Decisions, Big & Small -- Spring 2022

Time: Tuesdays and Thursdays, 10:30-11:45
Location: Room 401 ← TENTATIVE
Instructor: Tomer Ullman (tullman@fas.harvard.edu)
Student Hours: Thursday 5:30-6:30pm ← TENTATIVE
(Please review the email policy below when scheduling)

Sections: TBA
Teaching Fellows and sections:

Simge Topaloglu (sit591@g.harvard.edu)
Section time: TBA
Section location: TBA
Office hours: TBA

Overview: Life is full of decisions, but not all decisions are made equal. Choices can be big and consequential (should I focus on my success, family, or passion), or small and everyday (going out, or staying in). This course will introduce you to the cognitive science of judging and choosing. You will learn about rational planning, the kind a perfect intelligence might carry out; Common simplifications and shortcuts that non-perfect humans use, and how these may actually be appealing approximations for any decision-making system; Regret over choices taken and not taken; Making decisions with others, Transformative decisions, the ones that change who you are as a person. As we cover these topics, we will consider how to apply the insights from the psychology of decision making to your own ordinary and extraordinary choices.

Textbook: The course does not have a specific textbook. Reading materials from textbooks, books, articles, journals, and so on will be made available online.

Objectives: The main objective is to acquaint the students with the basic tenants of different approaches and models to decision making, relevant for their future research in cognitive science and psychology, as well as in their daily life. Students should also gain an appreciation for outstanding debates regarding optimal decision making, boundedly rational decision making, and deviations from optimality.

Website: We will make use of Canvas, and it will contain readings, announcements, links, assignments, and grades.

Accessibility: Any student needing academic adjustments or accommodations is requested to present a letter from the Accessible Education Office (AEO) and speak with Collin Conwell by the second week of classes. Failure to do so may result in our being unable to respond to your needs in a timely manner. All discussions will remain confidential, although AEO may be consulted to discuss appropriate implementation.

Grading and Requirements:

Discussion Posts and Replies: 24%
Final Paper: 30%
Final exam: 30%
Attendance and participation: 16%

Grading Scale:

A: 100-90	B+: 89-86	B: 85-80
C+: 79-76	C: 75-70	D: 69-62
F: 61 and below		

Exams: The exam is close-booked, and will contain a sample of the material in class. The exam will consist of a mixture of mostly multiple-choice questions and some short-answer questions. The exam will be given during exam period and last approximately three hours.

Discussion posts: 24% of your grade will be based on your participation in online discussion outside of class, specifically Posts and Replies. Questions based on the readings and lecture will be put on Canvas weekly, and you will have the option of posting your thoughts on the relevant question. These questions are meant to be relatively open-ended, without a strict 'correct/incorrect' response.

Posts: A good Post is one that engages thoughtfully with the material of that week, by raising points not covered, weakness and strengths of different viewpoints, outside empirical evidence, suggestions for new studies, and so on. You are expected to make at least 3 Posts throughout the term of around 150-400 words each, but can make up to 6 (grading will be based on the top 3 Posts).

Replies: In addition to making posts of your own, you will be asked to reply to other people's points. A Reply can be shorter or longer than the original Post, but should engage with it *thoughtfully* and *respectfully*. A reply that amounts to "Yeah!" or "Says you!" is not a good reply. As with Posts, you are expected to make at least 3 Replies throughout the term, but can make up to 6 (grading will be based on the top 3 Posts).

Final Paper: Final papers will consider a decision that you made during the term, had to make before it, are about to make, or a decision made by a friend. By 'consider', we mean you should explain the ins-and-outs of your decision in light of the topics covered in class, but using additional readings related to the topics of choice. The paper does not have to consider *all* the material covered, you can view your decision through the lens of just one topic, but again you are expected to consider additional resources. You can choose to explain how this topic was relevant, or alternatively why it wasn't and what can be done about that. You are also encouraged to think empirically, and propose new ways of examining (either in the lab or using data from outside the lab) decisions like the main one in your paper. Papers should be between 4-6 pages long, including a reference section. Draft papers can be submitted 2 weeks before the end of class, and will receive feedback on what can and should be improved, and what grade can be expected based on the draft.

Policies

Academic integrity: This course adheres to the university's standards regarding academic integrity. Suspected cheating or plagiarism will be referred to the Honor Council of Harvard College, as is required by the university. Students are responsible for knowing what constitutes plagiarism; please refer to the Harvard Guide to Using Sources for a detailed description of the different types of plagiarism.

Lectures and attendance: You are expected to attend the lectures. All lectures will be recorded and have associated handouts on Canvas, but this is not the same as attending the lecture and participating in exercises and discussions. Students that cannot attend the class due to time zone differences should write to the TF or instructor to accomodate. As a general rule, office hours will not be for answering questions that could easily be answered by attending the class.

