

**Syllabus for Professor Vincent Crawford's part of Second-Year Advanced Microeconomics: Behavioural Economics, University of Oxford, Michaelmas Term 2011**

**(Co-taught with Professor Sujoy Mukerji, who has a separate syllabus.)**

**My lectures are Tuesdays, Wednesdays, and Thursdays 9:30-11:00 in weeks 1-2, and Tuesday 9:30-11:00 in week 3, in Seminar Room A.**

**Professor Mukerji's lectures will follow mine immediately, Wednesday and Thursday 9:30-11:00 in week 3, Tuesday, Wednesday, and Thursday 9:30-11:00 in week 4, and Tuesday 9:30-11:00 in week 5, again in Seminar Room A.**

**My course materials are linked on the Department's course page and at <http://weber.ucsd.edu/~vcrawfor/>, linked to [http://www.economics.ox.ac.uk/index.php/staff/vincent\\_crawford/](http://www.economics.ox.ac.uk/index.php/staff/vincent_crawford/).**

**Professor Mukerji's course materials are linked separately.**

**My office hours are by email appointment.**

### **Overview**

Behavioural economics is a blend of traditional neoclassical microeconomics and empirically motivated assumptions whose goal is a better understanding of economic behavior and welfare. The field can be divided into two subfields: behavioural decision theory and behavioural game theory. Each combines standard neoclassical methodology with a more flexible attitude toward behavioural assumptions, motivated by psychological realism and consistency with empirical evidence.

The focus is on identifying empirically important deviations from traditional assumptions, integrating the alternative assumptions the evidence suggests into tractable models, and using the models to reconsider standard questions in economics. Much of the empirical evidence will be experimental, but experimental methods will be considered only as needed to understand the evidence. Little or no attention will be paid to models of bounded rationality whose motivations are mathematical rather than empirical, the possible evolutionary foundations of behaviour, or methodology per se.

In general behavioural decision theory covers topics ranging from present-bias and time-inconsistency in intertemporal choice; reference-dependence and loss aversion in choice under certainty or uncertainty; ambiguity aversion in choice under uncertainty; social preferences (altruism, envy, spite, fairness, reciprocity, etc.); overconfidence, identity, and self-image; and heuristics and biases in probabilistic judgment, and. This year, among those topics, I will cover present-bias and time-inconsistency; and Professor Mukerji will cover reference-dependence and loss aversion and social preferences. (Professor Mukerji will cover some related topics in his lectures on Topics in Choice Under Uncertainty in weeks 4-5 of Hilary Term 2012.) Topics will vary in future years.

In principle, behavioural game theory includes "behavioral decisions in games". However, the theory has so far followed the "divide and conquer" strategy of focusing on topics unique to games. This year my behavioural game theory lectures will cover models of learning, the process by which players learn to predict others' decisions from past experience with analogous games, mainly adaptive learning but touching on more sophisticated models; models of bargaining, mostly unstructured bargaining; and models of strategic thinking, the process by which players predict others' decisions and make their own decisions in initial responses to games without clear precedents. Topics will vary in future years.

**Readings** (includes only general background references and papers for this year's topics; for other topics see <http://dss.ucsd.edu/~vcrawfor/SecondYearAdvancedMicroBehaviouralEconSyllabus10.htm>)

The most important readings are marked \*.

*Advances* and *BGT* (identified below) are well worth owning if you have a special interest in this field, but the Social Science Library (lending and reference) has at least half a dozen copies of each.

