

Explanation and Evidence

Philosophy 9200

Meeting time: Tu, F 8:30 - 11:30, TC 305 (from Nov. 4)

Chris Smeenk

Office Hours: 412 Talbot College, W 9 -11 and by appointment

Email: csmeenk2@uwo.ca; phone ext. 8-5750

How does evidence lend credence to our scientific theories? This has long been a central question in epistemology and philosophy of science, and this seminar aims to combine a survey of some approaches to the issue with an assessment of a recent debate. One long-standing tradition in philosophy of science has taken probability theory as the most promising way to explicate the concept of evidential support. Many philosophers have argued instead that the credibility of a scientific theory should be analyzed (entirely or in part) in terms of its explanatory virtues. Scientific inference is, on this second view, best characterized as a form of “inference to the best explanation” (IBE), with attendant debates regarding what constitutes a good explanation. Defenders of a formal approach have pursued various lines of attack, from questioning the coherence of IBE to arguing that the alleged explanatory virtues can be subsumed under a richer notion of empirical success, undermining the need for IBE. One aim of the seminar will be to flesh out and assess this debate. We will also cover a number of related issues in formal epistemology and confirmation theory: underdetermination, Bayesianism, prediction vs. accommodation, unification and simplicity.

Seminar schedule: The seminar will have an unusual schedule, as I will be returning from leave in early November. I will have one introductory meeting in the first week of classes, and then we will meet twice a week from Nov. 4 - Dec. 12. Students will have an extended deadline to complete their papers (sometime in January, not yet finalized). I will also post all of the readings on the course website in September, and students will be asked to comment on some of the readings in an online forum prior to Nov. 4.

Evaluation: Students will be evaluated on the basis of:

1. Class participation, including contributions to online discussions of each of the assigned papers (10 %): The discussions will be open from the start of the term, with the expectation that students will have completed a majority of the reading and commented on it prior to the start of the seminar on Nov. 4.
2. Seminar presentation (20 %): presentation of one of the assigned readings.
3. Paper(s) (70 %): either a research paper, or a series of four shorter papers handed in over the course of the seminar.

Topics:

This list of topic is tentative and will be updated on the website as we progress through the seminar, and there will be multiple seminar sessions devoted to some topics.

- Classics on Induction and Confirmation
 - David Hume, *An Inquiry Concerning Human Understanding*, edited by Charles Hendel, section IV-VII.

- Goodman, “The New Riddle of Induction,” in *Fact, Fiction, and Forecast*.
- Hempel, “Studies in the Logic of Confirmation,” in *Aspects of Scientific Explanation*.
- Bayesianism and its Critics
 1. Basics of Bayesian Confirmation
 - Howson and Urbach, *Scientific Reasoning*, Chapters 2-3.
 - Earman, *Bayes or Bust*, 2, 6.1-6.6.
 2. Bayes meets Quine-Duhem and Kuhn
 - Dorling, “Bayesian Personalism, the Methodology of Scientific Research Programs, and Duhem’s Problem” *SHPMP* **10** (1979): 177-187.
 - Howson and Urbach, *Scientific Reasoning*, pp. 92-102.
 - Earman, *Bayes or Bust*, 3.7 (Duhem), 8 (Kuhn).
 - Salmon, “Rationality and Objectivity in Science, or Tom Kuhn meets Tom Bayes,” in *Scientific Theories*, ed. by Savage.
 3. Anti-Bayesianism
 - Glymour, “Why I am Not a Bayesian,” from *Theory and Evidence*.
 - Kelly and Glymour, “Why Probability does not Capture the Logic of Scientific Justification,” in *Contemporary Debates in Philosophy of Science*.
- Underdetermination
 - Earman, “Underdetermination, Realism, and Reason,” *Midwest Studies in Philosophy* **18** (1993): 19-38.
 - Laudan and Leplin, “Empirical equivalence and underdetermination,” *Journal of Philosophy* **88** (1991): 449-472.
 - Mark Wilson, “The Observational Uniqueness of Some Theories,” *Journal of Philosophy* **77** (1980): pp. 208-233.
 - John Norton, “Must Evidence Underdetermine Theory?” [phil-sci 00001257](https://philsci.org/archive/2000/01/00001257/).
- Inference to the Best Explanation
 - Selections from Peter Lipton, *Inference to the Best Explanation*.
 - Bas van Fraassen, Chapter 6 from *Laws and Symmetry*.
 - Larry Laudan, “How about Bust?: Factoring Explanatory Power Back Into Theory Evaluation” *PoS* **64** (1997): 306-316.
 - Psillos, “On van Fraassen’s Critique of Abductive Reasoning,” *Philosophical Quarterly* (1996): 31-47.
 - Bird, “Inference to the Only Explanation,” *Philosophy and Phenomenological Research* **74** (2007): 424-432.
- Induction Reconsidered
 - Roger White, “Explanation as a Guide to Induction,” *Philosopher’s Imprint*.
 - Gilbert Harman and S. Kulkarni, “The Problem of Induction” *Philosophy and Phenomenological Research*.

- John Norton, “A Material Theory of Induction,” *Philosophy of Science* **70** (2003): 647-670.
- Simplicity and Unification
 - Janssen, “COI Stories: Explanation and Evidence in the History of Science” *Perspectives on Science* (2002): 457 - 522.
 - Sober and Forster, “How to Tell When Simpler, More Unified, or Less Ad Hoc Theories will Provide More Accurate Predictions”, *BJPS* **45** (1994): 1-35.
 - Myrvold, “A Bayesian Account of the Virtue of Unification,” *PoS* **70**: 399-423.
- Prediction, Accommodation, and Bootstrapping
 - Glymour, *Theory and Evidence* (selections).
 - Hitchcock and Sober, “Prediction Versus Accommodation and the Risk of Overfitting,” *BJPS* **55** (2004): 932-942.
- Evidence in Action: Newtonian Methodology, Evolutionary Theory
 - Sober, *Evidence and Evolution* (selections)
 - Harper, “Newton’s Methodology and Mercury’s Perihelion Before and After Einstein” *PoS* **74**: 932-942; article in Kyburg volume
- Williamson on Knowledge and Evidence
 - Williamson, *Knowledge and Its Limits*, Chapter 9.
 - Bird, “Underdetermination and Evidence,” in *Images of Empiricism* (ed. by B. Monton).