

ECON 455, Discussion Section 12

TA: Shane Auerbach (sauerbach@wisc.edu) ; Date: 05/01/15
Office: SS 6470. OH: Wed 8:00-9:30am; Thu 4:15-5:45pm; or by appt.

Reminders/Updates:

- Please fill out course evaluations at aeis.wisc.edu. Good evaluations can really help me on the job market in a few years, so please be kind!
- The final exam is Sunday, May 10 from 2:45-4:45pm in Sterling 1310.
- No discussions next Friday (May 8), but I'll have extended OH Saturday, May 9 in the evening.
- Andrea said that the only pre-midterm materials to focus on for the final are time inconsistency and prospective utility / prospect theory.

This handout is intended to serve as a review guide for the final. Below are the topics, and, for each topic, relevant resources and questions. $Lx.y$ denotes slide(s) y of lecture x . $PSx.y$ denotes question y of problem set x . $Hx.y$ denotes question y of handout x . $M.y$ denotes question y of the midterm.

- 1. Introductory material.** L1-L2 [H1.3](#)
 - Homo-economicus. L1.2
 - Revealed preference. L1.8 [H1.1](#)
 - Rationality. L1.12-13
 - Violations of rationality (Choice overload and temptation). L1.18-21
 - Attention. L2
 - *Idea: Attention is costly, system 1 and system 2, etc.*
 - Model 1: Shrouded attributes (hotel/airline add-ons). L2.23-37 [PS1.1](#) [M.MC4](#)
 - Model 2: Counterfeit money. L2.38-41 [H1.2](#)
- 2. Time inconsistency.** L3-L6
 - Willpower. L3
 - *Idea: You only have so much willpower, and you must decide how best to use it*
 - Model: Willpower (willpower depletion) L3.11-35 [PS1.2](#) [M.TFU1](#)
 - Discounting (standard and hyperbolic). L4.1-4
 - Standard: $U = u_1 + \delta u_2 + \delta^2 u_3 + \dots$ L4.3
 - Quasi-hyperbolic (β/δ): $U = u_1 + \beta[\delta u_2 + \delta^2 u_3 + \dots]$. L4.4 [H2.2](#) [H2.3](#)
 - Model: Procrastination. L4.20 [PS1.3](#) [H2.1](#) [H2.4](#) [M.TFU4](#) [M.MC5](#)
 - Sophisticates anticipate how they will behave in the future. Naifs don't. L4.21-L5.17
 - Immediate reward, delayed cost OR immediate cost, delayed reward. L4.23-24
 - Model: Dual-self model of impulse control. L6 [PS2.1](#) [M.TFU1](#)
 - *Idea: Do the task if the outside option is bad enough*
 - Cutoff rules. Do if $x_t \leq x^*$. Don't do if $x_t > x^*$. L6.10 [H3.1](#) [H5.1](#)
- 3. Beliefs.** L7-L9
 - Basic probability. L7.1-10 [H3.5](#)
 - Bayes rule and conditional probabilities. L7.11-22 [H3.2](#) [H3.4](#) [H4.3](#)
 - Monty Hall problem. L7.18-22
 - Conjunction fallacy (people forget that $P(A \cap B) \leq P(B)$). L7.25-27
 - Base rate neglect (eg. cab color or medical test). L7.28-30 [H3.3](#)
 - Likelihood ratio version of Bayes rule. L7.31
 - Gambler's fallacy. L7.36-37 [PS2.3](#) [H4.1](#) [M.MC1](#)
 - Hot hand fallacy. L7.38
 - Law of small numbers (false) & law of large numbers (true). L7.40-44
 - Confirmation bias. L7.44-46 [PS2.2](#) [M.TFU3](#) [M.SA1e](#)
 - Polarization L8.4-8
 - Model: Confirmatory bias. L8.9-34 [H4.2](#)

- * *Idea: With probability q , professor misperceives tests that contradicts her prior.*
- * First impressions matter. L9.6-14
- * Over- (or under-) confidence. L9.15-18

