Psychology and Economic Theory

Tomorrow's Assumptions, Today

For now, the course will have no pre-scheduled lectures. Rather, students will work through on-line material on a (boundedly) self-paced schedule, and meet with Matthew in small groups to discuss material, and to meet with Yihong or Matthew as needed for help with additional material and problem sets. See below. This structure is experimental, and subject to change.

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WHAT IS THIS COURSE, AND CAN/SHOULD YOU TAKE IT?

This course explores ways that psychological research indicating systematic departures from classical economic assumptions can be translated into formal models that can be incorporated into economics. Topics include ways utility theory can be improved—such as incorporating reference dependence, news utility, social preferences, self image, and other belief-based tastes—and ways we can relax assumptions of perfect rationality—such as incorporating focusing effects, limited attention, biased prediction of future tastes, present-biased preferences, biases in probabilistic judgment, and errors in social inference. The course will emphasize (a) careful interpretation and production of new evidence on relevant departures, (b) formalizing this evidence into models that can, with discipline and rigor, generate sharp predictions using traditional economic approaches, and (c) exploring economic implications of those models presented. Although we will primarily emphasize (b), the course is meant to be useful to students whose interests lie anywhere in this spectrum, under the premise that all such research will be improved by a greater appreciation of the full spectrum. The course is intended for PhD students in the Business Economics and Economics programs and others who have a solid background in microeconomic theory at the level of introductory PhD courses in these programs. (Microeconomic courses in other programs on campus, and even many non-Harvard Economics PhD courses, are generally *not* likely to be adequate substitutes.) While obviously appropriate to those wishing to specialize in "behavioral economics", the course is also designed for those interested in doing research in particular fields of economics. And while the course centers on theoretical models (learning and evaluation will center around solving formal problem sets), the theory is focused on empirical implementability and economic relevance, so that the course is also designed for those interested in theory-influenced empirical research.

This course contains material and approaches targeted at those with an interest in doing PhD-level research in economics. **Enrollment in this course is simply not suitable for those unprepared in or uninterested in PhD-level economics** *no matter* **the intensity of interest in psychology or behavioral economics.** ***Really.***

If **after reading through this syllabus** you have any questions about whether this course is appropriate for you, please sign up to talk to me. While I will have 30-minute office hours throughout the semester (and always have such slots available to Harvard students to discuss anything, especially research), as well as longer group meetings discussed below, before the semester starts I have many 15-minute slots to discuss whether the course is a good idea for you. You can sign up for these at https://my.timetrade.com/book/3R5SG. I would suggest filling out the information sheets provided on canvas and my home page and send them to me before meeting. You must send an email after signing up in any event, and are welcome to send me an email for questions that can be answered that way or to find out if meeting is warranted.

Admission for credit will be automatic for regular (non-visiting) Harvard students in any department who have passed Economics 2010a and 2010b with a grade of B+ or better. (Those who have taken 2020a and 2020b may also qualify, but should talk to me first.) First-year PhD students, as well as Harvard or MIT undergraduates with *advanced* training in microeconomic theory and who have an interest in Economics graduate studies are also encouraged to consider taking the course. MIT Economics Department PhD students will be allowed to take the course for sure; MIT PhD students in other programs should consult with me about doing so. Brown University Economics PhD students should consult with a faculty member in their department, and then contact me for permission with relevant information (and the name and email of the faculty member I can contact about preparedness). With apologies, all other visiting students and students enrolled at other universities (besides MIT and Brown) cannot take the course for credit, for either grades or pass-fail, nor as an official auditor whose participation must be certified to somebody. (Students at Harvard and MIT who wish to work through the material without registering will be allowed to do so, but should also talk to me.) Those who are not enrolled cannot turn in problem set nor complete the exam for unofficial evaluation.