Attention splitting and note taking: Classes will be taking place in person. The use of laptops and cellphones is *strongly* discouraged, unless the instructors explicitly mention their use for a class exercise. This policy is for the benefit of the students.

Email Policy and scheduling meetings: Professor Ullman is happy to meet with any student for any reason, and you are encouraged to come to student hours. When asking to meet at an alternate time outside student hours, please include three proposed times and a description of the reason for meeting. Questions having to do with the syllabus or assignments are best shared with the class, and so it is better to ask these during or right after class.

Schedule:

(readings in parenthesis. Note that readings are subject to change, especially as the class progresses)

Prologue

Tuesday Jan 25st: Introduction to the course; The first decision; Optimal stopping. <- *while not "officially" part of the course any student thinking of taking the class is strongly encouraged to attend, including those are quite sure they're going to take it.*

(For more information on optimal stopping see "Algorithms to Live By", Chapter 1, Christian and Griffiths. Students do not have to read this before the first day of class)

ACT I: The Decision-Making Machine

Thursday Jan 27th: How Should a Balance Beam Decide; Costs and Rewards; Decisions as Weighing of Options under Uncertainty; Signal Detection Theory

(A decision-making theory of visual detection, Tanner and Swets 1954)

Tuesday Feb 1st: How Should a Balance Beam Decide; Costs and Rewards; Decisions as Weighing of Options under Uncertainty; Signal Detection Theory

(A decision-making theory of visual detection, Tanner and Swets 1954)
(The forgotten history of signal detection theory, introduction)
("I had a funny feeling in my gut", interview with Petrov)

Thursday Feb 4th: How Should a Robot Decide; The Fundamental Equation of AI; Expected Utility; Simple Choices

(Artificial Intelligence, a Modern Approach, 3rd edition, Chapter 16: up until 16.3.2)
(Skim Bernoulli, D. (1738). Exposition of a new theory on the measurement of risk.)
(skim the wiki page https://en.wikipedia.org/wiki/Von_Neumann–Morgenstern_utility_theorem)

Tuesday Feb 8th: How Should a Robot Decide; The Fundamental Equation of AI; Expected Utility; Simple Choices

(Artificial Intelligence, a Modern Approach, 3rd edition, Chapter 16: up until 16.3.2)
(Skim Bernoulli, D. (1738). Exposition of a new theory on the measurement of risk.)
(skim the wiki page https://en.wikipedia.org/wiki/Von_Neumann–Morgenstern_utility_theorem)

Thursday Feb 10th : The Ant and the Wind; Waiting for the World to Decide; the Accumulation of Evidence; Drift Diffusion and Sequential Sampling

(Smith, P. L., & Ratcliff, R. (2004). Psychology and neurobiology of simple decisions. Trends in neurosciences, 27(3), 161-168.)
(Ratcliff, R., Smith, P. L., Brown, S. D., & McKoon, G. (2016). Diffusion decision model: Current issues and history. Trends in cognitive sciences, 20(4), 260-281.)

Tuesday Feb 15th: The Ant and the Wind; Waiting for the World to Decide; the Accumulation of Evidence; Drift Diffusion and Sequential Sampling

(Smith, P. L., & Ratcliff, R. (2004). Psychology and neurobiology of simple decisions. Trends in neurosciences, 27(3), 161-168.)
(Ratcliff, R., Smith, P. L., Brown, S. D., & McKoon, G. (2016). Diffusion decision model: Current issues and history. Trends in cognitive sciences, 20(4), 260-281.)

Thursday Feb 17th: Transition/game/simulation

ACT II: The Machine Breaks Down

Tuesday Feb 22nd: The Battle-cry of Behavioral Economics: Prospect Theory

("Thinking, Fast and Slow", prospect theory, Daniel Kahneman)
"Prospect Theory: An Analysis of Decision under Risk"

Thursday Feb 24th: Silly Utility: More Prospect theory and the Endowment effect

("Thinking, Fast and Slow", prospect theory, Daniel Kahneman)
"Prospect Theory: An Analysis of Decision under Risk"
"Misbehaving", Thaler)

Tuesday March 1st: Would you Bet Your Life on a Vaccine? Probability weighting, Framing

("Frames and reality" by Kahneman)

Thursday March 3rd: Nudge, Nude, Wink Wink: Nudges
"Nudge" by Sunstein,
Nudges that fail
Nudges in perspective
https://bppblog.com/2017/06/02/much-ado-about-nudging/
https://www.nytimes.com/2010/05/16/magazine/16Sunstein-t.html

Tuesday March 8th: Decisions for My Future Self; The Effect of Time on Decisions; Hyperbolic Discounting
(TBD)

Thursday March 10th: The Future as it Might have Been: Regret; Sunk cost; Counterfactuals; Action and inaction

1."Keeping Score" from Thinking Fast and Slow <---Briefly covers regret, sunk cost, and some counterfactual reasoning. Short and to the point.
2. "Sunk cost" from Misbehaving<-- Another short, relevant chapter
3. "How things might be different"<--- chapter from Ruth Byrne's book "The Rational Imagination". a bit longer and more academic than the first two. If you don't have time for all of it, maybe read the first few pages and the summary. Consider the relevance of 13 year old book that starts with "Suppose you hear about a new disease..."