## General Background on Behavioural Decision Theory

- \*Colin Camerer and George Loewenstein, "Behavioral Economics: Past, Present, Future," Chapter 1 in Colin Camerer, George Loewenstein, and Matthew Rabin, editors, *Advances in Behavioral Economics*, Princeton 2003 ("Advances"); manuscript at <http://www.hss.caltech.edu/~camerer/ribe239.pdf>
- \*Matthew Rabin, "A Perspective on Psychology and Economics," *European Economic Review* 46 (2002), 657-685; <http://dx.doi.org/10.1016/S0014-2921%2801%2900207-0>.
- Matthew Rabin, "Psychology and Economics," *Journal of Economic Literature* 36 (1998), 11-46; <http://www.jstor.org/stable/2564950>
- Daniel Kahneman and Amos Tversky, editors, *Choices, Values, and Frames*, Cambridge 2000
- Richard Thaler, *The Winner's Curse: Paradoxes and Anomalies of Economic Life*, Princeton 1994.
- Daniel Kahneman, "Maps of Bounded Rationality: Psychology for Behavioral Economics," *American Economic Review* 93 (2003), 1449-1475; <http://www.jstor.org/stable/3132137>
- Stefano DellaVigna, "Psychology and Economics: Evidence from the Field," *Journal of Economic Literature*, 47 (2009), 315-372; <http://elsa.berkeley.edu/~sdellavi/wp/01-DellaVigna-4721.pdf>.

## Present-Bias and Time-Inconsistency in Intertemporal Choice

- \*George Loewenstein and Richard Thaler, "Anomalies: Intertemporal Choice," *Journal of Economic Perspectives* 3 (1989), 181-193; <http://www.jstor.org/stable/1942918>
- \*Shane Frederick, George Loewenstein, and Ted O'Donoghue, "Time Discounting and Time Preference: A Critical Review," *Journal of Economic Literature* 40 (2002), 351-401; Chapter 6 in "Advances"; <http://www.jstor.org/stable/2698382> or <http://www.hss.caltech.edu/~camerer/NYU/03-LowensteinODonoghueFrederick+.pdf>
- David Laibson, "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics* 112 (1997), 443-478; Chapter 15 in "Advances"; <http://www.jstor.org/stable/2951242>
- Ted O'Donoghue and Matthew Rabin, "Doing it now or later," *American Economic Review* 89 (1999), 103-124; Chapter 7 in "Advances"; <http://www.jstor.org/stable/116981>
- Ted O'Donoghue and Matthew Rabin, "Choice and Procrastination," *Quarterly Journal of Economics* 116 (2001), 121-160; <http://www.jstor.org/stable/2696445>
- George-Marios Angeletos, David Laibson, Andrea Repetto, Jeremy Tobacman, and Stephen Weinberg, "The Hyperbolic Consumption Model: Calibration, Simulation, and Empirical Evaluation," *Journal of Economic Perspectives* 15 (2002), 47-68; <http://www.jstor.org/stable/2696556> or <http://www.hss.caltech.edu/~camerer/NYU/03-Angeletos.pdf>
- Sharon Oster and Fiona Scott Morton, "Behavioral Biases Meet the Market: The Case of Magazine Subscription Prices," *Advances in Economic Analysis & Policy* 5 (2005), Article 1; <http://www.bepress.com/bejeap/advances/vol5/iss1/art1>
- Botond Köszegi and Paul Heidhues, "Exploiting Naivete about Self-Control in the Credit Market," *American Economic Review* 101 (2011), 2279-2303; <http://elsa.berkeley.edu/~botond/credit.pdf>.
- Kfir Eliaz and Ran Spiegler, "Contracting with Diversely Naïve Agents," *Review of Economic Studies* 73 (2006), 689-714; [www.jstor.org/stable/20185025](http://www.jstor.org/stable/20185025).