4. Expected utility theory and its violations; prospect theory. L10-L13

- Expectations. L10/11.2-7
- Expected utility and risk aversion. L10/11.8-13 [H5.2](#) [M.TFU2](#) [M.SA1a - b](#)
- Criticisms of and experimental evidence against EU-maximization: [PS2.4](#) [H1.4](#)
 - Rabin’s “risk aversion” paradox. L10/11.14-32
 - Certainty effect. L10/11.34-35
 - Framing. L10/L11.36-38
- Prospect theory [H5.3](#) [H6.1](#) [M.SA1c](#)
 - First approach: $PU = \pi(p_1)v(x_1) + \pi(p_2)v(x_2) + \dots$ L12.2
 - * An example. L12.3-7
 - * Typical assumptions on v . L12.8-9
 - * Typical assumptions on π . L12.10-12
 - * Problem with first approach. L12.17
 - *Idea: You may prefer x to a lottery over x and $x + \epsilon$.*
 - Second approach: cumulative prospective utility L13 [M.MC2](#)
 - * $x_1 < x_2 < \dots < x_3$ and $P_i = p_i + p_{i+1} + \dots + p_n$. L13.2
 - * $PU = v(x_1) + \pi(P_2)(v(x_2) - v(x_1)) + \pi(P_3)(v(x_3) - v(x_2)) + \dots$
 - * Examples of computing cumulative prospective utility. L13.3-11
 - * Application: equity premium puzzle. L13.12-27 [M.MC3](#)

MIDTERM

5. Strategic interaction, social preferences. L15-17

- Game theory intro. L15.2-6 [H7.1](#) [H7.2](#)
 - Dominant/-dominated strategies. L15.6-9 [H7.5](#)
 - Best responses. L15.10-11 [H7.4](#)
 - Nash equilibrium. L15.12-13 [PS3.1](#)
 - Dominance solvable games (iterated deletion) L15.14-28 [H7.3](#) [H7.6](#) [H8.1](#)
 - * A standard example. L15.17-22
 - * The beauty contest (IWD & Level-K). L15.23-31
 - Dynamic games (i.e. sequential). L15.32-43 [H8.2](#) [H8.5](#)
 - * Ultimatum game. L15.32-40
 - * Centipede game. L15.40-43
- Behavioral approach. L16.12-L17.21
 - Thought experiments on *fairness*. L16.12-21
 - Social preferences (i.e. $u_i = x_i + \lambda x_j$). L17.2-4 [H8.4](#)
 - Inequality aversion (i.e. $u_i = x_i - \alpha|x_i - x_j|$). L17.5-7
 - * Example: ultimatum game with inequality aversion. L17.8-19
 - * Application: Unemployment in a recession. L17.20
 - * Application: Contribution game class experiment. L17.21 [PS3.2](#)
- Game theory with uncertainty (and behavioral assumptions). L17.22-L17.39 [H8.3](#)
 - Perfect Bayesian Equilibrium (PBE) & Bayesian Nash Equilibrium (BNE). L17.23-24
 - Example: ultimatum game. L17.25-29 [PS3.3](#)
 - Example: auction. L17.30-39
 - * Winner’s curse. L17.38-39

6. Cognitive Dissonance, Overconfidence and Self-Justification. L18-

- Introduction. L18.1-11

- Personal examples. L18.3-4
- Cognitive dissonance. L18.7-8
- Hindsight bias. L18.9
- Self-serving bias. L18.10
- Self-handicapping. L18.11
- Umbrella example. L18.12-34 [H9.1](#) [H9.2](#)
 - With expected utility. L18.14-17
 - Model 1 (problem: no connection to true probabilities). L18.18-21
 - Model 2 (problem: chosen action inconsistency with chosen belief). L18.22-25
 - Model 3. L18.26-34
- Investment example. L18.35-41
- Self-deception. L19
 - *Idea: people do not want to lose confidence in their abilities.* L19.2
 - Goals and assumptions. L19.3-4
 - Basic model. L19.5-23 [PS4.1](#)
 - * Case 1: Overconfidence. L19.8-17 [H9.3](#) [H11.2](#)
 - * Case 2: Underconfidence. L19.18-22
 - * Application: Self-handicapping. L19.23 [H9.4](#)
 - Limited attention / selective awareness L19.25-35

