

History of Psychology

Session 12: What kind of science is psychology?

Rui Mata, Center for Cognitive and Decision Sciences
December 9, 2024

Session information

Sessions take place Mondays, 8.15-9.45, Chemie, Organische, Grosser Hörsaal OC.

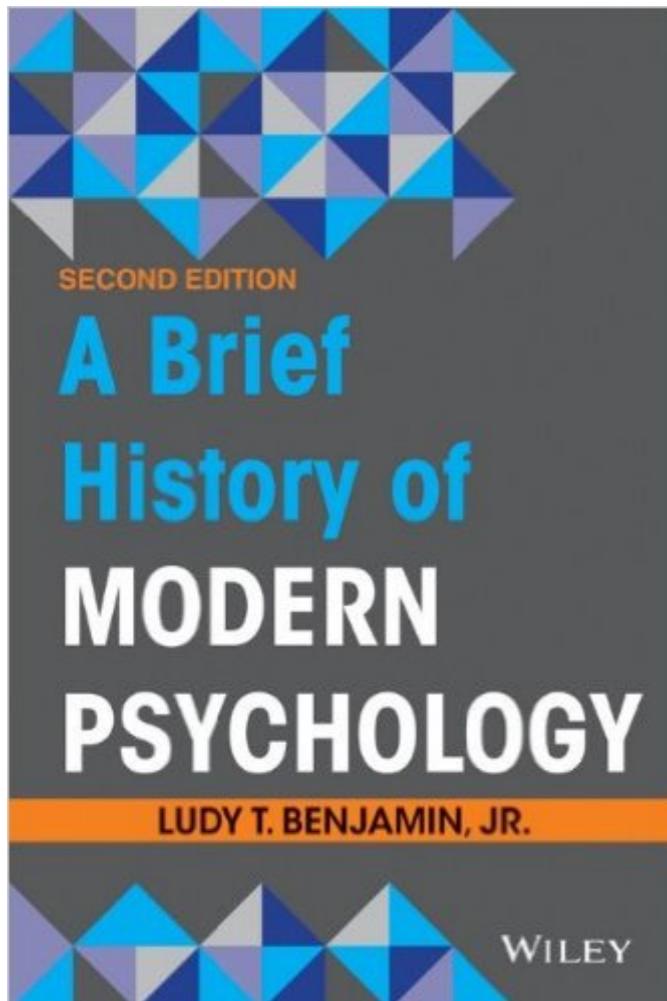
#	Date	Topic	Instructor	Slides	Reading
1	23.09.2024	Session 1: Introduction	Tisdall	pdf	Ball (2012)
2	30.09.2024	Session 2: Pre-psychology	Mata	pdf	Markie & Folescu (2023)
3	7.10.2024	Session 3: The birth of psychology	Mata	pdf	Brysbaert & Rastle (2009)
4	14.10.2024	Session 4: Psychoanalysis	Mata	pdf	Brysbaert & Rastle (2009)
5	21.10.2024	Session 5: Behaviorism	Mata	pdf	Brysbaert & Rastle (2009)
6	28.10.2024	Session 6: Gestalt psychology	Mata	pdf	Brysbaert & Rastle (2009)
7	4.11.2024	Session 7: Cognitive psychology	Mata	pdf	Brysbaert & Rastle (2009)
8	11.11.2024	Session 8: Psychology today	Tisdall	pdf	Spear (2007)
9	18.11.2024	Session 9: Psychotherapy research	Tisdall	pdf	Braakmann (2015)
10	25.11.2024	Session 10: Psychological testing	Tisdall	pdf	Wasserman (2012)
11	2.12.2024	Session 11: Decision science	Tisdall	pdf	Newell, Lagnado, & Shanks (2022)
12	9.12.2024	Session 12: What kind of science is psychology?	Mata	pdf	—
13	16.12.2024	Exam (see below)			

Learning Objectives for Today

- Distinguish different forms of psychology
- Learn about different positions in epistemology (e.g., falsificationism, paradigm shifts, research programs, epistemological anarchism)
- Discuss what “kind of science is psychology”...
- Course evaluation

Different Forms of Psychology

Academic (scientific), Professional, and Popular Psychologies



“Today psychology exists in three forms. There is an **academic psychology** located in secondary schools, colleges, and universities, and research institutes. (...) there is also a **profession of psychology** that applies the knowledge of scientific psychology to real-world problems. (...) The third kind of psychology is the oldest. It might be called public psychology or **popular psychology**. It comprises public interest in and beliefs about behavior and mental states.”

