

Economics 1036
Spring 2018

Matthew Rabin
HBS and Economics Department
Harvard University

The Psychology and Economics of Beliefs:

Preliminary, Abbreviated Syllabus: January 2, 2018

Wednesdays 1:00-3:00, 102 Harvard Hall

Professor: Matthew Rabin

Offices: 435 Baker Library, 310 Littauer Center; e-mail: matthewrabin@fas.harvard.edu

Teaching Fellow: William Murdock

Office: G31 Littauer Center; e-mail: wmurdock@g.harvard.edu

This preliminary short syllabus is being posted to give as accurate sense as possible for the nature of the course, to aid prospective students in decision-making. It will be changed and details added before the term starts.

Registration is by consent of the instructor. Students interested in taking the course should email me at matthewrabin@fas.harvard.edu **after reading the syllabus thoroughly** to indicate your relevant background, and ask questions. You should include if possible a resume including the prerequisite courses indicated below that you have taken, and ideally an (unofficial) transcript of your courses and grades at Harvard.

WHAT IS THIS COURSE?

This seminar focuses on how individuals and groups come to form beliefs about important things in their lives. What careers are lucrative and rewarding? What medicines are effective? What lifestyles are healthy? What investment strategies make sense? What is your nation's income and wealth distribution? What would a 10% decrease in taxes do to the unemployment rate? What will be the average global temperature in 2030, and how would that depend on the number of countries that adhere to the Kyoto Accords? How many days do you predict we will go on vacation next year? How many children will you have by 2030? What are the average grades likely to be in this course—and what will your grade be? What percentage of soldiers died in various previous wars and flu epidemics? What is the probability of a pandemic disease that doubles the death rate in the U.S. in 2018 compared to 2017? How many times do you expect to

check your email tomorrow? How many times do you believe you did it yesterday? Etc. And, centrally, how do all these beliefs compare to correct beliefs—those that are empirically valid, and those that would correspond to fully rational reasoning?

We will review theories and evidence about how individuals develop their beliefs from personal observations and experience, and how people learn from each other. We will also study difficulties in defining beliefs and in measuring beliefs, and the existence (or not) of data in different domains for what people actually believe. The organizing theme will be to compare the assumption of full rationality that is traditional in economic theory to evidence identified by psychologists about the types of errors people make. We will also explore what consequences these errors have for important economic, medical, social, and political choices. In each of these domains, when do people become overconfident in their beliefs? Or instead not learn as much as they should? Are people's beliefs internally consistent? When do groups of people all come to the same conclusions, vs. “polarize” into very different beliefs.

The course will be intentionally eclectic in nature, in terms of approach to material, and in assignments that will count towards your grade. Lectures will present some of the psychological evidence on how people do form beliefs, and an emphasis on some of the ways we formally model errors in belief formation. (In all cases, learning how we model the errors will necessarily involve learning the correct conclusions that rational agents would reach.) Assignments will include mathematical problem sets requiring you to solve for both what the rational conclusions are for processing information and what conclusions our models of errors predict people will reach. The course will also involve reading and research on people's particular beliefs in different domains, and some oral and written presentations of such research. Most oddly, some of the course will involve you—to the degree you are comfortable and consistent with desire for privacy—analyzing and understanding how you go about reaching beliefs relevant to your own economic, medical, social, and political choices.

Required readings will include academic research in psychology, economic theory, empirical economics, and historical and sociological research describing the prevalence and changes in beliefs over time. Given the nature of the course, full attendance (insofar as it is consistent with your health and the health of those around you) is required

CAN YOU TAKE THE COURSE, AND IS IT FOR YOU?

The course is available solely to undergraduates at Harvard. It is not open to registration for masters or PhD students. Because it is a seminar course that emphasizes comfortable participation and discussion in a small group sharing the appropriate background, it is not open for auditors.

