

Module 2 Unit 4

This is a **REQUIRED READING**.

Lau, J., and Chan, J. (n.d.). Choosing among theories. Critical Thinking Web.
Retrieved from <http://philosophy.hku.hk/think/sci/induction.php>. [1 p.]

MODULE: Scientific reasoning

TUTORIAL So2: Choosing among theories



Scientific reasoning is often about choosing the theory from a set of alternatives that we think is most likely to be true. But how do we decide which theory is the best one that is most likely to be true? Here are some relevant criteria.

Predictive power

The minimum requirement for a scientific theory is that it can help us make predictions and explain our observations. If a hypothesis generates no testable prediction, it fails the minimal requirement for a scientific hypothesis.

When we evaluate the predictive power of a theory, we consider both the quantity and the quality of the predictions. How many predictions can the theory make? How accurate and precise are they?

Mechanism

In general, we want theories that can explain the connections between events by revealing the underlying causal mechanisms. This can help us generate more predictions to test the theory and make other discoveries.

Fruitfulness

This is about whether a theory helps us make surprising or unexpected predictions which turn out to be correct, and whether the theory helps us detect and explain connections which we would not have noticed otherwise.

Simplicity

A simple theory is (roughly) one with fewer assumptions, and which posits less entities than its competitors. Many scientists believe strongly that we should search for simple theories if feasible.

Coherence

A theory should be internally coherent in the sense that it is logically consistent. If not, there is something wrong with the theory as it stands, and so there is a need to revise the theory to come up with a better version.

The other aspect of coherence is that we should look for theories that fit together with other well-confirmed facts and scientific theories. Widely accepted theories are already well-confirmed, so if a hypothesis is incompatible with existing science, the default response should be that the hypothesis is mistaken. An extraordinary claim incompatible with scientific knowledge should require very strong evidence before it can be accepted.



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