(Benjamin, 2014, pp. x-xi, emphasis added)

Benjamin, L. T. (2014). A brief history of modern psychology. Wiley: Honoke, NJ, USA.

WHAT IS EPISTEMOLOGY?

and why does it matter for psychology



Epistemology and History of Science

branch of philosophy concerned
with a theory of knowledge



The logic of scientific discovery (1934/1959)

Karl Popper

The structure of scientific revolutions (1962)

Thomas Kuhn

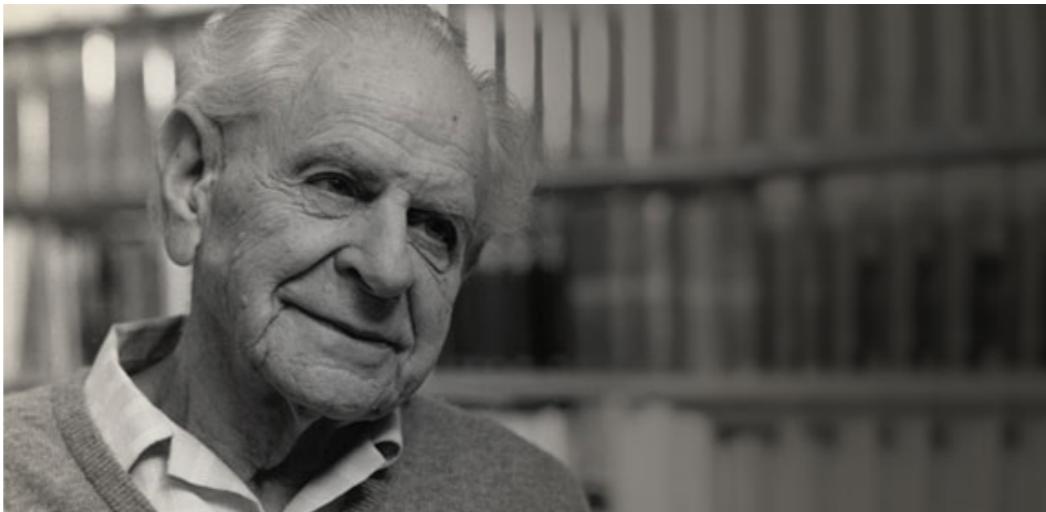
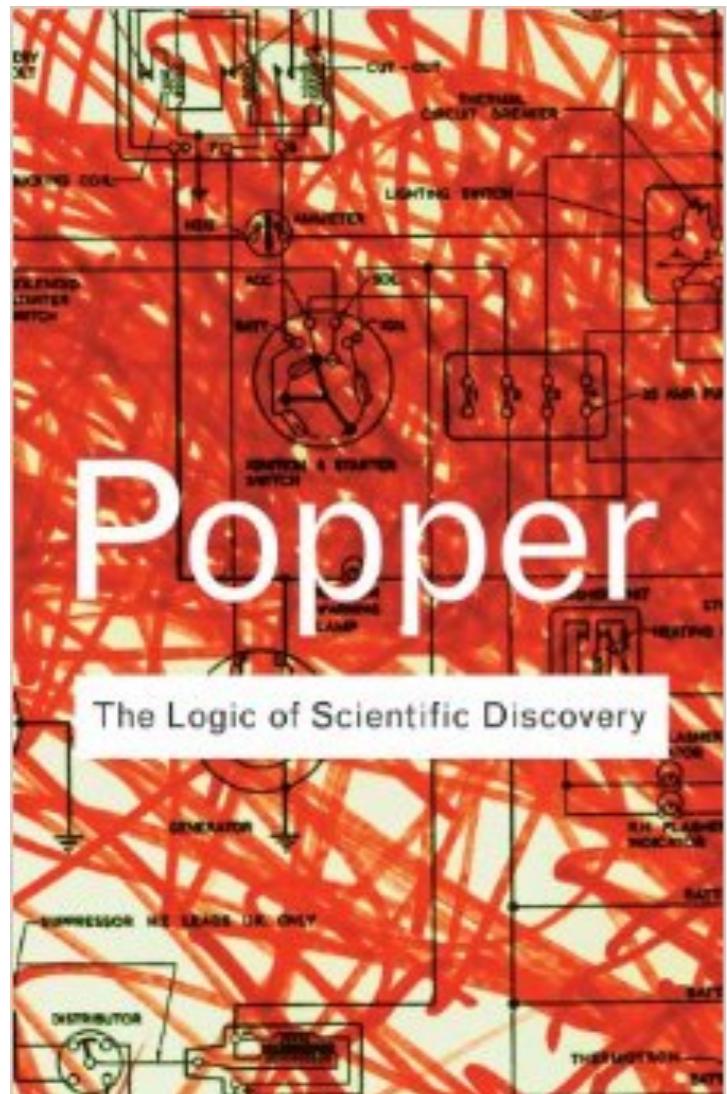
Criticism and the growth of knowledge (1970)