Because of the heavy emphasis on rigorous formal theories and measurements along the lines of mainstream economics, the seminar requires background in microeconomics, mathematics, and statistics/econometrics. Students should be prepared in these subjects at roughly the exposure to material expected of an economics or applied math major in the middle of junior year. Although

exceptionally qualified students at earlier stages or with different backgrounds are encouraged to consider the course, it is simply not suitable for somebody who has not been exposed to economics and math at roughly this level. (An understanding of Bayes Law and basic probabilities and statistics is a must, as is some exposure to mathematical microeconomics.)

The perspective of the seminar is influenced by the background of both the professor and teaching fellow in economic theory, empirical economics, as well as psychology and (what is popularly known as) behavioral economics. I (Professor Rabin) have been doing research related to the topics of this seminar for quite a long time. But much of this is new territory for me—and even new territory for the economic-research community at large. The primary goal of the seminar is to draw out connections between some of the more recent economic theory that attempts to incorporate more realistic psychology, and actual beliefs in the world. As such, we'll be exploring how to take these new theories and the psychological evidence that motivates them “to the field,” to figure out if and when and how these theories matter.

REQUIREMENTS AND GRADING

(These too are subject to change, once planning for the course, based in part on how the class size and preparation background of students are more fully understood.)

Requirements will include:

- Near full attendance (required for passing, not graded otherwise)
- Mathematical problem sets
- Written assignments summarizing existing or original research about beliefs
- Brief oral presentations to the class
- An office meeting with me early in the semester about these written and oral assignments.
- Analysis of your own belief-formation in some domain
- There will **not** have an exam in the course, either in class or during the finals period.

Grading (again, subject to change) will be roughly (dropping your worst 10%):

- Problem sets, in total: 50%
- Participation in class discussions: 20%
- Mini-presentations: 15%
- Written assignments: 25%

Tentative Schedule

We meet on Wednesdays between January 24 and April 25 (we're not meeting March 14). The planned schedule is as follows—but there will almost surely be some modifications to this.

Meeting 1: January 24

- Lecture 1: Introduction to Seminar, extended motivating examples

Meeting 2: January 31

- Lecture 2: Statistical Biases Part 1—Evidence and Models
- Practice problems and solutions handed out

Meeting 3: February 7

- Lecture 3: Statistical Biases Part 2—Evidence and Models
- Problem Set #1 (statistical reasoning) handed out

Meeting 4: February 14

- Lecture 4: Incoherence and Inconsistencies in Probabilistic Beliefs
- Flaky Written Assignment #1 handed out: Record your evolving probabilistic beliefs about something in your life for two months

Meeting 5: February 21

- Group Discussion 1: Discuss examples students have found where it seems that people are exhibiting one of the statistical errors discussed in Meetings 1-3
- Problem Set #1 due by 1.07 at Harvard Hall Room 102.

Meeting 6: February 28

- Lecture 5: Social Inference and Non-Inference, Evidence and Models
- Problem Set #2 (Incoherent beliefs, social inference) handed out

Meeting 7: March 7

- Group Discussion 2: “Show and Tell” discussion of erroneous beliefs (about objective reality) that you, or your parents/other influential elders, or your friends/community, have had that you’ve now come to believe (correctly?) are wrong; please do not make it *too* personal! (Even if you don’t speak, as an exercise think to yourself something you’ve really changed your mind about.)
- Flaky Written Assignment #2 handed out: write down your precise beliefs about something. Spend 5 or more hours on the internet, and form updated beliefs. Then discuss it for two hours with a classmate, and record your final beliefs.
- Approach to individual presentations discussed

Non-Meeting: No Class on March 14

Meeting 9: March 21

- Group Discussion #3: Popular medical/nutritional beliefs from 10,000 BC to today.
- Problem Set #2 due by 1.07 pm in Harvard Hall Room 102

Meeting 10: March 28

- Individual Presentations #1
- Flaky Assignment #2 is due

Meeting 11: April 4

- Individual Presentations #2

Meeting 12: April 11

- Lecture #6: Beliefs about self—mispredictions of own future preferences and actions, motivated distortion of beliefs
- (Unflaky) written assignment #3: propose an empirical test based solely on observed behavior for how we would be able to tell if a person has incorrect beliefs about her own future utility or behavior.

