HPSC 1001/1901/2101/2901

WHAT IS THIS THING CALLED SCIENCE?

Semester 2, 2020

Lecture 13: Kuhn and Progress

1. Pre-paradigm science... 2. Normal science...
3. Accumulation of Anomalies... 4. Crisis...
5. Scientific Revolution. A new paradigm arises and takes over, and normal science resumes.

Today: other topics and questions coming out of K's view of science:

- Progress (and incommensurability)
- Relativism
- Observation
- Realism - "The world changes..."

Progress

Does science progress, or just change?

Certainly there is progress within normal science, but is there progress overall?

K had a complicated view, with at least two strands, with tension between them.

1. A deflation of the idea of scientific progress.

In a revolution, you tend to gain some things and lose some things. Can there be an unbiased accounting?

But also: look at how the process works. How could there fail to be the appearence of progress?

An "eye of the beholder" treatment.
In a revolution, you tend to gain some things and lose some things. Can there be an unbiased accounting?

But:
2. At the end of his book he seems to commit to something more than this. If we just look at problem-solving, not at the idea of "truth", etc, then:

> ... the nature of such communities provides a virtual guarantee that both the list of problems solved by science and the precision of individual problem-solutions will grow and grow. (p. 170 - see 3rd extracts)

Seem to be some tensions between these two ideas? Maybe it all makes sense. Certainly a different view from that of most empiricists.

Relativism

Relativist views hold that the truth of a claim, or the applicability of a rule or standard, depends on one's situation or point of view.

This claim might be made generally ("all truth is relative") or in a more restricted way, about art, morality, good manners, or whatever.

The “situation or point of view” might be that of an individual, a society, a historical period, or something else.

There can be relativism about *facts* and relativism about *standards*. And each of these is applicable to particular cases.

Example: Moral relativism: there is no single set of standards entitled to govern moral behavior and judgment.

Here "applicability of a standard" is understood in normative terms. It does not matter whether people actually agree or disagree.

Aesthetic relativism: there is no single set of standards entitled to govern judgments about beauty, the goodness of works of art, and related matters.

Relativism about rationality: there is no single set of standards entitled to govern choices about what to believe, how to assess evidence, and so on.

Kuhn: much less of a relativist than people often say.
He does sometimes seem to think that judgments of the superiority of one paradigm over another are relative to the standards that are associated with particular paradigms.

But: later paradigms have more problem-solving power than earlier ones. And does not seem to be a relativist about the comparison between science and other kinds of investigation. (Science is a "supremely efficient instrument" etc.)

Observation

A theme in Kuhn's book and other work around this time.

Empiricism of the kind we started the course with: observation provides an *unbiased* way of assessing and choosing between theories.

A series of challenges to this in the mid C20.

Claims of the "theory-ladenness of observation."
What sort of ladenness?

1. Where you look.
2. How you interpret what you see.
3. What you see.

Re 1: Where you look.
Undeniably an issue. Though important accidental discoveries do occur (discovery of penicillin).
But if there is a problem here, it is fixable within empiricism.

Role of Popper's ideas here. Do you actively look for possible falsifying data?

2. How you interpret what you see.
Also an issue in many real-life cases.
Throwing away data, interpreting some of it as mere "noise."

Example from a student in this class a few years ago (Adam Collingswood). In human bodies there are two kinds of fat, brown and white adipose tissue. Long believed that brown adipose tissue is not found in adults.
Early C20: new scanning technologies. Scientists began to see things that looked like areas of brown adipose tissues in

adults, but wrote them off as artifacts of the scanning technology. Later the brown tissue turned out to be there.

Nedergaard, Jan, Tore Benson, and Barbara Cannon. 2007. Unexpected evidence for active brown adipose tissue in adult humans. *American journal of physiology* 293:444-452.

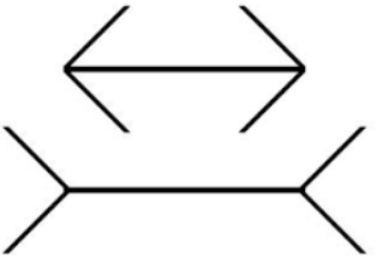
How damaging is this to the empiricist picture? Can you step back from more "theory-laden" interpretations of an observation when you suspect a problem?

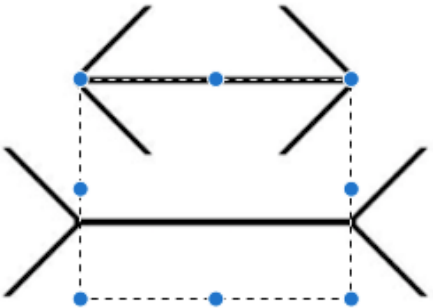
3. What you see.

Here there has been at least some overstatement.

See Fodor, "Observation Reconsidered" 1984.
Argument from perceptual illusions.

Müller-Lyre illusion:





Knowing illusions are misleading does not make them go away.

Fodor took this to be helpful to the traditional role of empiricism. Perception is not entirely infected with background beliefs and assumptions, especially not

conscious, sophisticated ones. Vision is affected by some basic "theories" about space, light, and objects. These are not easily altered. They may in some cases not be entirely true. But they might still enable us to form true observational beliefs, and they are shared across all normal humans.

Closer look at this, using the Müller-Lyre case.
The "theory" we use gets us to a false belief initially, not a true one. But we can choose to look more closely -- put the extra lines on the diagram, for example. Then we can work out what is going on. The experiences stay pretty stable as we reassess, change our minds, etc.

Realism

Kuhn's official view and his unofficial view.

Official: "The world changes..."

> At the very least, as a result of discovering oxygen, Lavoisier saw nature differently. And in the absence of some recourse to that hypothetical fixed nature that he "saw differently," the principle of economy will urge us to say that after discovering oxygen Lavoisier worked in a different world. (1996, 118)

Lots of problems here. See T&R ch. 10.

Kuhn's unofficial view: introduce it with a question.
Why can't there be a final paradigm for Kuhn?
Maybe there can? He does not say it's impossible. But he seems to think so. Why might this be?

The unofficial view: nature is complex and science must simplify in order to work at all. That means every paradigm eventually gets into trouble.