

# Models of Belief and Decision

Munich Center for Mathematical Philosophy  
*Ludwig-Maximilians-Universität München*  
Summer 2016

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Instructors:	Dr. Gregory Wheeler <sup>†</sup> Dr. Arthur Paul Pedersen	Classroom:	Ludwigstr. 31, 021
Office: <sup>†</sup>	Ludwigstr. 31, Room 131	Time:	Thursday, 10:00–12:00, ct
Office Hours:	<i>By Appointment</i>	Coursesite:	<a href="http://gregorywheeler.coursesites.com">gregorywheeler.coursesites.com</a>
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## Course Description

In this course we will consider the quantitative and qualitative models of belief. In particular, we will investigate in some detail the philosophical and mathematical foundations of the subjective theory of probability. We will probe the limits and contours of the normative standards this theory can and cannot provide through a variety of puzzles and impossibility results that arise from attempts to apply the framework to model various aspects of belief and decision making under conditions of uncertainty.

## Course Requirements

There are three requirements for the course: (1) Approximately ten weekly written assignments (“Weeklies”), submitted online at [gregorywheeler.coursesites.com](http://gregorywheeler.coursesites.com); and (2) a final (~9000 word) philosophical essay. All assignments are to be completed in English.

1. *Weeklies*: These assignments may either ask you to formulate one or two questions or objections in short but clear and precise prose on assigned readings, or answer particular questions on the readings. These assignments will be graded anonymously. Your weekly assignments may be viewed as an opportunity to “vet” points to discuss in-class questions that you have about each week’s readings. Instructions for each weekly will be given online.

*Deadlines*: Weeklies, when assigned, are **due by 12:00 on Wednesday**, the day before the lecture covering the assigned readings.

2. *Paper proposal*: You are required to submit a 1000 word proposal for your final paper. This proposal must include a thesis statement that is within the scope of this course and an outline of your argument strategy for supporting your thesis. To be within scope, your thesis ought to engage with one (or more) of the topics that are covered in the class and the assigned readings corresponding to your topic.

*Deadlines*: Your final paper proposal is **due July 14, 2016**.

3. *Final paper*: You are required to write a final paper **no longer than 9000 words**. You will be penalized for going over this limit.

*Deadlines*: Your final paper is **due August 22, 2016**.

## Online Registration

To access course materials and submit papers and weekly assignments, students must register for *Models of Belief and Decision* online at [gregorywheeler.coursesites.com](http://gregorywheeler.coursesites.com).

To register for the course, **email Dr. Wheeler to receive an invitation to join the course.**

## Grading

Your final grade will be calculated by a weighted average using the following weights:

Weeklies: 30%

Paper proposal: 20%

Final paper: 50%

No late assignments will be accepted.

