

NYU PHIL-GA 1104, Fall 2023

ADVANCED INTRODUCTION TO THE PHILOSOPHY OF SCIENCE THE SPECIAL SCIENCES

Time & Place Class meets Tuesdays 4 to 6 PM in Room 202, 5 Washington Place

Texts Readings will be found on the class's NYU Brightspace site (or possibly another web site, depending on class needs)

Topics The special sciences study the behavior of particular or "special" physical structures: organisms, ecosystems, brains, languages, economies, planets and their climates. In this seminar, we will explore the equally specialized devices for thinking and representing that scientists use to characterize and to understand those behaviors: models (typically heavily idealized), inexact generalizations, hedged generalizations, probability distributions. And we will bring what we learn to bear on various questions about the autonomy of the special sciences. As an Advanced Introduction, the seminar will not presuppose any expertise in the philosophy of science; indeed, an aim of the seminar is to gain familiarity with some of the many topics in the philosophy of science—in particular, those having to do with lawhood, probability, modeling, explanation, and autonomy—by viewing them in the light of the special needs of the special sciences.

Questions that we will investigate include:

1. Does the contingency of many special science regularities undermine their lawhood?
2. Are some special science generalizations conceptual necessities?
3. Can a model that contains idealizations, hence falsehoods, genuinely explain anything about the corresponding system?
4. What explanatory work can be done by a probabilistic model of a deterministic system?
5. Does adding "ceteris paribus" to a generalization render it empty or trivially true?
6. In what senses are the special sciences autonomous from physics?

Evaluation Your total grade will be made up of:

Your grade is based on two papers (50% each).

The first paper should be 10 to 12 pages long. The second paper may be another essay of the same length on a different topic, or a 20 to 24 page extension and rewrite of the first. If you pursue this latter option, then, you will submit a 12 page paper and then a 24 page paper that is based on (and may incorporate all of) the shorter paper.

The first paper is due on November 3rd. The second paper is due on December 15th.

In the event of your taking an incomplete, all coursework must be submitted before the first day of classes of the subsequent fall semester, or you will receive a failing grade. No extensions: this is a fixed deadline.

Michael Strevens Office hours are Wednesday 1-2:30 PM and by appointment
Room 603, 5 Washington Place, phone (212) 998-3559
strevens@nyu.edu ■ www.strevens.org

THE SPECIAL SCIENCES

READINGS

The Character of the Special Sciences

- Sep 5 Introduction
- Sep 12 Three perspectives on the special sciences
 - ▷ Oppenheim and Putnam, "Unity of science as a working hypothesis", pp. 3–16
 - ▷ Fodor, "Special sciences"
 - ▷ Cartwright, *The Dappled World*, pp. 1–19 (Introduction)
- Sep 19 Special science "laws"
 - ▷ Cohen and Callender, "A better best system account of lawhood"
 - ▷ Optional: Strevens, "Physically contingent laws and counterfactual support"

Inexactness in Special Science Models

- Sep 26 Entanglement and contingency
 - ▷ Jackson and Pettit, "Program explanation: A general perspective"
 - ▷ Strevens, "High-level exceptions explained"
- Oct 3 Ceteris paribus hedges
 - ▷ Lange, "Who's afraid of ceteris paribus laws? or: How I learned to stop worrying and love them"
 - ▷ Strevens, "Ceteris paribus hedges: Causal voodoo that works", pp. 652–660 (the rest is optional)
- Oct 10 Legislative Monday – no class
- Oct 17 No class
- Oct 24 No class
- Oct 31 High-level probability
 - ▷ Rosenthal, "Johannes von Kries's range conception, the method of arbitrary functions, and related modern approaches to probability"
 - ▷ Optional: Strevens, "Dynamic probability and the problem of initial conditions"

Abstraction and Idealization in Special Science Models

- Nov 7 Autonomy, explanatory and metaphysical
 - ▷ Kitcher, "1953 and all that: A tale of two sciences", pp. 335–351
 - ▷ Wilson, "Non-reductive physicalism and degrees of freedom"

