POL 226: Approaches to Political Science

Lecture 4 - Philosophy of Science: Falsificationism

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Plan for Today

1. Can Science Prove a Theory?

2. Popper's Falsificationism

3. Lakatos' Research Programmes

What About Scientific Proof?

Can science prove a theory?

Technically speaking, we never prove a theory because we can never be fully certain.

There is no such thing as scientific proof, only scientific evidence that either supports or contradicts our hypotheses.

- ▶ The more evidence supporting our hypotheses, the more we can trust the theory/explanation.
- ▶ But we might find some evidence that contradicts them.

Where Does This Leave Us?

We need to be aware of the power of the scientific approach

▶ We can learn new things about how the world around us works!

We need to be aware of the limitations of the scientific approach

▶ We need to remain humble about the answers we currently have and trust this collective endeavor

Okay, So We Just Need to Find More Support For Our Theories Then?

Not so fast, says Karl Popper! Finding confirmatory evidence is easy.[1]

All sorts of "theories" in different fields can point to observations that confirm them, whether they be in astronomy, astrology, religion, chemistry, superstition, or political science.

How can we distinguish between scientific claims and "pseudo-scientific" claims?

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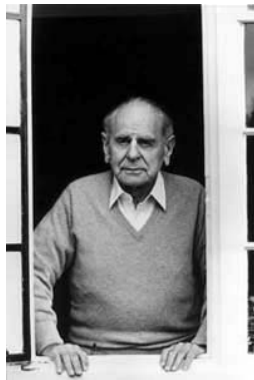
[1]Popper, Karl. 1963 [2001]. "Science: Conjectures and Refutations." In *Philosophy of Science: Contemporary Readings*, eds. Yuri Balashov and Alex Rosenberg, 294-301. London/New York: Routledge.

Scientific Theories Must Make *Risky* Predictions

The difference is **NOT** necessarily in the method or the level of precision of measurement. Pseudo-science may use empirical methods and some scientific theories deal with subject matter that is difficult to measure.

The difference is in their explanatory power.

► Pseudo-scientific theories can explain everything because there is no possible outcome that contradicts the theory.

► Scientific theories make risky predictions. In other words, there is a possible outcome that contradicts the theory.

"The criterion of the scientific status of a theory is its falsifiability, or refutability, or testability."

Popper's Conclusions

1. It's easy to find confirmation to a theory.
2. Confirmations should only count if they are risky (i.e., they can be falsified).
3. "Good" scientific theories "forbids certain things to happen"
4. "A theory that is not refutable by any conceivable event is non-scientific"
5. "Every genuine test of a theory is an attempt to falsify it."
6. "Confirming evidence should not count except when it is the result of a genuine test of the theory"
7. Some theories are modified *ad hoc* when falsified by empirical evidence. People don't want to let them go.

What Should We Do When a Theory Is Falsified?

Popper: Discard it!

Lakatos: Dude, chill, it can still be helpful.

What Should We Do When a Theory Is Falsified?

What Popper saw as a refutation, Lakatos believed it to be an inconsistency.[2]

Lakatos proposed that we can distinguish between a good and a bad research programme by its development.

▶ A progressive program (i.e., good science) will develop and predict "new facts".

▶ A degenerative program (i.e., bad science) does not predict "new facts" and develops more ad hoc explanations.

Put differently, scientific theories may be modified AND make new predictions while non-scientific theories continue modifying the explanation to fit previous inconsistencies.

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[2]"Imre Lakatos." Stanford Encyclopedia of Philosophy.

What Should We Take Away?

Social scientific research, like any other scientific endeavor, seeks to make inferences, which by definition are not fully certain.

A scientific claim is testable and falsifiable.

We judge scientific theories by their ability to help us predict "new facts."

For Next Class

Read

▶ *DASS.* Chapter 1: pp. 7-14 (stop when you reach section 1.7).

We will install R and RStudio!

We're done!

Questions or comments?

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