of California who succeeded in having a dogmatic formulation of evolution removed from the textbooks and an account of Genesis included”
Science and Religion: Creationists

- deny that evolutionary theory is a science
- state that evolution is just a statement of faith
- suggest that evolution theory is less well supported by evidence as compared to other scientific theories
Challenges (Lakatos)

- Historically many accepted scientific theories have been accused of pseudoscience

Trial of Galileo

Lyschenko and Mendelian genetics

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