## General Background on Behavioural Game Theory

- \*Colin Camerer, Chapter 1, Introduction; Appendix 1.1, Basic Game Theory; and Appendix 1.2, Experimental Design in *Behavioral Game Theory: Experiments on Strategic Interaction*, Princeton 2003 (“BGT”); manuscript of Chapter 1 at [http://dss.ucsd.edu/~vcrawfor/Camerer\\_Ch1intro.pdf](http://dss.ucsd.edu/~vcrawfor/Camerer_Ch1intro.pdf).
  - \*Vincent Crawford, Sections 1, Introduction; 2, Theoretical Frameworks and Unresolved Questions; 3, Experimental Designs; and 7, Conclusion in “Theory and Experiment in the Analysis of Strategic Interaction” (“TE”), Chapter 7 in David Kreps and Ken Wallis, Editors, *Advances in Economics and Econometrics: Theory and Applications, Seventh World Congress*, Vol. I, Cambridge 1997; <http://dss.ucsd.edu/~vcrawfor/CrawfordThExp97.pdf>; Chapter 12 in “Advances”; manuscript also at <http://dss.ucsd.edu/~vcrawfor/ShortTh&Exp.pdf>.)
- Thomas Schelling, *The Strategy of Conflict*, Oxford 1960 or Harvard 1980  
David Kreps, *Game Theory and Economic Modelling*, Oxford 1990

## Adaptive Learning: Reinforcement, Beliefs-Based, and Experience-Weighted Attraction

- BGT, Chapter 3, Mixed-Strategy Equilibrium Games; Chapter 6, Learning; Sections 7.4, Payoff-Asymmetric Order-Statistic Games; 7.6, Applications: Path-Dependence, Market Adoption, and Corporate Culture; 8.1, Simple Signaling Games and Adaptive Dynamics; and 8.4, Conclusion TE, Sections 2.3, 2.4, and 6; <http://dss.ucsd.edu/~vcrawfor/CrawfordThExp97.pdf>; Chapter 12 in “Advances”; manuscript also at <http://dss.ucsd.edu/~vcrawfor/ShortTh&Exp.pdf>.
- John Van Huyck, Joseph Cook, and Raymond Battalio (1997): “Adaptive Behavior and Coordination Failure,” *Journal of Economic Behavior and Organization* 32, 483-503; at <http://www.sciencedirect.com/science/journal/01672681>.
- Vincent Crawford, “Learning Dynamics, Lock-in, and Equilibrium Selection in Experimental Coordination Games,” in Ugo Pagano and Antonio Nicita, editors, *The Evolution of Economic Diversity*, London and New York: Routledge, 2001, 133-163; UCSD Discussion Paper 97-19; at <http://dss.ucsd.edu/~vcrawfor/ucsd9719.pdf>.
- Ido Erev and Alvin E. Roth, “Predicting how people play games: Reinforcement Learning in Experimental Games with Unique, Mixed Strategy Equilibria,” *American Economic Review* 88 (1998), 848-881; <http://www.jstor.org/stable/117009>.
- Vincent Crawford, “Adaptive Dynamics in Coordination Games,” *Econometrica* 63 (1995), 103-143; <http://www.jstor.org/stable/2951699> or <http://dss.ucsd.edu/~vcrawfor/Crawford95EMT.pdf>.
- Vincent Crawford and Bruno Broseta, “What Price Coordination? The Efficiency-enhancing Effect of Auctioning the Right to Play,” *American Economic Review* 88 (March 1998), 198-225; <http://www.jstor.org/stable/116825> or <http://dss.ucsd.edu/~vcrawfor/CrawBro98AER.pdf>.
- Jordi Brandts and Charles Holt, “An Experimental Test of Equilibrium Dominance in Signaling Games,” *American Economic Review* 82 (1992), 1350-1365; <http://www.jstor.org/stable/2117483>.
- Colin Camerer and Teck-Hua Ho, “Experience-weighted Attraction Learning in Normal Form Games,” *Econometrica* 67 (1999), 827-874; <http://www.jstor.org/stable/2999459>.
- Colin Camerer and Teck-Hua Ho, “Experience-Weighted Attraction Learning in Coordination Games: Probability Rules, Heterogeneity, and Time-Variation,” *Journal of Mathematical Psychology* 42 (1998), 305-326; <http://dx.doi.org/10.1006/jmps.1998.1217>.

