Block 1.4: History & Methods of Psychology Dilosophy of Science Diver Lindemann Erasmus University Rotterdans	Epistemology Knowledge, truth, reasoning and theory
What is a Theory?	Related concepts and terms
Definition	Scientific laws
 a set of statements that organizes, predicts and explains observations it tells you how phenomena relate to each other, and what you can expect under as yet unknown conditions. 	 must necessarily hold, counterfactual empirical laws: empirical generalizations, only observables occur theoretical laws: laws with unobservable.
 allows predictions that can be tested formulated in such a way that testable hunotheres can be derived from them 	Models
 Infinitiated in such a way that testable hypotheses can be derived from them refutable / falsifiable (Popper) 	• kind of mini-theory
Deductive-nomological explanation	• visualizable representation of the theory, as in some kind of analogy
 seeks to show how a phenomenon is connected to general laws/principles (nomological). follows a deductive¹ logical structure 	• Example : the model of the <i>atom</i> as a collection of coloured balls (electrons) circling around a core composed of differently coloured balls (protons and neutrons).
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Knowledge, Theory and Truth I Realism "The world is like it is, independent of human exploration and theorizing" • Knowledge pictures the objective world • Truth is a correspondence between knowledge and the world • Theories are true if they correspond with nature • Problem: measurement agreement between language/theory and reality	 Knowledge, Theory and Truth II Pragmatism Knowledge is functional and interactive, "coping with the world" Truth is success Theory: Meaning of theories comes from their practical use, which aligns with the theory of truth known as pragmatism
Idealism "The mind makes up the world" • Knowledge is a subjective (or social) construction • Truth is a coherence with the rest of knowledge • Theories are true if they are consistent with the rest of our knowledge	
Problem: Idealism suggests there's no objective way to choose between different points of view, if all knowledge is subjective.	Palanghy d'Some (D
Reasoning: Deduction From general statements to individual observations Example A Example B	Reasoning: Induction From individual observations to general statements Example A Example B
1. All humans are mortal 1. All beans in that bag are white. 2. and Secretars is human 2. These hears are from that hear	1. Lots of swans were observed 1. These beans are from that bag. 2. All wore white 2. These beans are white
2. and sociates is mutant 2. These beans are from that bag. 3. Therefore, Socrates is mortal 3. Therefore, these beans are white.	2. An were write 2. These beans are write. 3. Therefore: all swans are white 3. Therefore, all beans in that bag are white.
 Deductions is always being true (logically correct) Logical certainty, because the conclusion is contained in premises: no new knowledge. form of re-stating what is already know, 	 General conclusion about the sample is drawn on the basis that the observed pattern. Induction is a form of generalization Induction is not necessarily true (logically not correct)
Philosophy of Science 🗘	Philimphy of Simon

Reasoning: Abduction Inference to the best explanation Example A Example B • You see outside that the street is wet. 1. These beans are white. (Observation) 2. All beans in that bag are white. • Therefore: It had been raining. 3. Therefore, these beans are from that bag. What is science? (Explanation) • Explanatory reasoning by generating hypotheses • No logical certainty, but suggest new ways of explaining things. new theory. · Considering a given outcome along with some possible preconditions, and concluding that the outcome is likely to have been caused by those preconditions. φ **Characteristics of Science** Norms of Science ("Ethos of Science") "C.U.D.OS norms" summarized by Merton (1942) 1. Systematicity: Theories must board, coherent and (if possible) hierarchical 2. Well-defined methods. Methods specify what will count as legitimate subject 1. C Communism: (somethings also Communalism) matter, facts and explananda. • Science is product of social collaboration and are assigned to the community. 3. Reduction: Reducing phenomena to underlying principles at the explanatory 2. U Universalism level and ignoring aspects of reality, which are supposedly accidental. 4. Objectivity: In the sense of being controllable, reliable and intersubjectively • Acceptance of claims is not to be based on personal or social attributes of the claim maker. observable. 3. D Disinterestedness 5. Clarity: Scientific statements are phrased unambiguously, in principle addressed to the public domain. • Scientists should not have other interest then the truth. 6. Revisable: Scientific knowledge is open, at all times revisable, and never 4. OS Organized Skepticism: definitive. • Science should be always open to falsify the currently accepted theories. Central criterion that distinguishes science from pseudo-science. Ø φ Everyday (common-sense) and scientific knowledge **Empirical Research Cycle** Differences 1. Direct, unbiased, impartial or theory-free observation scientific methodology Observatio 2. Empirical laws are based on induction • reductionism vs.phenomenological experience (inductive generalization or normal generalization) Sellars (1963): science and common sense not as a conflict but a continuum, with Evaluatio 3. You try to explain empirical observations by science as an extension of human practice. developing a theory. This theory also enables you to deduce new hypotheses (Deduction). 4. Testing of the hypotheses based on new empirical material. 5. Evaluating the findings: Predictions are tested through direct observation. φ Ø Demarcation Problem: Science vs. Non-science The demarcation criterion separates rational scientific knowledge from metaphysical speculation, irrationality, superstition and pseudo-science. **Different Views** Philosophy of science • Logical positivists: Verifiability • Popper: Falsifiability • What defines science? • Post-positivism • How and why science is successful? • no rule can guarantee scientific rationality • What are the criteria and standards for a good scientific method? scientists have a dogmatic faith in their theories theory choice is socially and historically determined φ



- testable and **falsifiable** • Empirical content of a theory increases with the degree of falsifiability
- "A theory that explains everything is explains nothing."
- "The more a theory forbids, the more it says about the world."

Example: Black swan example

Since confirmation is not possible, Popper accepted the uncertainty and provisional nature of theories.

- hypothesis was in principle legitimate, as long as it was refutable.
- Criticism then was the mark of real scientific rationality.
- Theories that were advertised as immune to criticism are pseudo-science • cf. psychoanalysis debate in Vienna at that time

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