7. Bounded Rationality & Imperfect Recall. L20/21.20-

- Sleeping beauty. L20/21.21-23
- Absent-minded driver. L20/21.24-42 [PS4.3](#) [H10.1](#) [H10.2](#) [H11.3](#)
 - Ex ante optimal mixed strategy. L20/21.29
 - Interim optimal mixed strategy. L20/21.30-41
 - * Interim optimality = no profitable one-shot deviations. L20/21.34
 - Ex ante optimal mix = Interim optimal mix. L20/21.42
- Search decisions with limited memory. L20/21.45-61 [PS4.2](#) [H10.3](#)
 - Expected payments given categories. L20/21.48-50
 - Optimal design of categories. L20/21.51-55
- Bounded memory & biases in information processes. L22.15-31 [H12.1](#)
 - Remembering one signal. L22.20-23
 - Remembering two signals. L22.24-27
 - Implied optimal confirmation bias. L22.28
 - Generalized model. L22.29-31

8. Reason-based choice, persuasion & framing effects. L23

- Reason-based choice. L20/21.2-15
 - Rubinstein's similarity-based choice procedure. L20/21.16
- Uninformative Persuasion
 - Transference. L23/24.4-5 [H11.1](#)
 - * Silk in shampoo model. L23/24.7-19
 - Framing. L23/24.20
 - * Merrill Lynch example. L23/24.21-48
- Advertising and source amnesia. L25.1-
 - Memory-jamming theory of advertising. L25.2-21 [H12.2](#)
 - * Learning, expectations and beliefs. L25.5-10
 - * Model 1: Conversion technology. L25.11
 - * Model 2: Selection technology. L25.12
 - * Example: Conversion with $C = N$. L25.15-21
 - Source amnesia models. L25.22-31 [H12.3](#)
 - * Model 1: Is information new or repeated? L25.23-27
 - * Model 2: How reliable are remembered signals? L25.28-31

A few new simple questions:

1. In the bounded memory model in which you can only remember x signals, which of the following statements are true? (More than one of them is true)
 - (a) If $x = 1$, it is optimal to just remember the most recent signal.
 - (b) If $x = 2$, you receive signal h , and you remember $\{h, l\}$ from before, it is optimal to remember $\{h, h\}$ going forward.
 - (c) If $x = 2$, you receive signal h , and you remember $\{h, l\}$ from before, it is optimal to remember $\{h, l\}$ going forward.
 - (d) If $x = 2$, you receive signal h , and you remember $\{h, l\}$ from before, it is optimal to remember $\{h, h\}$ going forward with some probability and $\{h, l\}$ with the remaining probability. That is, it is optimal to mix.

Solution: (a) and (b) are true. See L22.

2. Which of the following statements about the memory-jamming theory of advertising is not true?
 - (a) In the conversion technology model, the consumer reacts less to remembering a positive experience if they think they've been exposed to advertising.
 - (b) With the selection technology model, the consumer always remembers a positive experience.
 - (c) With conversion advertising with $C = N$, any consumer who has seen an ad will recall a favorable experience with the product.
 - (d) If a consumer remembers having an unfavorable experience, that memory is even more meaningful (in terms of being an accurate signal) if he believes he has been exposed to advertising.

Solution: Only (b) is false. See L25.

3. In Source Amnesia Model 1, you don't know whether the information you're seeing is new or repeated. In Source Amnesia Model 2, you know the quality of a source when you first see it, but then in subsequent periods you remember only the signal, forgetting the quality of its source. Which of the following statements are true? (more than one is true)
 - (a) In Model 1, the signals you see earlier end up more important (in the degree to which they affect your beliefs) than the signals you see later, resulting in an effect similar to confirmation bias.
 - (b) Model 1 implies that people tend to overreact to low-quality info but underreact to high-quality info.
 - (c) One application of Model 1 is that even if a witness is discredited, and a juror is aware of it at the time, the discredited info may have a lingering effect on his posterior beliefs.
 - (d) In Model 2, even if you know at the time that your information is low-quality, it can impact your future beliefs as if it were higher-quality.

Solution: (b) and (d) are correct. The opposite of (a) is true, thus (a) is false. (c) is a true application of model 2, not of model 1, hence the statement is false. See L25.

Quick final exam advice: Read the questions *very* carefully, and try to understand what *it's getting at*, and what subject it is on, before trying to answer. If you can show it in math, great, but sometimes doing it words is just as good, so long as your wording is concise, precise, and accurate. The true/false/uncertain explain questions probably give the fewest points per unit of effort/time, so it may be best to leave them to last. Don't panic when you see something you don't immediately understand, or something that looks unfamiliar. Breaking the problem down into parts and thinking about what you do know can make an insurmountable problem doable. Study. DO NOT SELF-HANDICAP!