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What is it that makes the sciences *rational*, if anything? For much of the twentieth century, philosophers of science held that if science were rational then it must be *logical*, logic being the very essence of reason. Philosophers agreed that there must be a *logic of scientific discovery*, though they disagreed about how that logic of discovery might be best characterized. Some argued that scientific claims must be inductively *verified* by appropriate sense data. Others replied that verifying the truth of a claim in science was impossible in principle (for several reasons), and so they argued that the *falsification* of claims was the best that might be achieved. In 1962, Thomas Kuhn published his *Structure of Scientific Revolutions* in which he placed less of an emphasis on the logic of scientific discovery and more of an emphasis on the *history* of scientific discovery. Kuhn claimed that science involves non-rational (non-logical) changes of belief which he initially called “paradigm shifts.” This new emphasis precipitated what at least one philosopher has called a “crisis of rationality.”

Since 1962 (but almost certainly not because of Kuhn), researchers in the social sciences – particularly economics – have been rethinking rationality. Rather than equating rationality with obedience to logical prescriptions they have attempted to understand rationality from a *naturalistic* perspective. That is, they have been looking at how people *actually do* go about reasoning and making decisions, rather than arguing about how people *ought* to reason in order to qualify as rational. This does not decry logic. It suggests only that people reason effectively in several ways, only one these ways is a logical style of reasoning. The question for this course is: Can naturalistic accounts of reasoning help us understand how science might be described as rational even if there may be no identifiable logic of scientific discovery? Since we are borrowing material from the social sciences a second question will be important: Are the social sciences sufficiently similar to the natural sciences that a new account of scientific rationality developed in the former could be applied to explain the latter?

Requirements:

	Undergraduate	Graduate
Seminar and Handout	20%	20%
First Essay (~6 pages)	20%	20%
Second Essay (~6 pages)	25%	20%
Final Paper	35% (8-10 pages)	40% (12-14 pages)

Expectations:

- All class members will be engaging with the same course materials. In papers and class discussion, both undergraduate and graduate students are expected to demonstrate thoughtfulness and (on occasion) insight.
- However, the mark distributions and qualitative expectations are different for undergraduate and graduates. Graduate students are expected to demonstrate a proficiency in argument, expression and writing appropriate to their level of study.

Submission Rules:

- Late papers will be penalised 3 percent per day (of 100 percent of the assignment grade). This is a modest penalty in recognition of the real problem of course work congestion.
- Papers more than five days late will not be accepted without an extension. Weekends count as two days.
- Extensions are granted for documented illness and under other extenuating circumstances.
- Papers *may not* be submitted by email.

Tentative Reading List (Subject to Revision)**Topic 1 – Verification and Falsification**

Stephen Straker, “Knowledge and Logic: An Introduction”.

Carl Hempel, *Philosophy of Natural Science*, ch.3, 4, 6-8.

Carl Hempel, “The Empiricist Criterion of Meaning” in A.J. Ayer, *Logical Positivism*.

Rudolf Carnap, “Empiricism, Semantics and Ontology.”

Karl Popper, “Truth, Rationality and the Growth of Scientific Knowledge” in *Conjectures and Refutations*, ch.11.

Topic 2 – Scientific Revolutions

Paul Feyerabend, “Explanation, Reduction and Empiricism” from *Minnesota Studies in the Philosophy of Science*.

Paul Feyerabend, “Consolation for the Specialist” in *Criticism and the Growth of Knowledge*

Barry Barnes, “Thomas Kuhn” in Quentin Skinner, ed., *The Return of the Grand Theory in the Human Sciences*, ch.5.

Thomas Kuhn, “What Are Scientific Revolutions?” in *The Road Since Structure*, ch.1.

Karl Popper, “The Rationality of Scientific Revolutions” in Ian Hacking, ed., *Scientific Revolutions*, ch.4.

Topic 3 – For and Against Incommensurability

Hilary Putnam, “Two Theories of Rationality” in *Reason, Truth and History*.

