

Explanation
Phil 232 Philosophy of Science
Monday 3:00-5:50, Dodd 325
Description

Science seems to provide us with two distinct kinds of knowledge- descriptive and explanatory. For example, it is easy to see that there is a difference between knowing *that* there is a correlation between the position and phase of the moon and the rising and falling of the tides and knowing *why*. It is not so easy to see what this difference consists in. What are scientific explanations, and how do they differ from mere descriptions? We will survey and discuss some of the most influential answers to these questions since Hempel and Oppenheim's famous paper, "Studies in the Logic of Explanation". In the first half of the quarter, we will discuss:

- Hempel's Deductive-Nomological and Inductive-Statistical models of scientific explanation
- Peter Railton's Deductive-Nomological model of probabilistic explanation
- Friedman/Kitcher Unificationist model
- Wesley Salmon's Statistical Relevance and Causal Mechanical models
- van Fraassen's pragmatic theory of explanation

In the second half of the quarter, we will read (much of) James Woodward's *Making Things Happen*, in which he develops and defends a counterfactual theory of scientific explanation and an interventionist theory of causation.

Reading Schedule

Week 1: The DN Model

1. 4 Decades- Chapter 1, up to 1.2.
2. 4 Decades- Chapter 2-2.2, 2.3-2.4
3. Hempel, Carl G. "Aspects of Scientific Explanation", sections 1 and 2. (posted online)

Week 2: DS, IS, and DNP

1. 4 Decades- 2.4, 3.6, 4.6
2. Hempel, Carl G. "Aspects of Scientific Explanation", section 3 up to 3.4.3 (posted online)
3. Jeffrey, R., 1969, "Statistical Explanation vs. Statistical Inference" (posted online)
4. Railton, P., 1981, 'Probability, Explanation, and Information.', *Synthese*, 48: 233-56. (posted online)

Week 3 (when?): SR and CM

1. 4 Decades- Chapter 3 up to 3.3, 3.7
2. Salmon, "Probabilistic Causality" (posted online)
3. Salmon, "Causation without Counterfactuals". (posted online)

Week 4 : Pragmatics of Explanation

1. Salmon, 2.2, 4.4
2. van Fraassen, Chapter 5 of *The Scientific Image*. (posted online)

Week 5: Unification

1. Salmon, 3.5, 5.1
2. Kitcher, "Explanatory Unification and the Causal Structure of the World". (posted online)

Week 6: Woodward

1. Chapter 2

Week 7 (When?): Woodward

1. Chapter 3

Week 8: Woodward

1. Chapter 4 and 5 (up to 5.8)

Week 9: Woodward

1. Chapter 5 (5.8 to the end) and 8.

Week 10: TBA

Readings

The only required text for the class is Wesley Salmon's *Four Decades of Scientific Explanation*, which we will make extensive use of in the first half of class. Woodward's *Making Things Happen*, which is the focus of the second half of the class, is available through Oxford Scholarship Online. Additional readings will be posted online on the course website. If you would like access to the website, but are not enrolled in the class, please send me an email.

Grading

Everyone taking the class for credit will turn in a 15-20 page paper. [When is this paper due? Good question. Because our class meets on Mondays, we have some scheduling conflicts with holidays. We will very likely have a class meeting during finals week, and the paper will be due before that class.]