Imre Lakatos

Against method (1975)

Paul Feyerabend

Epistemology and History of Science



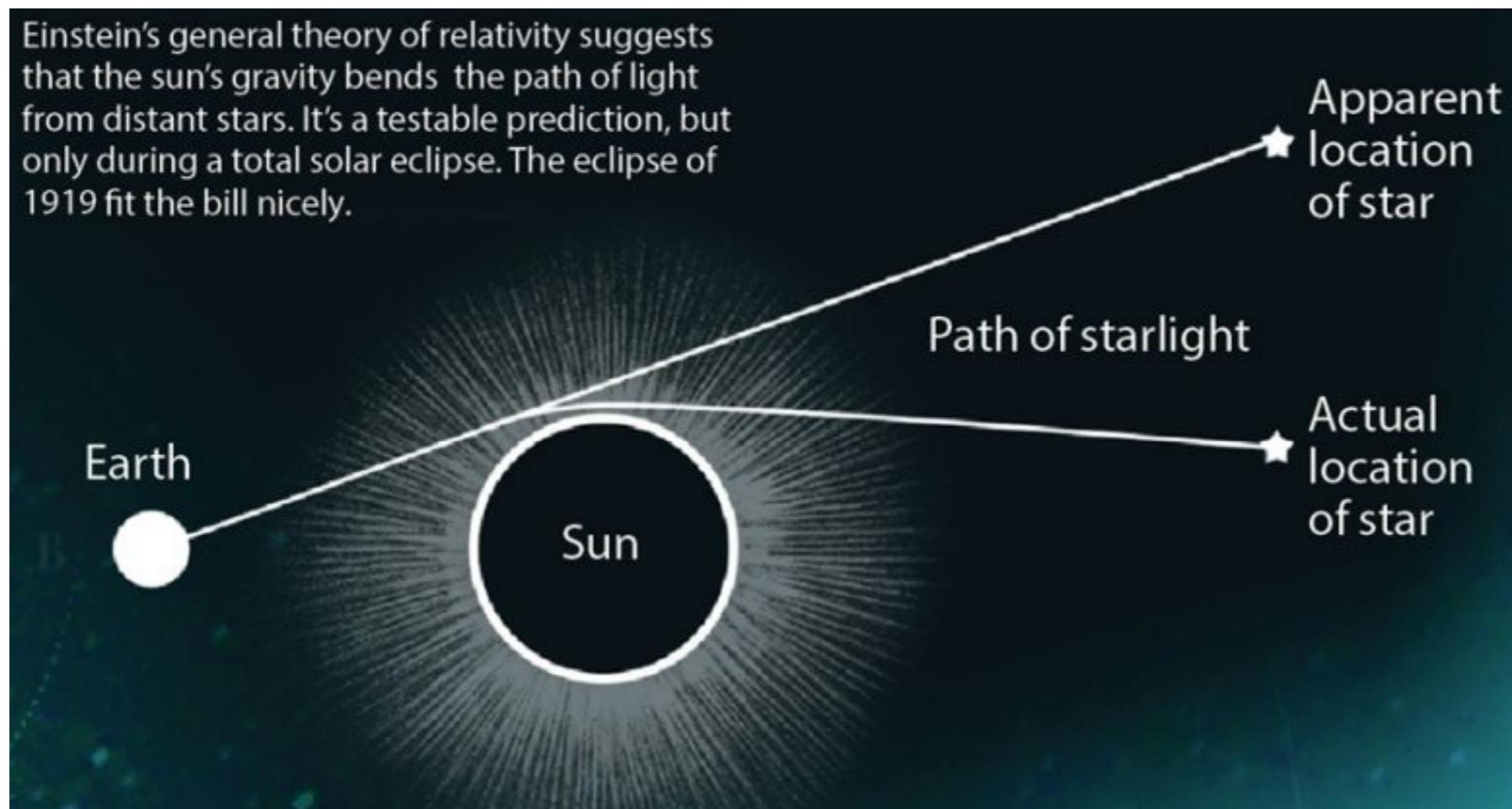
Karl Popper
1902-1994

Austrian-born philosopher of science (psychologist!), lecturer in philosophy U New Zealand (1937), reader logic London School of Economics (1946), prof. of logic and scientific method U London (1949). Popper wrote *The Logic of Scientific Discovery* (1959 based on Die Logik der Forschung that he had published in 1934) in which he discussed the **problem of demarcation** of science (i.e. what distinguishes science from non-science). Popper rejected the classical inductivist views on the scientific method and advocated **empirical falsification** as the hallmark of the empirical sciences. Further, Popper emphasised that a theory in the empirical sciences can never be proven, only falsified, meaning that it can and should be scrutinised by decisive experiments. Popper's views can be described as prescriptive.



<https://www.youtube.com/watch?v=sLDpj8dx0UU>

General Relativity and the Dyson-Eddington-Davidson test



<https://earthsky.org/human-world/may-29-1919-solar-eclipse-einstein-relativity>