Meeting 13: April 18

- Group Discussion #4: What known (but not covered in this course) or unknown (you have come up with the hypothesis) error in reasoning or social inference do you think people make?
- Flaky Assignment #1 is due

Meeting 14: April 25

- Group Discussion #5: (Recognizing this is sort of a dangerous exercise that must be handled with care) Prepare to discuss what you think is among the biggest/most costly errors that humans make where it is clear what the rational answer is. Even if on what is a (rightly or wrongly) controversial topic, make the argument that beliefs aren't just in your mind disastrously wrong, but that they are an error—rational thinking would lead people to the right answer. As with everything in the course, it must be on an objective question not a value judgment (even if it is your value judgment that leads you to believe the objectively bad answer is so costly).
- Unflaky written assignment #3 due

Basic Readings (Partial List)

Below is a partial list of the anticipated reading, in approximate order they will be covered. Any revisions will be announced in class.

The readings in bold are (likely to be) required.

General Interest, and Methodological Approach:

1. **Rabin, Matthew, Syllabus.**
2. Kahneman, Daniel, Paul Slovic, and Amos Tversky, eds. (1982): *Judgment under Uncertainty: Heuristics and Biases*, Cambridge University Press. Arguably the seminal book on behavioral economics.
3. Kahneman, Daniel and Amos Tversky, eds. (2000): *Choices, Values and Frames*, New York: Russell Sage Foundation: Cambridge University Press.
4. Nisbett R. and S. Ross. (1999) *The Person and Situation*, McGraw Hill.
5. Thaler, Richard H. (1994): *The Winner's Curse: Paradoxes and Anomalies of Economic Life*, Princeton University Press. Collection of Thaler's *Anomalies* columns from *Journal of Economic Perspectives*.
6. Baron, Jonathan. (1994): *Thinking and Deciding*, Cambridge, UK; New York: Cambridge University Press.
7. Nisbett, R. and S. Ross. (1980): *Human inference: strategies and shortcomings of social judgment*, Prentice-Hall.
8. Cialdini, R. (1993): *Influence, the psychology of persuasion*, Quill. A classic in psychology.
9. Gilbert, D., S. Fiske, and G. Lindzey, editors. (1998): *Handbook of Social Psychology*, 4th ed., McGraw Hill.
10. Thaler, Richard. (1991): *Quasi-Rational Economics*: Russell Sage Foundation.
11. Kahneman, T. Gilovich, & D. Griffin, eds. (2002): *Intuitive Judgment: Heuristics and Biases*, Cambridge: Cambridge University Press.
12. Thaler, Richard, eds. (1993): *Advances in Behavioral Finance*, New York: Russell Sage Foundation.
13. Kagel, John. and Alvin Roth, eds. (1995): *Handbook of Experimental Economics*, Princeton, N.J.: Princeton University Press.
14. Camerer, Colin. (2003): *Behavioral Game Theory: Experiments in Strategic Interaction*, Russell Sage Foundation and Princeton University Press.
15. Kahneman, D., Diener, E., and Schwarz, N. (1999): *Well-Being: The Foundations of Hedonic Psychology*, Russell Sage Foundation.
16. Camerer, Colin, Loewenstein, George, and Rabin, Matthew, eds. (2003): *Advances in Behavioral Economics*, Russell Sage Foundation and Princeton University Press.
17. Thaler, Richard, "Towards A Positive Theory of Consumer Choice," CVF Chapter 15.
18. **Rabin, Matthew. (1998): "Psychology and Economics." *Journal of Economic Literature* 36 (1): 11-46.**
19. Rabin, Matthew. (2000): "A Perspective on Psychology and Economics," *European Economic Review*, 46(4-5): 657-685.
20. **Rabin, Matthew. (2013): "An Approach to Incorporating Psychology into Economics." *American Economic Review Papers and Proceedings*, 103(3): 617-622.**
21. Rabin, Matthew. (2013): "Incorporating Limited Rationality into Economics," *Journal of*