- Michihiro Kandori, George Mailath, and Rafael Rob, "Learning, Mutation, and Long Run Equilibria in Games," *Econometrica* 61 (1993), 29-56; <http://www.jstor.org/stable/2951777>.
- H. Peyton Young, "The Evolution of Conventions," *Econometrica* 61 (1993), 57-84; <http://www.jstor.org/stable/2951778>.
- Jack Robles, "Evolution and Long Run Equilibria in Coordination Games with Summary Statistic Payoff Technologies," *Journal of Economic Theory* 75 (1997), 180-193; <http://dx.doi.org/10.1006/jeth.1997.2274>.
- Dale Stahl, "Boundedly Rational Rule Learning in a Guessing Game," *Games and Economic Behavior* 16 (1996), 303-330; <http://dx.doi.org/10.1006/game.1996.0088>
- Crawford, "Introduction to Experimental Game Theory," *Journal of Economic Theory*, 104 (2002), 1-15, especially 8-12; [doi:10.1006/jeth.2001.2909](https://doi.org/10.1006/jeth.2001.2909) or <http://weber.ucsd.edu/~vcrawfor/IntroEGTSym.html>
- Camerer, Ho, and Juin-Kuan Chong, "Sophisticated Experience-Weighted Attraction Learning and Strategic Teaching in Repeated Games," *Journal of Economic Theory*, 104 (2002), 137-188; <http://dx.doi.org/10.1006/jeth.2002.2927> or <http://www.hss.caltech.edu/~camerer/jeth2927.pdf>

### **Bargaining (time permitting)**

- "BGT", Chapter 4.1, Unstructured Bargaining
- "TE", Section 5.3, Unstructured Bargaining; <http://dss.ucsd.edu/~vcrawfor/CrawfordThExp97.pdf>; Chapter 12 in "Advances"; manuscript at <http://dss.ucsd.edu/~vcrawfor/ShortTh&Exp.pdf>.)
- Thomas Schelling, *The Strategy of Conflict*, Oxford 1960 or Harvard 1980: Chapter 3, Bargaining, Communication, and Limited War, and Appendix C
- Alvin Roth, "Bargaining Phenomena and Bargaining Theory," Chapter 2 in Roth (ed.), *Laboratory Experimentation in Economics: Six Points of View*, Cambridge, 1987
- Alvin Roth, "Toward a Focal-Point Theory of Bargaining," Chapter 12 in Roth, (ed.), *Game-Theoretic Models of Bargaining*, Cambridge, 1985

### **Strategic Thinking**

- \*Vincent Crawford, Miguel Costa-Gomes, Vincent Crawford, and Nagore Iriberri, "Strategic Thinking," <http://dss.ucsd.edu/~vcrawfor/CGCI27Dec10.pdf>, Sections 1, Introduction, and 2 Alternative Models of Strategic Thinking.
- Adam Brandenburger, "Knowledge and Equilibrium in Games," *Journal of Economic Perspectives* 6 (1992), 83-101; <http://www.jstor.org/stable/2138270>.
- John Harsanyi and Reinhard Selten, *A General Theory of Equilibrium Selection in Games*, MIT 1988
- Richard McKelvey and Thomas Palfrey, "Quantal Response Equilibria for Normal-Form Games," *Games and Economic Behavior* 10 (1995), 6-38; [doi:10.1006/game.1995.1023](https://doi.org/10.1006/game.1995.1023).
- "BGT", Chapters 5, Dominance-Solvable Games; and 7, Coordination
- "TE", Sections 4, Dominance and Iterated Dominance; and 5, Simultaneous Coordination
- Dale Stahl and Paul Wilson, "On Players' Models of Other Players: Theory and Experimental Evidence," *Games and Economic Behavior* 10 (1995), 218-254; [doi:10.1006/game.1995.1031](https://doi.org/10.1006/game.1995.1031).
- Rosemarie Nagel, "Unraveling in Guessing Games: An Experimental Study," *American Economic Review* 85 (1995), 1313-1326; <http://www.jstor.org/stable/2950991>.
- Teck-Hua Ho, Colin Camerer, and Keith Weigelt, "Iterated Dominance and Iterated Best Response in Experimental 'p-Beauty Contests'," *American Economic Review*, 88 (1998), 947-969; <http://www.jstor.org/stable/117013>.

