

Explanation: Models

PHL 311
Spring 2006

Explaining

- Specify the cause of something
 - Matter, form, efficient, final
- Specify the general case under which event falls
 - Laws, theories
- Specify the way in which the reality accounts for variation in the observed
- Specify the way in which the surprising is normal

Causal Explanation

- Stemming from Aristotle four factors in causation
 - Material - of what the thing is made
 - Formal - the mathematical description of the change
 - Efficient - the event that generated the change
 - Final - the 'purpose' of the change

Causal Explanation

- More modern version of efficient causation
 - An observed constant conjunction of cause and effect
 - Cause is temporally prior to effect.
 - Cause and effect can be independently described
 - Removal of the cause removes the effect all things being equal

Law-like explanation

- An event is explained if it can be shown to be the outcome of a general law
 - A general law has universal scope
 - A general law may be complex
 - A general law represents a condition result pair
 - The 'showing' may be deductive or may be historical

Theoretical Explanation

- An event is explained if the variations of the event type can be deduced from well established theoretical principles
 - Beyond the appearances yet saving the appearances
 - Theory as a special representation of reality
 - Explanation via logical arguments or mathematical deduction

Common-sense Explanation

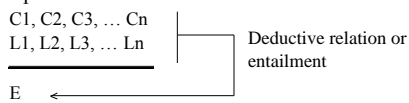
- A surprising event can be explained if it can be linked as a result to other non-surprising events
 - Explanation in everyday life
 - Linking as causal or narrative
 - Relation to learning

Hempelian Explanation

- Preserve scientific explanation
- Use logical formalism and theory
- Provide empirical constraints
- Identify forms of explanation where an explanation is an argument to the effect that the phenomenon to be explained was to be expected in virtue of certain explanatory facts.

Deductive-nomological (DN)

- Premises of the argument each contain statements that specify:
 - (1) initial conditions C, and
 - (2) law-like generalizations L.
- In each, the conclusion is the event E to be explained.



DN Explanation

- The explanation has the form of a sound deductive argument in which the explanandum follows as a conclusion from the premises in the explanans.
- The explanans must contain at least one “law of nature” and this must be an essential premise in the derivation.
 - Essential means that the derivation of the explanandum would not be valid if the premise were removed.

S-type Explanation

- *Deductive-statistical (DS)* explanation, involves the deduction of a narrower statistical uniformity from a more general set of premises, where at least one of the premisses involves a more general statistical law. Since *DS* explanation involves deduction of the explanandum from a law, it conforms to the same general pattern as the *DN* explanation of regularities.
- *Inductive-statistical or IS* explanation, involves the subsumption of individual events (like the recovery of a particular person from streptococcus infection) under statistical laws (such as a law specifying the probability of recovery, given that penicillin has been taken).

From Syllabus

- The Nature Of Scientific Explanation And The Philosophical Problems It Raises
 - Defining scientific explanation. Why do laws explain? Counter-examples and the pragmatics of explanation. Causation and explanation. Explaining why and explaining how.
- *Explanation, Causation and Laws*
 - Two Models of Scientific Explanation, Carl Hempel
 - The Pragmatics of Explanation, van Fraassen
 - Explanatory Unification and the Causal Structure of the World, Philip Kitcher
 - Scientific Explanation: Causation *and* Unification, Wesley C. Salmon
 - The Logic of Conditionals, J.L. Mackie
 - Laws of Nature, John Earman
