Philosophy 9620: Empiricism and the Structure of Theories

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· Office Hours: Tuesday, 10-11, or by appointment

What is the structure of scientific theories, and how do experiment and observation contribute to their justification? Philosophers of science have approached these two central, intertwined questions from different starting points throughout the last century. This course will survey attempts to clarify the structure of theories, and formulate and assess empiricism, from formal, historical, and practice-oriented approaches. Two central themes will run throughout these discussions. First, how do positions regarding the appropriate epistemic attitude to take towards different aspects of scientific theories relate to definitions of theoretical equivalence? Second, how does experience contribute to theoretical knowledge, and how are answers to this question reflected in different views about the structure of theories?

Evaluation:

- Participation (20 %): One goal of the seminar is to have lively and well-informed philosophical discussions. To fulfill this goal, please come to class prepared to contribute actively, based on careful reading and reflection on the topics raised in the assigned readings. Half of your participation grade will be based on your participation over the course of the term. You will receive full marks for thoughtful and productive contributions to discussion. The other half will be based on a 30 minute presentation, on a topic of your choice. (Typically the presentation will focus on the topic you have chosen to write a paper about, although that is not required.)

- Commentaries (10 %): Please post short commentaries (about 250 - 500 words) on the assigned readings by 5:00 p.m. Tuesday each week. These will be posted to an online discussion forum on OWL, accessible to everyone in the class. In these posts, you should either (i) identify one of the main contributions you think the assigned paper makes, and briefly characterize this contribution and explain what is interesting or exciting about, or (ii) pose a question regarding one of the paper's central claims (either a question of clarification, or a potential objection). While I encourage you to post a commentary each week, your mark will be based on 10 commentaries.

- Paper (70 %): You will be evaluated based on either (1) a research paper due at the end of the term (approximately 6,000 - 7,500 words), or (2) three shorter papers due roughly every 4 weeks. For option (1), a brief description of the paper topic and / or outline, along with a bibliography, is due Nov. 28. I expect to help refine the topic and find appropriate readings in light of this initial proposal. For option (2), students will be responsible for choosing topics for three papers, of approximately 2,000 words each, based on the readings and seminar discussion.

Course Website & Readings: Assigned readings, supplementary readings, updated schedules, and commentaries will be posted on the website.

Tentative Schedule

This is a tentative list of topics and readings, and will be revised as the term progresses based in part on the interests of the seminar participants. I will post a regularly updated schedule on the website.

- Positivist Accounts of Scientific Theories
  - Carnap, selections from *Logical Syntax of Language*.
  - Demopoulos, "Carnap on the Rational Reconstruction of our Scientific Theories" in *Cambridge Companion to Carnap*.
  - Hempel, "On the 'Standard Conception' of Scientific Theories," in *Minnesota Studies in Philosophy of Science*.
  - Mormann, "The Structure of Scientific Theories in Logical Empiricism" in *Cambridge Companion to Logical Empiricism*.
  - Ramsey, "Theories," in *Philosophical Papers*.
- The Problem of Theoretical Terms
  - Carnap, "The methodological character of theoretical terms," in *Minnesota Studies in Philosophy of Science*, volume 1, pp. 38-76.
  - Hempel, "Theoretician's Dilemma".
  - Lewis, "How to Define Theoretical Terms," *JPhil* **47** (1970).
- Critical Reflections on Positivist Accounts
  - Demopoulos, "Three Views of Theoretical Knowledge" *BJPS* (2010).
  - Stein, "Was Carnap Entirely Wrong After All?" *Synthese* **93** (1992): 275-295.
  - Feyerabend, "Explanation, Reduction, and Empiricism," in *Realism, Rationalism, and Scientific Method: Philosophical Papers, Volume 1*.
- Semantic View
  - van Fraassen, Chapter 3 from *The Scientific Image* and "The Semantic Approach to Scientific Theories" (1987).
  - Suppe, introduction to the *The Structure of Scientific Theories*.
- What should be saved?
  - Bogen and Woodward, "Saving the Phenomena" *Philosophical Review* **97** (1988): 303-352.
  - Sklar, "Saving the Nuomena" *Philosophical Topics* **13** (1982): 89-110.
- Theoretical Equivalence
  - Coffey, "Theoretical equivalence as Interpretative Equivalence," *BJPS* **65** (2014): 821-844.
  - Glymour, "Theoretical realism and theoretical equivalence" *PSA Proceedings* (1970).
  - Weatherall, "Are Newtonian gravitation and geometrized Newtonian gravitation theoretically equivalent?" *Erkenntnis* **81** (2016): 1073-1091.

  - Wilson, "On the Observational Uniqueness of Some Theories" *Journal of Philosophy* (1980).

- Semantic vs. Syntactic Views

  - Halvorson, "What Scientific Theories Could Not Be" *Philosophy of Science*.
  - Suppes, "What Is a Scientific Theory?" In *Philosophy of Science Today*, edited by S. Morgenbesser, 55-67.
  - Glymour and van Fraassen responses.

- Putnam's Paradox

  - Lewis, "Putnam's Paradox," *Australasian Journal of Philosophy* **62** (1984): 221-236.
  - Putnam, Hilary. "Models and Reality." In *Realism and Reason*, 1–25. Cambridge: Cambridge University Press, 1983.

- Continuity and Theory Change

  - Field, Hartry. "Theory Change and the Indeterminacy of Reference." *JPhil* **70** (1973): 462-481.
  - Laudan, "A confutation of convergent realism" *Philosophy of Science* (1981).
  - Stein, "Yes, but ... some skeptical remarks on realism and anti-realism" *Dialectica* (1989).

- Structure of Physical Theories

  - North, "The 'structure' of physics: A case study," *The Journal of Philosophy* 106: 57-88.
  - Greaves, "In Search of (Spacetime) Structuralism," *Philosophical Perspectives*, **25**(2011), pp. 189-204.

- Application and Measurement

  - Chang, selections from *Inventing Temperature*.
  - Smith, "Closing the Loop," in *Newton and Empiricism*.
  - van Fraassen, selections from *Scientific Representations*.