- Colin Camerer, Teck-Hua Ho, and Juin Kuan Chong, "A Cognitive Hierarchy Model of Games," *Quarterly Journal of Economics* 119 (2004), 861-898; <http://www.jstor.org/stable/25098704>.
- Miguel Costa-Gomes, Vincent Crawford, and Bruno Broseta, "Cognition and Behavior in Normal-Form Games: an Experimental Study," *Econometrica* 69 (2001), 1193-1235; <http://www.jstor.org/stable/2692219> or <http://dss.ucsd.edu/~vcrawfor/CGCrBr01EMT.pdf>.
- Miguel Costa-Gomes and Vincent Crawford, "Cognition and Behavior in Two-Person Guessing Games: An Experimental Study," *American Economic Review* 96 (2006), 1737-1768; <http://www.jstor.org/stable/30034993> or <http://dss.ucsd.edu/~vcrawfor/CGCAER06.pdf>.
- Miguel Costa-Gomes and Georg Weizsäcker, "Stated Beliefs and Play in Normal-Form Games," *Review of Economic Studies*, 75 (2008), 729-762; <http://www.jstor.org/stable/20185053>.
- Miguel Costa-Gomes, Vincent Crawford, and Nagore Iriberry, "Comparing Models of Strategic Thinking in Van Huyck, Battalio, and Beil's Coordination Games," *Journal of the European Economic Association* 7 (2009), 377-387; <http://dss.ucsd.edu/~vcrawfor/CGCIJEEA17Oct08.pdf>.
- Isabelle Brocas, Juan Carrillo, Stephanie Wang, and Colin Camerer, "Imperfect Choice or Imperfect Attention? Understanding Strategic Thinking in Private Information Games"; <http://www-bcf.usc.edu/~brocas/Research/mousebetting.pdf>.
- Erik Eyster and Matthew Rabin, "Cursed Equilibrium," *Econometrica*, 73 (2005), 1623-1672; [www.jstor.org/stable/3598885](http://www.jstor.org/stable/3598885)
- Vincent Crawford and Nagore Iriberry, "Level- $k$  Auctions: Can Boundedly Rational Strategic Thinking Explain the Winner's Curse and Overbidding in Private-Value Auctions?," *Econometrica* 75 (2007), 1721-1770; <http://dss.ucsd.edu/~vcrawfor/CrawfordIriberriEMT07.pdf> or [www.jstor.org/stable/4502047](http://www.jstor.org/stable/4502047).
- Vincent Crawford and Nagore Iriberry, "Fatal Attraction: Salience, Naivete, and Sophistication in Experimental Hide-and-Seek Games," *American Economic Review* 97 (2007), 1731-1750; <http://www.jstor.org/stable/30034582>.
- Vincent Crawford, "Lying for Strategic Advantage: Rational and Boundedly Rational Misrepresentation of Intentions," *American Economic Review* 93 (2003), 133-149; <http://dss.ucsd.edu/~vcrawfor/CrawAER03.pdf> or <http://www.jstor.org/stable/3132165>.
- Tore Ellingsen and Robert Östling, "When Does Communication Improve Coordination?," *American Economic Review* 100 (2010), 1695-1724; <http://www.aeaweb.org/articles.php?doi=10.1257/aer.100.4.1695>.
- Vincent Crawford and Joel Sobel, "Strategic Information Transmission," *Econometrica* 50 (1982), 1431-1451; <http://www.jstor.org/stable/1913390>.
- Rany Jazayerli, "Guest Column: Will Bin Laden Strike Again?," October 10, 2008; <http://www.fivethirtyeight.com/2008/10/guest-column-will-bin-laden-strike.html>.
- Joseph Wang, Michael Spezio, and Colin Camerer, "Pinocchio's Pupil: Using Eyetracking and Pupil Dilation To Understand Truth-telling and Deception in Sender-Receiver Games," *American Economic Review* 100 (2010), 984-1007; <http://www.aeaweb.org/articles.php?doi=10.1257/aer.100.3.984>.