“(...) the experiment sought to test between three different theoretical predictions. The first was the presumption, inherent in the nineteenth-century wave theory of light, that light has no mass and is unaffected by gravity. As such, the presence of the Sun would cause no deflection of stars in its field. The second possibility was put forward by Einstein as a consequence of his principle of equivalence. In this viewpoint, light has energy, which means it has mass. Thus it falls towards the Sun as it passes by, causing a small deflection (0.87 arcsecond at the limb of the Sun) in star positions away from the Sun, as seen from Earth. Finally, after developing GR, with its prediction that gravity alters the geometry of spacetime, Einstein realized there would be an additional deflection, due to curvature near the Sun. This resulted in his final light deflection prediction (1.75 arcsecond at the limb of the Sun), twice as great as his original one. In their presentations, Eddington and Dyson chose to assign credit for the middle ('half-deflection') prediction, to Newton, on the grounds that it was consistent with massive photons interacting with the Sun according to his famous law of gravity”.

The Problem of Induction



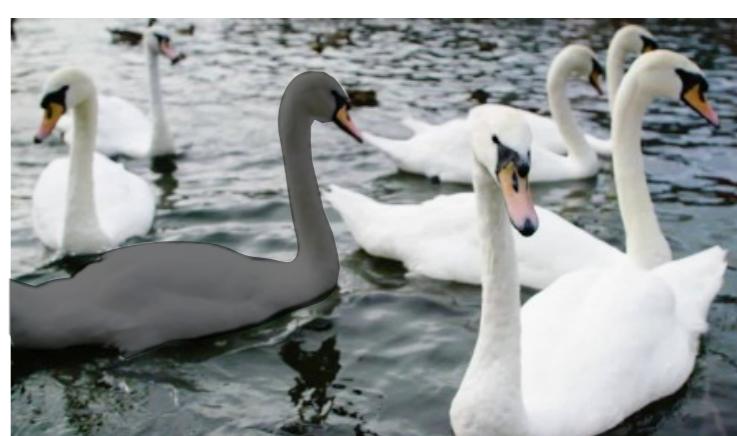
derivation of general principles from specific instances
induction // probability



Finding a white swan... supports the hypothesis that “all swans are white”
inductively sound but deductively invalid