## Course Schedule

WEEK	TOPIC	<ul style="list-style-type: none"> <li>○ READINGS</li> <li>● DUE DATES</li> </ul>
(1) APR 14	Introduction	<ul style="list-style-type: none"> <li>○ (de Finetti 1974, §1.11, 1.2, 2.1-2.7)</li> <li>○ (Bradley and Drechsler 2014)</li> <li>○ (Walley 1991, §2.1-2.3)</li> </ul>
(2) APR 21	Axiomatic Systems and Axiomatic Probability I	<ul style="list-style-type: none"> <li>○ (Fine 2006a; Fine 2006b)</li> <li>○ (Fishburn 1986)</li> <li>○ (Regoli 1999)</li> </ul>
(3) APR 28	Axiomatic Systems and Axiomatic Probability II	<ul style="list-style-type: none"> <li>○ (DeGroot 1970, Ch. 6)</li> <li>○ (Kyburg, Teng, and Wheeler 2007)</li> <li>○ (Resnik 1985)</li> </ul>
(4) MAY 5	NO CLASS	
(5) MAY 12	Basic Dominance Reasoning	<ul style="list-style-type: none"> <li>○ (Jeffrey 1965, Ch. 1)</li> <li>○ (Joyce and Gibbard 1999)</li> <li>○ (Weirich 2012, §2.1)</li> </ul>
(6) MAY 19	Representing Value	<ul style="list-style-type: none"> <li>○ (Fishburn 2001; Fishburn 2006)</li> <li>○ (Grant and van Zandt 2009)</li> <li>○ (Fishburn and Roberts 1978)</li> </ul>
(7) MAY 26	NO CLASS	
(8) JUN 2	Representing Commitments I	<ul style="list-style-type: none"> <li>○ (de Finetti 1974, §4.8)</li> <li>○ (Levi 1981; Levi 1994)</li> <li>○ (Schick 1986)</li> <li>○ (Maher 1992)</li> <li>○ (Huttegger 2013)</li> </ul>
(9) JUN 9	Representing Commitments II	<ul style="list-style-type: none"> <li>○ (Good 1967)</li> <li>○ (Skyrms 1990)</li> <li>○ (Wakker 1999)</li> </ul>
(10) JUN 16	The Scope of Dominance Reasoning I	<ul style="list-style-type: none"> <li>○ (Stinchcombe 1997)</li> <li>○ (Levi 1989)</li> </ul>
(11) JUN 23	The Scope of Dominance Reasoning II	<ul style="list-style-type: none"> <li>○ (Pedersen and Wheeler 2015)</li> <li>○ (Good 1974)</li> </ul>
(12) JUN 30	Puzzles and Problems Reconsidered: – Sleeping Beauty – St Petersburg – Newcomb's Problem – Allias Paradox – Ellsberg – Conglomerability – Bertrand's Paradox	<p>SELECTED FROM:</p> <ul style="list-style-type: none"> <li>○ (Elga 2000)</li> <li>○ (Bernoulli 1954; Martin 2013)</li> <li>○ (Nozick 1969)</li> <li>○ (Steele 2015, §2.3)</li> <li>○ (Ellsberg 1961)</li> <li>○ (Dubins 1975)</li> <li>○ (Jaynes 1973)</li> </ul>
(13) JUL 7	What are Normative Standards?	<ul style="list-style-type: none"> <li>○ (Baron 2004)</li> <li>○ (Kyburg 1988)</li> <li>○ (Ellsberg 2001)</li> </ul>
(14) JUL 14	Spillover	<ul style="list-style-type: none"> <li>● Paper Proposal Due</li> </ul>
AUG 22		<ul style="list-style-type: none"> <li>● Final Paper Due</li> </ul>