Because of the structure of the course described below, even following along without registration will not be possible without a serious engagement with the material, and for both those registered and those not, the notes will not be suited for printing out. This barrier is intentional, for pedagogical purposes of both each individual participant (I believe thinking through the concepts and the math as you go through it is generally the best way to learn this type of material) and for their fellow students (to assure that when we meet together to discuss the material all participants are prepared and engaged). I hope to eventually make non-interactive notes available to all interested, and reading through the related papers gives a good sense of things in the meanwhile.

> Note: The barrier to passive participation is intentional, but I intend no other barrier that might make this structure difficult, such as personal conditions (e.g., visual problems) or technological constraints (connections, pdf readers). I hope in fact the structure makes it easier not harder (no time-zone, individualized pacing, and better for non-native speakers). But this is experimental and I may have neglected something, so please let me or Yihong know of any concerns you have now or that may become apparent later.

DETAILED COURSE NON-DESCRIPTION

Because it is designed as an introduction to modeling psychological phenomena that are not yet totally integrated into mainstream economic analysis, the material in this course is not entirely like what you've seen in most of your other economics courses. But it is *not* an alternative to mainstream economics. It is only about improving the psychological realism of formal economics, so as to use classical economic approaches to improve our answers to classical economic questions. Like all other courses, this course does not cover all topics that might be of interest. So, this course is …

not about the philosophy or methodology of economics: Maybe too little time is spent on methodology in graduate school. And some methodological quandaries inhere in the topics of this course, and I have strong views that you won't be able to miss. But beyond the class, I will not spend time exploring methodological issues. Doing so takes time away from the substance. And usually when economists debate "Methodology" in the context of challenging existing assumptions, the debate ends up focusing on an abstract official line about appropriate methodology, rather than a realistic assessment of how workaday economic research is actually done. The maintained hypothesis of the course is that it is sensible for some economists to spend some of their time doing standard economic research that happens to incorporate some until-recently-untraditional-as-a-focus-within-economics elements of human nature that seem to be both true and economically relevant.

not about non-psychological models of bounded rationality: We won't consider models of bounded rationality (based on computer science, artificial intelligence, etc.) that are meant to capture cognitive limits of economic actors, but not based on evidence that humans think this way. In some arenas I think it makes tremendous sense to focus on these alternative models of bounded rationality, and more generally this can be a very useful research agenda. But that's not what this course is about. We will consider those models based on research inspired by the empirical evidence of what humans are like.

not about savanna economics: Many people are interested in how the human species evolved to be the way we are, and most economists are prone to think of evolutionary arguments when being exposed to unfamiliar assumptions. Whatever the merits or demerits of an evolutionary perspective on social science, it is not what this course is about. Under the maintained hypothesis that in the (very long) "short run" we can treat the biological aspects of human nature as fixed, we won't consider the biological dynamics of evolutionary change. We will try to figure out some facts about what humans are like, and see how that matters for the economy. Any empirical insights into how people are—from whatever source, including by researchers who find a focus on evolutionary pressures to be enlightening—is of course welcome. And presumably some researchers believe that the focus on evolutionary pressures will eventually yield high payoff in understanding humans as they currently are, at which point evolution-inspired insights into human nature about economically relevant behavior can be incorporated into a course like this. But this course will not emphasize why being the way we are was adaptive for our ancestors on the savanna.

not about experimental economics as such: Readings will include experimental papers, and as such we will when appropriate examine the nature of the experimental evidence. But the course won't be about experimental methods per se. I am not qualified to give detailed guidance on

such methods, and in any event this course is meant to use the results from experiments to motivate new economic assumptions, and to emphasize the potential for non-experimental research in these topics. We also won't study experiments testing economic institutions in the laboratory, except insofar as they are either motivated by or informative about the underlying psychology of economic actors.