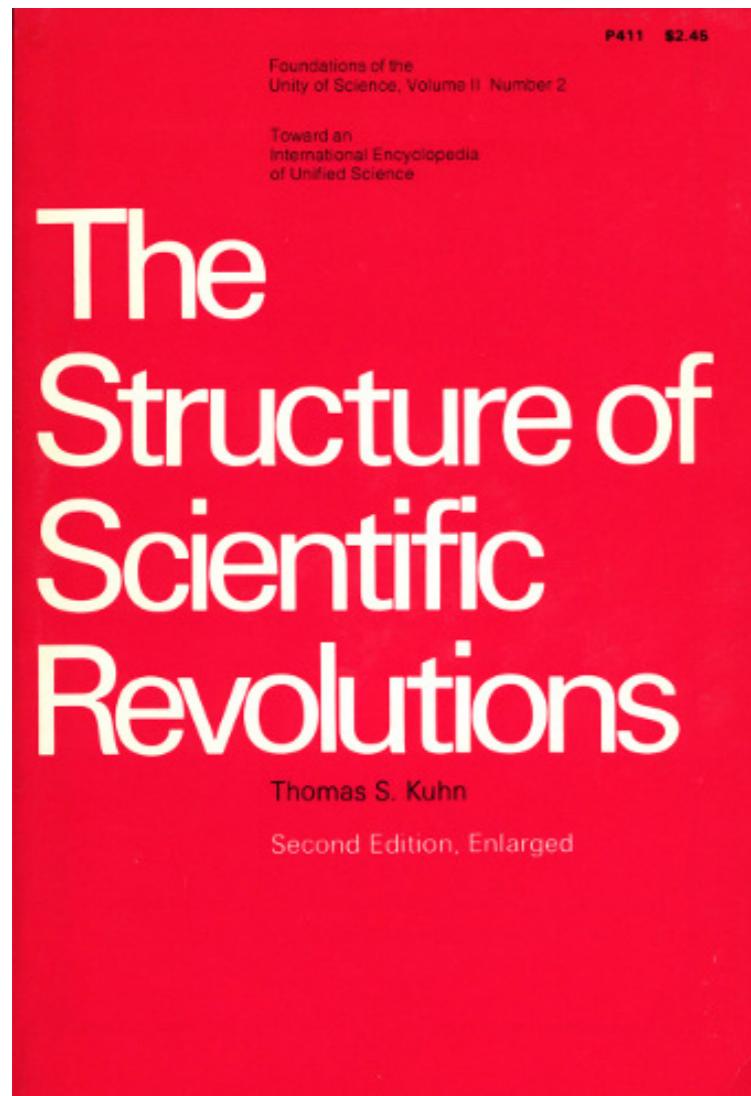


the inference of a particular instance from a general principle
deduction // certainty



Finding a black swan... rejects the hypothesis that “all swans are white”
deductively valid

Epistemology and History of Science



Thomas Kuhn
1922-1996

American philosopher of science (physicist, historian), prof. of history of science philosophy dept. at UC Berkeley. His major work is *The Structure of Scientific Revolutions* (1962) which exposed his view that scientific fields undergo periods of "normal science" characterised by a consensual "paradigm" shared by a scientific community, occasionally disrupted/renewed by a "paradigm shift", typically in the face of accumulated "anomalies" that cannot be explained in the context of the previous paradigm. Kuhn held that competing paradigms are often incommensurable, that is, they are competing and irreconcilable accounts of reality. Kuhn's views are largely anchored in a historic and sociological analysis of science (e.g., development of chemistry) rather than a prescriptive view.

Scientific Revolutions // Paradigm shifts

Pre-science

No existing paradigm



Normal Science

Puzzle solving stage

Scientists share a common paradigm

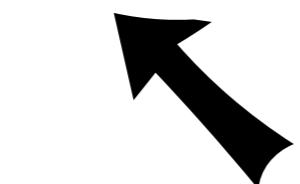
- articulate theory
- make predictions
- measurement

all the theories, concepts, and methods that a discipline takes for granted to make sense of some phenomena



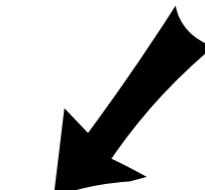
Scientific revolution

A paradigm shift takes place -
new paradigm prevails that
best accommodates the facts
to be judged relevant



Anomalies arise

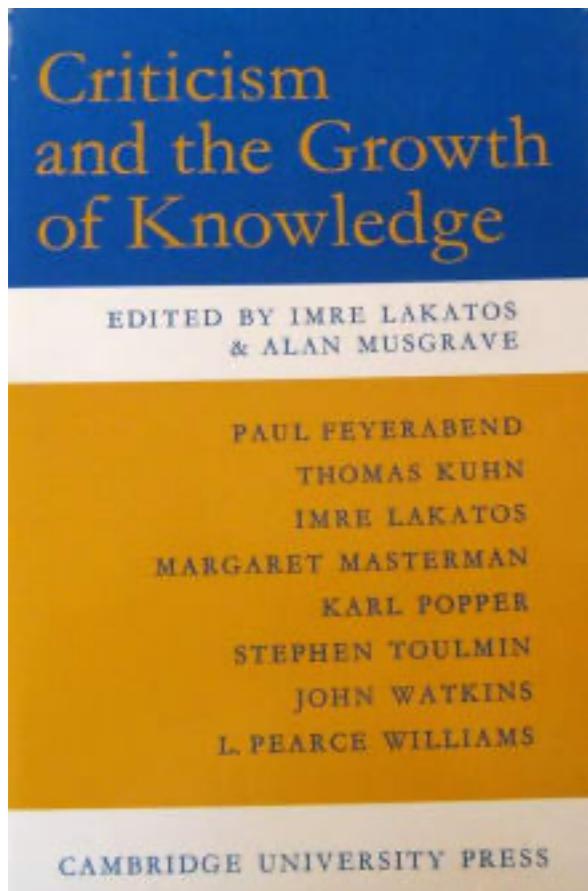
Blame apparatus
Auxiliary assumptions
Set aside problem



