

PHIL-UA 90, Spring 2012

PHILOSOPHY OF SCIENCE

Time & Place Philosophy second floor seminar room, 5 Washington Place
9.30 to 10.45 AM

Texts *Theory and Reality*, Peter Godfrey-Smith, University of Chicago Press, 2003.

- *The Structure of Scientific Revolutions*, Thomas Kuhn, University of Chicago Press, 1996. (Any edition that contains Kuhn's postscript will work.)
- Readings distributed via Blackboard

Web The latest versions of course handouts and so on are at my personal web page: www.strevens.org/classes/philsci12

Scanned readings will be posted on the course's Blackboard site, which you access from NYU Home.

Content What is science? How does it work? When it works, what kind of knowledge does it provide? Is there a scientific method? How do experiments provide evidence for theories? What is the nature of scientific explanation? How does the social organization of science contribute, if at all, to its success?

Evaluation Your total grade will be made up of:

First paper (due March 5)	20%
Second paper (due April 2)	20%
Third paper (due April 30)	20%
Class participation	10%
Take-home exam (due May 9)	30%

Papers should be 1800 to 2000 words long (about six pages with lines one-and-a-half spaced)

Strevens Office hours are Wed 11:00 to 12:30, after class, and by appointment.
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READINGS PHIL SCIENCE

- Jan 23 Introduction
▷ Godfrey-Smith, *Theory and Reality*, chapter 1

Big Theories of Science

- Jan 25 The logical empiricist tradition
▷ Schlick, M., "Positivism and realism", pp. 86–102, 106–107
▷ Godfrey-Smith, *Theory and Reality*, chapter 2
- Jan 30 The problems of induction
▷ Strevens, "The problem of induction" (background)
▷ Goodman, N., *Fact, Fiction, and Forecast*, pp. 66–83
▷ Godfrey-Smith, *Theory and Reality*, chapter 3 (skip §3.3)
- Feb 1 Popper's falsificationism
▷ Popper, K., *The Logic of Scientific Discovery*, pp. 27–42, 78–87, 265–273
▷ Godfrey-Smith, *Theory and Reality*, chapter 4
- Feb 6 Popper continued
- Feb 8 No class
- Feb 13 Kuhn on normal science
▷ Kuhn, *Structure*, chapters 1 through 8
▷ Godfrey-Smith, *Theory and Reality*, chapter 5
- Feb 15 Kuhn on revolutions
▷ Kuhn, *Structure*, chapters 9 through 13 and postscript
▷ Godfrey-Smith, *Theory and Reality*, chapter 6
- Feb 20 President's day – no class
- Feb 22 Theory and observation
▷ Hanson, N. R., *Patterns of Discovery*, chapter 1
▷ Fodor, J. A., "Observation reconsidered" (NYU Proxy), introduction, §3 (so omit §§1 & 2)
▷ Godfrey-Smith, *Theory and Reality*, chapter 10, §3
- Feb 27 After Kuhn
▷ Laudan, L., *Progress and Its Problems*, excerpt
▷ Godfrey-Smith, *Theory and Reality*, chapter 7
- Feb 29 Corrigibility and the scientific method
▷ Reading to be announced

Realism, Laws of Nature, Causality

- Mar 5 Unobservable entities: Empiricism versus realism ◁ Due date
- ▷ Maxwell, G., "The ontological status of theoretical entities", pp. 1–15, 25–27 (the rest is recommended but optional)
 - ▷ van Fraassen, B. C., *The Scientific Image* (NYU Proxy), pp. 6–21, 23–25
 - ▷ Godfrey-Smith, *Theory and Reality*, chapter 12
 - First paper due
- Mar 7 Pessimism and beyond
- ▷ Stanford, P. K., "Pyrrhic victories for scientific realism" (NYU Proxy)
- Mar 19 Laws and causality: Empiricism versus realism
- ▷ Ayer, A. J., "What is a law of nature?", part II
 - ▷ Dretske, F., "Laws of nature" (NYU Proxy)
- Mar 21 Laws and causality: Humeanism
- ▷ Lewis, D., *Counterfactuals*, pp. 72–77
 - ▷ Lewis, D., *Philosophical Papers*, volume 2, pp. ix–xiii
 - ▷ Menzies, P., "Counterfactual theories of causation", §§1, 2, 3.4