And

***totally not* an alternative to mainstream economics:** In the most important senses, the course won't at all be a departure from mainstream economics. I am a devotee of mainstream economic methods: methodological individualism; formal, careful, mathematical articulation of assumptions; logical analysis of what conclusions follow from those assumptions; and thoughtful empirical testing of both the assumptions and the conclusions. This isn't the only way to approach social science, and it is true that obsessions with methodological individualism and mathematics can sometimes damage research. It is a good thing that these methods and standards are not imposed on all social-science research. Indeed, much of the evidence for the formal models we will be developing doesn't meet economists' narrow criteria for good research—and it should humble us that so much useful insight is derived from modes of research we do not employ. But it is my belief that the best way for economists to do economics in general, and the best way for us to use this material in particular, is with careful formal theory and statistical analysis. In these regards, the course will be purposely, pointedly, persistently, proudly, and ponderously mainstream.

COURSE STRUCTURE AND REQUIREMENTS

Here is the current plan: We will post interactive lecture notes on all the required (and some optional) material on canvas. These notes will generally encourage you to work through material as you go along (individually or as self-organized small virtual groups). At other times the notes you will be more than encouraged—you will be required to provide answers in order to move on, and at other times required to provide correct answers before moving on. Then at the end of each topic in the notes you will be complete problem sets and turn them in for grades, and correct answers provided.

The idea is that this will be self-paced within limits; students taking the course for credit will be required to finish each unit by some deadline. But they can go faster, subject to the (likely to be very real) constraint of how fast the material is posted. The material will also include questions and topics meant to be conducive to students meeting with Matthew in groups to discuss the material. These too will aspire to be self-paced: as groups of students get through material but prior to the related problem set being due I will schedule two-hour sessions on the material at a convenient time. The idea is to do this at different times depending on demand (as well as to do so on different topics depending on interest), subject to what makes sense after learning course size and experience with the initial attempts.

My hope is that students with similar background and on a similar pace and compatible time zones, can log on together if they wish to go through the notes together. You are also encouraged to work together on the problem sets. It is a great way to learn, especially on challenging problems. But

while collaboration is allowed, directly copying someone else's work is not, and will be considered a violation of the university's code of ethics. Do not read others' answers from past or present problem sets—you should write up solutions after any joint work that reflect your own understanding. Please state who you worked with, and the extent of collaboration at the top of the relevant assignments.

More generally, if the self-pacing works and generates real heterogeneity, there will be an honor system for not sharing answers with those who are behind. As you will see below we also plan to have a self-scheduled, timed, "closed-book" exam towards the end of the course that you should work on alone. You will be asked to give us a time you plan to download the exam and to spend three immediate hours working on it. We have yet to figure out the logistics (maybe you have to return it within three hours, maybe you must stop at three hours and scan it without editing).

RESEARCH

Most who are taking this course should be in transit from a life of coursework towards a life of research. A major reason for teaching this material is to positively influence your research. While it is of course intended for those interested in psychology and economic theory, it is likely (and it is my wish) that most taking the course plan research or policy careers in other areas. Indeed, the material in this course and the focus of my own research is towards models that can be used as input into other areas of economics. This is a course in theory, but it is meant as applicable theory that is engaged with the rest of economics.

And yet: this course won't focus on research. So: I encourage you to think about research on your own, with each other, and with faculty, including me. It is easy to shortchange this goal under the pressure of taking courses and other obligations, so it requires some focus on your part to attend to it. I encourage you to talk to me about ideas for research applying the material from this (or any) course. While I welcome discussions on any of your ideas, including experimental research and modeling-new-psychology theory, I most strongly encourage ideas for "field-empirical" research and implications-of-these-assumptions theory. I especially encourage ideas that do not merely test the validity of some of the principles and models discussed in the course, but are of direct general interest to economics. I enjoy talking to students about their ideas for empirical research.

In addition to coursework related meetings, if you wish to talk about research, please also feel free to sign up for a slot. More generally, if for some reason you need to talk to me about something for which office hours attended by others aren't appropriate, you should feel free to sign up. Also, for those in the Business Economics and Economics Ph.D. programs, I and other faculty are always available to discuss *any* issues regarding the program.