Crisis

Anomaly too problematic
Faith in paradigm shaken
Alternative concepts compete

Epistemology and History of Science



Imre Lakatos
1922-1974

Hungarian-born philosopher of science; initially studied mathematics and philosophy, influenced by Marxist and Hegelian ideas before turning to philosophy of science. A student of Karl Popper at the London School of Economics, Lakatos sought to reconcile Popper's falsificationism with Thomas Kuhn's paradigms. As a professor at the London School of Economics, he developed the *methodology of scientific research programs*, outlined in works like *Criticism and the Growth of Knowledge* (1970). Lakatos emphasized that science advances through competing research programs, judged on their ability to generate novel predictions (progressiveness) rather than strict falsification. His work bridges rationalism and historicism, offering a middle ground between Popper and Kuhn.

Epistemology and History of Science

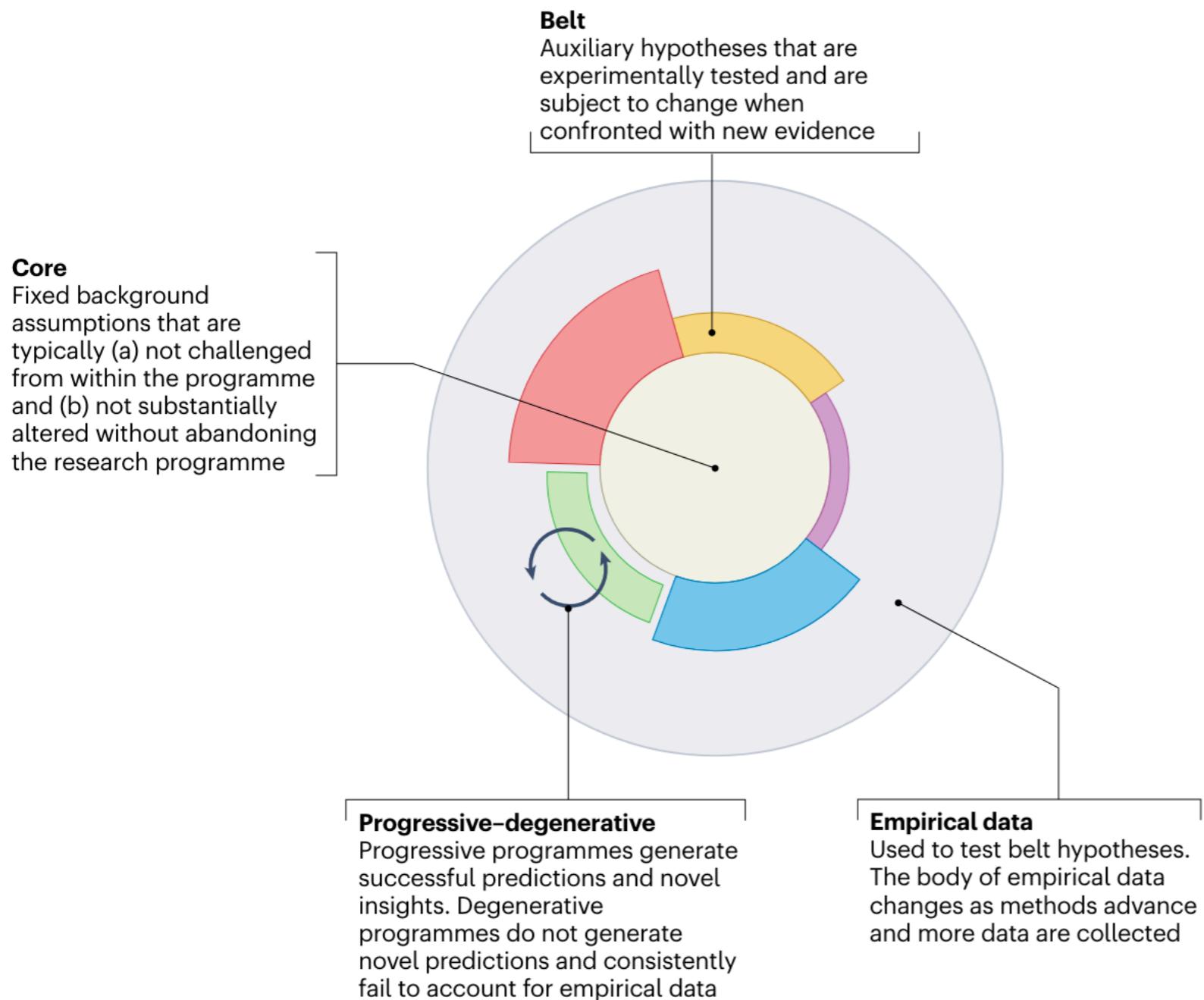
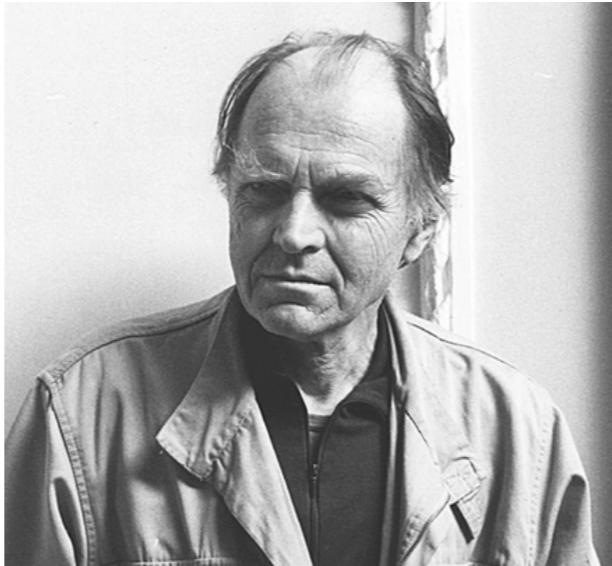
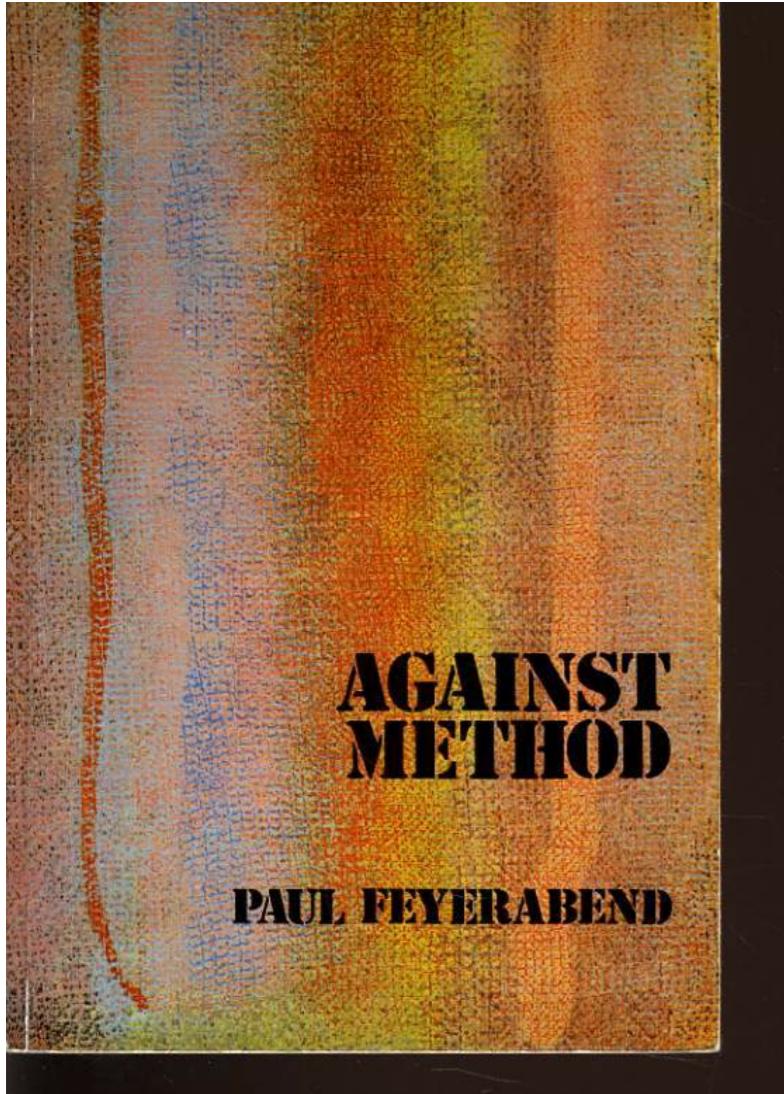