Explanation

- Mar 26 Hempel's expectability approach
- ▷ Hempel, C. G. and P. Oppenheim, "Studies in the logic of explanation" (NYU Proxy), pp. 135–146
 - ▷ Salmon, W. C., *Four Decades of Scientific Explanation*, pp. 46–50
 - ▷ Godfrey-Smith, *Theory and Reality*, chapter 13 (optional)
- Mar 28 The causal approach
- ▷ Strevens, M., *Depth*, §§1.41, 1.42, 2.1
- Apr 2 The unification approach ◁ Due date
- ▷ Kitcher, P., "Explanatory unification" (NYU Proxy)
 - Second paper due
- Apr 4 Sophisticated causalism
- ▷ Strevens, M., "The causal and unification accounts of explanation unified – causally" (NYU Proxy)

Evidence

- Apr 9 Instantialism and the ravens
- ▷ Hempel, C. G., "Studies in the logic of confirmation" (NYU Proxy), §§1–5
 - ▷ Godfrey-Smith, *Theory and Reality*, chapter 3, §3
- Apr 11 Instantialism and unobservables
- ▷ Glymour, C., "Relevant evidence" (NYU Proxy)

- Apr 16 Bayesianism: Mechanics
- ▷ Strevens, M., "Notes on Bayesian confirmation theory", §§1–6
 - ▷ Godfrey-Smith, *Theory and Reality*, chapter 14, §§1–4 (optional)
- Apr 18 Bayesianism: Philosophical issues
- ▷ Strevens, M., "Notes on Bayesian confirmation theory", §§7, 9
- Apr 23 Breathcatching day - No reading

The Social Structure of Science

- Apr 25 The sociology of science: Merton
- ▷ Merton, R. K., "The normative structure of science"
 - ▷ Merton, R. K., "Priorities in scientific discovery" (NYU Proxy), pp. 635–649, 658–659 (the rest is optional)
 - ▷ Godfrey-Smith, *Theory and Reality*, chapter 8
- Apr 30 The sociology of science: Critical approaches ◁ Due date
- ▷ Collins, H. M., "The seven sexes" (NYU Proxy)
 - ▷ Okruhlik, K., "Gender bias in the biological and social sciences" (interesting but optional)
 - ▷ Godfrey-Smith, *Theory and Reality*, chapter 9
 - Third paper due
- May 2 Organizing science
- ▷ Kitcher, P., "The division of cognitive labor" (NYU Proxy)
 - ▷ Godfrey-Smith, *Theory and Reality*, chapter 11
- May 7 The credit system in science
- ▷ Latour, B. and S. Woolgar, *Laboratory Life*, pp. 200–208
 - ▷ Strevens, M., "The role of the priority rule in science" (NYU Proxy)

No classes: Feb 8; Feb 20

Papers are due on March 5th, April 2nd, April 30th

Take-home exam due May 9th

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- Collins, H. M. (1975). The seven sexes: A study in the sociology of a phenomenon, or the replication of experiments in physics. *Sociology* 9:205–224.
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- Hempel, C. G. and P. Oppenheim. (1948). Studies in the logic of explanation. *Philosophy of Science* 15:135–175.
- Kitcher, P. (1981). Explanatory unification. *Philosophy of Science* 48:507–531.
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- Menzies, P. (2009). Counterfactual theories of causation. In E. N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy*, fall 2009 edition.
- Merton, R. K. (1942). The normative structure of science. *Journal of Legal and Political Sociology* 1:115–126. Originally titled “Science and Technology in a Democratic Order”. Reprinted under the new title in Merton (1973).
- . (1957). Priorities in scientific discovery. *American Sociological Review* 22:635–659.
- . (1973). *The Sociology of Science*. University of Chicago Press, Chicago.
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- . (2012). Notes on Bayesian confirmation theory. Unpublished manuscript.