Donald Davidson, “On the Very Idea of a Conceptual Scheme” in *Inquiries into Truth and Interpretation*.

Thomas Kuhn, “Commensurability, Comparability, Communicability” in *The Road Since Structure*, ch.2.

Thomas Kuhn, “Second Thoughts on Paradigms” in *The Essential Tension*, ch.12.

Ian Hacking, “Working in a New World: The Taxonomic Solution” in Paul Horwich, ed. *World Changes*.

Helen Longino, *Science as Social Knowledge*, ch.3-5.

Topic 4 – Social Epistemologies

Trevor Pinch and Harry Collins, “The Sun in a Test Tube: The Story of Cold Fusion” in *The Golem*, ch.3.

Peter Galison and Alexi Assmus, “Artificial Clouds, Real Particles” in *The Uses of Experiment*.

Ronald Giere, “Realism in the Laboratory” in *Explaining Science*, ch.5.

Trevor Pinch and Harry Collins, “The Germs of Dissent: Louis Pasteur and the Origins of Life” in *The Golem*, ch.3.

Bruno Latour, “Where Were Microbes before Pasteur?” in *Pandora’s Hope*, ch.5.

Bruno Latour, “Circulating Reference: Sampling Soil in the Amazon Forest” from *Pandora’s Hope*, ch.2.

Donna Haraway, “Apes in Eden, Apes in Space,” from *Primate Visions*, ch.7

Steve Fuller, “Social Epistemology and Social Metaphysics” in *Social Epistemology*, ch.2.

William P. Alston, “Belief-forming Practices and the Social” in Frederick Schmitt, ed., *Socializing Epistemology*.

Hilary Kornblith, “A Conservative Approach to Social Epistemology” in Frederick Schmitt, ed., *Socializing Epistemology*.

Philip Kitcher, “Contrasting Conceptions of Social Epistemology” in Frederick Schmitt, ed., *Socializing Epistemology*.

Helen E. Longino, “The Fate of Knowledge in Social Theories of Science” in Frederick Schmitt, ed., *Socializing Epistemology*.

Topic 5 – Hot and Cold Cognition

Miriam Solomon, “Scientific Rationality and Human Reasoning” in *Philosophy of Science* 59 (3), 439-455.

Paul Thagard, “Scientific Cognition: Hot or Cold?” in Steve Fuller, ed., *The Cognitive Turn: Sociological and Psychological Perspectives on Science*, 71-82.

Amos Tversky and Daniel Kahneman, , "Rational Choice and the Framing of Decisions" in Robin M. Hogarth and Melvin W. Reder, eds., *Rational Choice*.

Jon Elster, “Rationality, Emotions and Social Norms” in *Synthese* 98 (1994), 21-49.

N. Naqvi, B. Shiv, A Bechara, “The Role of Emotion in Decision-making: A Cognitive Neuroscience Perspective” in *Current Directions in Psychological Science* 15 (2006), 260-264.

Topic 6 – Kinds, Projection and Looping Effects

Ernest Nagel, *The Structure of Science*, ch.13-14.

Nelson Goodman, *Ways of World Making*, ch.1 and ch.6.

Nelson Goodman, *Fact, Fiction and Forecast*, ch.3.

Karl Popper, *The Logic of Scientific Discovery*, Appendix VII.

Ian Hacking, “The Looping Effects of Human Kinds” in Dan Sperber, David Premack, and Ann James Premack, eds., *Causal Cognition: A Multidisciplinary Debate*.

Ian Hacking, “The Making and Molding of Child Abuse” in *Critical Inquiry* 17 (1991), p.253-288.

Ian Hacking “World-Making by Kind-Making: Child Abuse for Example” in M. Douglas and D. Hull, eds. *How Classification Works: Nelson Goodman among the Social Sciences*.

Ian Hacking, “Making Up People” in *London Review of Books* 28 (2006).

S. Cooper, “Why Hacking is Wrong about Human Kinds” in *British Journal for the Philosophy of Science* 55 (2004), p.73-85.