Bonus (Bonus)
1. The Simulation Heuristic (1982)<--- Short classic paper on imagining how things could have gone otherwise; there's been a lot more work since and the main results are summarized in the book chapters above but still, worth reading.
2. Counterfactual Thought(2016) <-- Recent-ish review by Byrne, who wrote the book above, with updated findings and a more 'scholarly' treatment than her book.
3. Counterfactual Thinking (1997)<-- Older work by Roese but also a good review, especially with regards to counterfactuals and negative events.
4. Inaction effect and regret (2002)<-- a two-for-one (inaction AND regret), sensitivity of regret to prior
5. The Psychology of Doing Nothing (2003)<-- more of a meta-point about why we chose to do nothing rather than something. The answer is: There are several answers.
6. Regret and elation in action and inaction (1987)<-- Older paper but worth considering the flip-side of regret

Not a scholarly paper but an interesting first-person perspective on what it's like to "lose" (in the sense of not winning as much as you thought you would), the intense regret that comes with that, and trying to pull through:
"I Lost on Who Wants to Be a Millionaire and it Almost Destroyed me"
http://www.slate.com/articles/arts/culturebox/2015/02/who_wants_to_be_a_millionaire_i_lost_on_the_show_and_it_almost_destroyed.html

https://www.grubstreet.com/2020/12/2020-bucatini-shortage-investigation.html
d69vhttps://www.grubstreet.com/2020/12/2020-bucatini-shortage-investigation.htmlkjkj i

Tuesday March 15th and Thursday March 17th: Spring Break (No class, No Regrets)

Tuesday March 22nd: I Regret Everything: Regret and Counterfactuals in Decisions

(See previous readings)

Thursday March 24th: Counterfactuals, action and inaction

Intermission

Tuesday March 28th: The Value of Life, Taboo Tradeoffs

(Chapter 5-6 from Choice and Consequence by Schelling -- "The life you save could be your own" and "strategic relationships in dying", "value of life" 1991,
Button button Twilight Zone episode,
VSL paper,
Thaler and Rosen 1976,
"What's bad is easy: Taboo values, affect, and cognition" (2007)

ACT III: The Machine Reflects

Thursday March 30th: Commitment devices, Kavka's poison, Odysseus and the Ropes,

(More Schelling, more Breakdown of Will)
- Kavka, G. S. (1983). The toxin puzzle. Analysis, 43(1), 33-36,
- Rogers, T., Milkman, K. L., & Volpp, K. G. (2014). Commitment Devices: Using Initiatives to Change Behavior. Journal of the American Medical Association (JAMA), 311(20), 2065-2066.
- https://www.stickk.com/, etc
- The Odyssey
"carrots and sticks", Ian Ayres
Meta-preferences by Frankfurt, also by Hirschman)

Tuesday, April 5th: The Decisions of Others

(level-k reasoning and the beauty pageant, NYT implementation,
Golden balls,
Some game theory,
Inverse planning
Wisdom of crowds
Bonus: Bayesian democracy paper by McCoy and Prelec)

Thursday, April 7th: What to Do when you can Do Anything; Action Set Selection

(Phillips and Cushman,
'Radical freedom'
Overton window)

Tuesday, April 12th: What is this Worth Anyway? The construction of Value and Preference

(Ariely, D., Loewenstein, G., & Prelec, D. (2006). Tom Sawyer and the construction of value. Journal of Economic Behavior & Organization, 60(1), 1-10.
'Predictably irrational' by Arieli, a chapter or two
'The construction of preference', Lichtenstein and Slovic, a chapter or two)

Thursday, April 14th: The story of your life, narrative self and experiencing self

("Thinking, Fast and Slow", Part V: "Life as a story", Daniel Kahneman)

Tuesday, April 19th: Big Decisions; Hard Decisions; Transformative Decisions

(Paul, L. A. (2015). What you can't expect when you're expecting. Res Philosophica, 92(2), 149-170.
Ullmann-Margalit, E. (2006). Big decisions: opting, converting, drifting. Royal Institute of Philosophy Supplements, 58, 157-172.
S.D. Levitt, Heads or Tails: The Impact of a Coin Toss on Major Life Decisions and Subsequent Happiness, National Bureau of Economic Research, 2016, No. w22487.

Thursday, April 21st: Big decisions, hard decisions, transformative experience (Guest Lecture, Prof Laurie Paul)

("The art of decision making" Rothman, New Yorker
LA Paul, Transformative experience, chapter 1)

Tuesday April 26th: Closing Points, Reflections by Students

If there is time:

- Optimism Bias
- Inside/Outside Framing
- Planning Fallacies