Fig. 2 | Lakatosian research programmes.

A conceptualization whereby research programmes are composed of a core of fixed background assumptions and a variable belt of auxiliary hypotheses. Empirical data are used to test and falsify belt hypotheses without changing the core. In the Lakatosian view, the entire research programme is not immediately falsified by conflicting empirical data. Instead, it is judged on its ability to successfully adapt its belt hypotheses to satisfy empirical constraints, which is indicated longitudinally by whether the research programme generates new insights and corroborates belt hypotheses (progressive) or not (degenerative).

Epistemology and History of Science



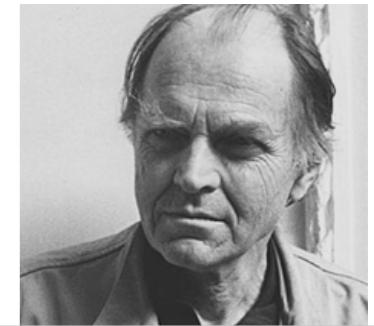
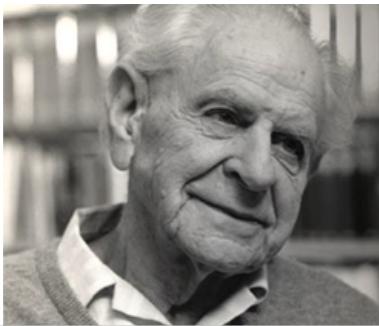
Paul Feyerabend

1924-1994

Austrian-born philosopher of science; studied with Popper (Feyerabend was first a supporter, later a critic of Popper), he was professor of philosophy at UC Berkeley (overlapped and interacted with Kuhn) and LSE (overlap with Lakatos) among other appointments. One of his major works is *Against Method* (1975) which exposes his anarchistic view of science (epistemological anarchism) and his rejection of the existence of universal methodological rules. He applied both humanitarian and historic arguments to argue for diversity in scientific process and discovery.

<http://plato.stanford.edu/entries/feyerabend/>

archetypes of epistemologists...



	Popper	Kuhn	Lakatos	Feyerabend
Nickn	“the logician”	“the sociologist”	“the mediator”	“the anarchist”
Thesis	scientists attempt to <u>falsify</u> their theories, without resorting to ad hoc explanations	old scientists do “normal science” and brush aside “anomalies”, young scientists fight for “paradigm shifts”	competing research programs are judged on their ability to generate novel predictions and solve anomalies (progressiveness vs. degeneration).	anything goes - rejects the idea of universal methodological rules in science, advocating for pluralism and creativity in scientific discovery.
Exam ples	Positive: Einstein’s General Relativity Negative: Freud’s Psychoanalytic Theory	The discovery of oxygen and the chemical revolution (by Lavoisier and others)	Positive: Quantum mechanics replacing classical physics. Negative: The Ptolemaic system in its degenerative phase.	Galileo’s defense of heliocentrism using rhetorical and non-empirical methods.

WHAT KIND OF SCIENCE IS PSYCHOLOGY?

Which theories have been falsified? What anomalies, if any, have led to shifts? What are core assumptions in psychology?



Exam: Format and Number or Questions

Multiple-choice, 30 questions

- 18 A-type questions
- 12 K-type questions

Exam: Locations

Monday 16.12.2024, 8:15-9:45

- **Last Name A–F**
Kollegienhaus, Hörsaal 001: Students with last names starting A up to and including F
- **Last Name G–Z**
Bernoullianum, Grösser Hörsaal 148: Students will last names starting with G to Z
- **Nachteilsausgleich**
Students notified individually by email (Missionsstr. 64a, Seminarraum 00.001)