## Reading List

- Baron, J. (2004). Normative models of judgment and decision making. In D. J. Koehler and H. Nigel (Eds.), *Blackwell Handbook of Judgment and Decision Making*, pp. 19–36. Blackwell Publishing.
- Bernoulli, D. (1954). Exposition of a new theory on the measurement of risk. Republished in *Econometrica*, 22: 23–36, 1954.
- Bradley, R. and M. Drechsler (2014, December). Types of uncertainty. *Erkenntnis* 79(6), 1225–1248.
- de Finetti, B. (1974). *Theory of Probability* (1990 ed.), Volume I. New York: John Wiley.
- DeGroot, M. H. (1970). *Optimal Statistical Decisions*. New York: McGraw-Hill.
- Dubins, L. E. (1975). Finitely additive conditional probability, conglomerability, and disintegrations. *Annals of Probability* 3, 89–99.
- Elga, A. (2000). Self-locating belief and the sleeping beauty problem. *Analysis* 60(2), 143–147.
- Ellsberg, D. (1961). Risk, ambiguity and the savage axioms. *Quarterly Journal of Economics* 75, 643–69.
- Ellsberg, D. (2001). *Risk, Ambiguity and Decision*. Studies in Philosophy. Taylor and Francis.
- Fine, T. L. (2006a). Probability, foundations of – I. In *Encyclopedia of Statistical Science* (2nd ed.). Hoboken, NJ: John Wiley and Sons, Inc.
- Fine, T. L. (2006b). Probability, foundations of – II. In *Encyclopedia of Statistical Science*. Hoboken, NJ: John Wiley and Sons, Inc.
- Fishburn, P. C. (1986, August). The axioms of subjective probability. *Statistical Science* 1(3), 335–345.
- Fishburn, P. C. (2001). Measurement theory: Conjoint. In N. J. Smelser and P. B. Baltes (Eds.), *International Encyclopedia of the Social and Behavioral Sciences* (2 ed.), Volume 14. Elsevier.
- Fishburn, P. C. (2006). Utility theory. In *Encyclopedia of Statistical Sciences*. John Wiley and Sons, Inc.
- Fishburn, P. C. and F. S. Roberts (1978, April). Mixture axioms in linear and multilinear utility theories. *Theory and Decision* 9(2), 161–171.
- Good, I. J. (1967). On the principle of total evidence. *The British Journal for the Philosophy of Science* 17(4), 319–321.
- Good, I. J. (1974). A little learning can be dangerous. *The British Journal for the Philosophy of Science* 25(4), 340–342.
- Grant, S. and D. van Zandt (2009). Expected utility theory. In P. Anand, P. Pattanaik, and C. Puppe (Eds.), *The Handbook of Rational and Social Choice*, pp. 21–68. Oxford University Press.
- Huttegger, S. M. (2013, July). In defense of reflection. *Philosophy of Science* 80(3), 413–433.
- Jaynes, E. T. (1973). The well-posed problem. *Foundations of Physics* 3, 477–493.
- Jeffrey, R. (1965). *Logic of Decision*. New York: McGraw-Hill.
- Joyce, J. M. and A. Gibbard (1999). Causal decision theory. In S. Barbera, P. Hammond, and C. Seidl (Eds.), *Handbook of Utility Theory*, Volume 1: Principles, pp. 628–664. Kluwer Academic Publishers.
- Kyburg, H. E. (1988). Normative and descriptive ideals. Technical Report AD-A255-236, University of Rochester.
- Kyburg, Jr., H. E., C. M. Teng, and G. Wheeler (2007). Conditionals and consequences. *Journal of Applied Logic* 5(4), 638–650.
- Levi, I. (1981, December). Direct inference and confirmation conditionalization. *Philosophy of Science* 48(4), 532–552.
- Levi, I. (1989). Possibility and probability. *Erkenntnis* 31(2-3), 365–386.
- Levi, I. (1994). Rationality and commitment. In C. Gould and R. Cohen (Eds.), *Artifacts, Representations and Social Practice*, pp. 257–275. Kluwer Academic Publishers.
- Maher, P. (1992, March). Diachronic rationality. *Philosophy of Science* 59(1), 120–141.
- Martin, R. (2013). The st. petersburg paradox. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. CSLI Publications.
- Nozick, R. (1969). Newcomb’s problem and the two principles of choice. In N. Rescher (Ed.), *Essays in Honor of Carl G. Hempel*, Synthese Library, pp. 114–146. D. Reidel.
- Pedersen, A. P. and G. Wheeler (2015, July). Dilation, disintegrations, and delayed decisions. In T. Augustin, S. Doria, E. Miranda, and E. Quaeghebeur (Eds.), *International Symposium on Imprecise Probability: Theories and Applications (ISIPTA)*, Volume 9, pp. 227–236.
- Regoli, G. (1999). Comparative probability orderings. Technical report, Society for Imprecise Probability: Theories and Applications, www.sipta.org.
- Resnik, M. D. (1985, June). Logic: Normative or descriptive? the ethics of belief or a branch of psychology? *Philosophy of Science* 52(2), 221–238.
- Schick, F. (1986). Dutch bookies and money pumps. *Journal of Philosophy* 83(2), 112–119.
- Skyrms, B. (1990). The value of knowledge. *Minnesota Studies in the Philosophy of Science* 14, 245–266.
- Steele, K. (2015). Decision theory. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. CSLI Publications.
- Stinchcombe, M. B. (1997). Countably additive subjective probabilities. *Review of Economic Studies* 64, 125–16.
- Wakker, P. (1999). Justifying bayesianism by dynamic decision principles. Plenary Lecture at *Ninth Biennial Foundations of Utility and Risk Conference*.
- Walley, P. (1991). *Statistical Reasoning with Imprecise Probabilities*. London: Chapman and Hall.
- Weirich, P. (2012). Causal decision theory. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. CSLI Publications.