Economic Literature, 51(2): 528-543

22. Gabaix, Xavier, and David Laibson. (2008): "The Seven Properties of Good Models." In eds Andrew Caplin and Andrew Schotter *The Methodologies of Modern Economics: Foundations of Positive and Normative Economics*, Oxford University Press.
23. Kahneman, D. (2011): *Thinking, Fast and Slow*, New York: Farrar, Straus, and Giroux.
24. **DellaVigna, Stefano. (2009): "Psychology and Economics: Evidence from the Field." *Journal of Economic Literature*, 47 (2): 315-372.**
25. Chetty, Raj (2015), "Behavioral Economics and Public Policy: A Pragmatic Perspective," Richard T. Ely Lecture, *American Economic Review: Papers & Proceedings 2015*, 105(5): 1–33.

Inattention

26. Bazerman, Max, *The Power of Noticing: What the Best Leaders See*, book.
27. Schwartzstein, Josh, "Selective Attention and Learning" [pdf], [online appendix] *Journal of the European Economic Association*, 2014, 12(6): 1423-1452
28. Hanna, Rema, Sendhil Mullainathan, and Josh Schwartzstein, "Learning Through Noticing: Theory and Evidence from a Field Experiment," *Quarterly Journal of Economics*, 2014, 129(3): 1311-1353

Biases in Statistical Reasoning

29. **Kahneman, Daniel, and Amos Tversky. (1974): "Judgment under Uncertainty: Heuristics and Biases," *Science*, 185: 1124-1131.**
30. Kahneman, D, and A. Tversky. (1983): "Extensional vs. Intuitive Reasoning: The Conjunction Fallacy in Probability Judgment," *Psychological Review*, 90(4): 293- 315.
31. Tversky, Amos, and Derek Koehler, (1994): "Support Theory: A Nonextensional Representation of Subjective Probability," *Psychological Review*, 101(4): 547-567.
32. Kahneman, D., and Tversky, A. (1972): "Subjective probability: a judgment of representativeness," *Cognitive Psychology*, 3(3): 430-454.
33. Tversky, A., & Kahneman, D. (1973): "Availability: a heuristic for judging frequency and probability," *Cognitive Psychology*, 5(2): 207-232.
34. Rabin, Matthew and Joel Schrag. (1999): "First Impressions Matter: A Model of Confirmatory Bias." *Quarterly Journal of Economics*, 114(1): 37-82.
35. Madarasz, Kristof. (2012): "Information Projection: Model and Applications," *Review of Economic Studies*, 79 (3): 961-985.
36. **Griffin, D. and A. Tversky. (1992): "The Weighing of Evidence and the Determinants of Confidence," *Cognitive Psychology*, 24: 411-435.**
37. **Rabin, Matthew. (2002): "Inference by Believers in the Law of Small Numbers." *Quarterly Journal of Economics*, 117(3): 775-816.**
38. Rabin, Matthew and Dimitri Vayanos. (2010): "The Gambler's and Hot-Hand Fallacies: Theory and Applications." *Review of Economic Studies*, 77(2): 730-778.
39. Benjamin, D., M. Rabin, and C. Raymond. (2015): "A Model of Non-Belief in the Law of Large Numbers," forthcoming, *Journal of the European Economics Association*.
40. Benjamin, Dan, Aaron Bodoh-Creed, and Matthew Rabin. (2013): "The Dynamics of Base-Rate Neglect," Non-Existent Working Paper, UC Berkeley.

41. Camerer, Colin F. (1989). "Does the Basketball Market Believe in the Hot Hand?" *American Economic Review*: 1257-1261.
42. Miller, Joshua Benjamin, and Adam Sanjurjo (2014). "A cold shower for the hot hand fallacy."
43. Green, Brett S., and Jeffrey Zwiebel (2015). "The Hot-Hand Fallacy: Cognitive Mistakes or Equilibrium Adjustments? Evidence from Major League Baseball: Evidence from Major League Baseball."
44. Tversky, Amos, and Thomas Gilovich (1989). "The 'hot hand': Statistical reality or cognitive illusion?" *Chance* 2(4), 31-34.
45. Tversky, Amos, and Thomas Gilovich (2005). "The Cold Facts About the 'Hot Hand' in Basketball." *Anthology of Statistics in Sports*: 169.
46. **Benjamin, Dan, Don Moore, and Matthew Rabin. (2017): "Misconceptions of Chance: Evidence from an Integrated Experiment." Working Paper, UC Berkeley.**