- Nov 14 **Differencemaking**
- ▷ Garfinkel, *Forms of Explanation*, chapter 2
 - ▷ Strevens, "The causal and unification approaches to explanation unified—causally"
- Nov 21 **Idealization**
- ▷ Elgin, "Understanding and the facts", pp. 39–41
 - ▷ Bokulich, "How scientific models can explain"
 - ▷ Weisberg, "Three kinds of idealization"
- Nov 28 **Black-boxing and the division of labor**
- ▷ Potochnik, "Optimality modeling and explanatory generality"
 - ▷ Franklin-Hall, "Explaining causal selection with explanatory causal economy: Biology and beyond"
 - ▷ Optional: Strevens, "Special-science autonomy and the division of labor"
- Dec 5 **Multiple realizability**
- ▷ Shapiro, "Multiple realizations"
 - ▷ Fodor, "Special sciences: Still autonomous after all these years", pp. 156–162 (skim the rest)
- Dec 12 **Universality**
- ▷ Something on convergent evolution
 - ▷ Strevens, "Why high-level explanations exist"

Special Science Taxonomy

- TBD** The Naturalness of Special Science Kinds
- ▷ Franklin-Hall, "Natural kinds as categorical bottlenecks"

Papers are due on November 3rd and December 15th

HOW SCIENCE WORKS REFERENCES

- Bokulich, A. (2011). How scientific models can explain. *Synthese* 180:33–45.
- Cartwright, N. (1999). *The Dappled World: A Study of the Boundaries of Science*. Cambridge University Press, Cambridge.
- Cohen, J. and C. Callender. (2009). A better best system account of lawhood. *Philosophical Studies* 145:1–34.
- Elgin, C. (2007). Understanding and the facts. *Philosophical Studies* 132:33–42.
- Fodor, J. A. (1974). Special sciences. *Synthese* 28:97–115.
- . (1997). Special sciences: Still autonomous after all these years. *Philosophical Perspectives* 11:149–163.
- Franklin-Hall, L. R. (2015a). Explaining causal selection with explanatory causal economy: Biology and beyond. In C. Malaterre and P.-A. Braillard (eds.), *How Does Biology Explain?* Springer-Verlag, Heidelberg.
- . (2015b). Natural kinds as categorical bottlenecks. *Philosophical Studies* 172:925–948.
- Garfinkel, A. (1981). *Forms of Explanation*. Yale University Press, New Haven, CT.
- Jackson, F. and P. Pettit. (1990). Program explanation: A general perspective. *Analysis* 50:107–117.
- Kitcher, P. (1984). 1953 and all that: A tale of two sciences. *Philosophical Review* 93:335–373.
- Lange, M. (2002). Who's afraid of ceteris paribus laws? or: How I learned to stop worrying and love them. *Erkenntnis* 57:407–423.
- Oppenheim, P. and H. Putnam. (1958). Unity of science as a working hypothesis. In H. Feigl, M. Scriven, and G. Maxwell (eds.), *Concepts, Theories, and the Mind-Body Problem*, volume 2 of *Minnesota Studies in the Philosophy of Science*. University of Minnesota Press, Minneapolis.

- Potochnik, A. (2007). Optimality modeling and explanatory generality. *Philosophy of Science* 74:680–691.
- Rosenthal, J. (2016). Johannes von Kries's range conception, the method of arbitrary functions, and related modern approaches to probability. *Journal for General Philosophy of Science* 47:151–170.
- Shapiro, L. (2000). Multiple realizations. *Journal of Philosophy* 97:635–654.
- Strevens, M. (2004). The causal and unification approaches to explanation unified—causally. *Noûs* 38:154–176.
- . (2008). Physically contingent laws and counterfactual support. *Philosophers' Imprint* 8.8:1–20.
- . (2012). Ceteris paribus hedges: Causal voodoo that works. *Journal of Philosophy* 109:652–675.
- . (2014). High-level exceptions explained. *Erkenntnis* 79:1819–1832.
- . (2016). Special-science autonomy and the division of labor. In M. Couch and J. Pfeifer (eds.), *The Philosophy of Philip Kitcher*. Oxford University Press, Oxford.
- . (2021). Dynamic probability and the problem of initial conditions. *Synthese* 199:14 617–14 639.
- . (forthcoming). Why high-level explanations exist. In K. Robertson and A. Wilson (eds.), *Levels of Explanation*. Oxford University Press, Oxford.
- Weisberg, M. (2007). Three kinds of idealization. *Journal of Philosophy* 104:639–659.
- Wilson, J. (2010). Non-reductive physicalism and degrees of freedom. *British Journal for the Philosophy of Science* 61:279–311.