Tentative Schedule

Below is the intended schedule of material. The start date for each module is the target date for posting the notes; the finish date is the *very latest* you should be done going through those notes (you might even be able to detect the very subtle framing effect I employ to drive home the "very latest" part). The end date is not the date of any meeting we arrange; it is the date by which you must *arrange* the meeting. You'll be asked to arrange meetings only after you finish the relevant material. (For longer modules we will indicate good times for interim meetings.) When I have the material, I post notes that are not required material.

We will also post reading lists relevant for each of the modules when we first post the notes.

The problem sets are due quite firmly at the date listed. The parenthetical percentages for the problem sets and the exam are the proportion of the course grade. The total percentage for the course does not reflect my past as a football coach (not sure how parochial that reference is); rather, rather, we will take your lowest score on a problem set or the exam, and reduce its weight by 10 percentage points.

There is almost zero chance we'll end up on this exact schedule.

Module 1: Introduction; Methodological and Substantive Themes: Perspectives, conceptual framework; preferences and errors; well-being and choice. (January 27 to January 27 + 1 week)

> **Problem Set Western Gorilla – Part 1** (3%): due February 22

Module 2: Introduction to Belief-Based Utility: Introduction to belief-based utility**;** "causative preferences, regret; anticipatory utility, anxiety; inward- and outward-looking ego utility, status-seeking; motivated cognition. (February 1 to February 10 + 1 week)

> **Problem Set Western Gorilla – Part 2** (9%): due February 22

Module 3: Belief-Based Utility and News Utility: Introduction to reference dependence and prospect theory; reference-dependence and expectations; expectations as the reference point, news utility, risk preferences, informational preferences. (February 12 to February 26 + 1 week)

> **Problem Set Bornean Orangutan** (18%): due March 15

Module 4: Introduction and Conclusion to Social Preferences: Altruism; Fair Allocations; belief-based utility redux; spite, reciprocity; authority and autonomy preferences. (February 26 to March 1 + 1 week)

> **Problem Set Human – Part 1** (3%): due March 26

Module 5: Introduction to Limited Rationality: Principles of Limited Rationality, Welfare and Rationality; focusing and bracketing effects, context effects, choice sets, and distortions. (March 5 to March 10 + 1 week)

> **Problem Set Human – Part 2** (7%): due March 26

Module 6: Hedonic Mispredictions: Introduction to mispredicting utility; projection bias and mispredicting utility and behavior; errors in interpreting experience, attribution bias. (March 15 to March 26 + 1 week)

> **Problem Set Eastern Gorilla – Part 1** (10%): due April 15

Module 7: Non-Unitary Utility: present bias (the only example of NUU that has much psychological meat and economic implications); misprediction of present bias. (March 22 to April 1 + 1 week)

> **Problem Set Eastern Gorilla – Part 2** (9%): due April 15

Module 8: Biases in Probabilistic Judgment: Introduction to "heuristics and biases" and jdm; quasi-Bayesian modeling; hypothesis-framing effects; sampling biases, law of small numbers, non-belief in the law of large numbers; base-rate neglect and confirmatory bias; over- and under-confidence; motivated willful distortion of beliefs. (April 2 to April 9 + 1 week)

> **Problem Set Chimpanzee – Part 1** (12%): due April 23

Module 9: Attention and Memory (April 9 to April 16 + 1 week)

> **Problem Set Chimpanzee – Part 2** (3%): due April 23

> **Exam Bonobo** (20) April 17 to April 25; based on Modules 1-8.

Module 10: Errors in Inferring from and Predicting Others' Behavior: Social inference and non-inference; information projection; reasoning about others; social learning and neglecting redundancy. (April 16 to April 22 + 1 week.)

> **Problem Set Sumatran Orangutan** (16%): due May 3