Biases in Social Reasoning

47. **Eyster, Erik, and Matthew Rabin. (2005): "Cursed Equilibrium." *Econometrica*, 73(5): 1623-1672.**
48. Esponda, Ignacio, and Emanuel Vespa (2014). "Hypothetical Thinking and Information Extraction in the Laboratory." *American Economic Journal: Microeconomics*, 6(4): 180-202.
49. Vallee, Boris, and Claire Celerier. "The Motives for Financial Complexity: An Empirical Investigation." Working Paper.
50. Carrillo, Juan D., and Thomas R. Palfrey. "No trade." *Games and Economic Behavior* 71.1 (2011): 66-87.
51. Carrillo, Juan D., and Thomas R. Palfrey (2009). "The Compromise Game: Two-Sided Adverse Selection in the Laboratory." *American Economic Journal: Microeconomics*, 1(1): 151-81.
52. Eyster, Erik, Matthew Rabin, and Dimitri Vayanos. (2015): "Financial Markets Where Traders Neglect the Informational Content of Prices." Working Paper.
53. Jehiel, P. (2005): "Analogy-Based Expectation Equilibrium," *Journal of Economic Theory*.
54. Mullainathan, S., J. Schwartzstein, and A. Shleifer (2008): "Coarse Thinking and Persuasion," *Quarterly Journal of Economics*.
55. Esponda, I. (2008): "Behavioral Equilibrium in Economies with Adverse Selection," *American Economic Review*.
56. Shleifer, Andrei. (2000): "Inefficient Markets," Clarendon Lectures, Oxford University Press.
57. Gabaix, Xavier and David Laibson (2006), "Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets," *Quarterly Journal of Economics*, 121(2): 505-540.
58. Brown, Jennifer, Tanjim Hossain, and John Morgan (2010). "Shrouded Attributes and Information Suppression: Evidence from the Field" *Quarterly Journal of Economics* 125(2): 859-876.
59. Laibson, David and Leeat Yariv (2007), "Safety in Markets: An Impossibility Theorem for Dutch Books," working paper.
60. DeLong, B., L. Summers, A. Shleifer, and R. Waldmann (1990): "Noise Trader Risk in Financial Markets," *Journal of Political Economy*.
61. Shleifer, A. and R. Vishny (1997): "The Limits of Arbitrage," *Journal of Finance*.
62. Esponda, Ignacio and Demian Pouzo, "Berk-Nash Equilibrium: A Framework for Modeling Agents with Misspecified Models", working paper, 2015.
63. DeMarzo, Peter, Dimitri Vayanos, and Jeff Zwiebel (2003), "Persuasion bias, social influence, and unidimensional opinions," *Quarterly Journal of Economics*.
64. Eyster, Erik, and Matthew Rabin. (2010): "Naïve Herding in Rich-Information Settings."

- American Economic Journal: Microeconomics*, 2: 221-243.
65. Eyster, Erik, Matthew Rabin, and Dimitri Vayanos (2015), “Financial Markets Where Traders Neglect the Informational Content of Prices,” working paper.
 66. Eyster, E. and M. Rabin. (2008): “Rational and Naïve Herding,” Working Paper, UC Berkeley.
 67. **Eyster, E. and M. Rabin. (2014): “Extensive Imitation is Irrational and Harmful,”**
***Quarterly Journal of Economics*.**
 68. Gagnon-Bartsch, Tristan and Matthew Rabin (2015), “Naïve Social Learning, Mislearning, and Unlearning”, working paper (incomplete at the time this syllabus is being prepared!)
 69. Eyster, E., Rabin, M., and G. Weizsacker (2015), “An Experiment on Social Mislearning” (incomplete at the time this syllabus is being prepared!)
 70. Gagnon-Bartsch, T. (2014): “Taste Projection in a Model of Social Learning,” Working Paper, UC Berkeley.