Failures of Utility Maximization

Behavioral Economics:
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Failures of Utility Maximization

- This presentation gives a (non-exhaustive) list of documented failures of utility maximization
- Will use this (in part) to motivate our study of bounded rationality (part 1) and reference dependence (part 3)

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Failures of Utility Maximization

- Choice mistakes
- Stochastic choice
- Too much choice
- Status quo bias
- Endowment Effect
- Faming effects
- Asymmetric dominance/Compromise effects

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Choice Mistakes

- Claim: People often fail to choose the best alternative
- However, identifying 'choice mistakes' in the field can be challenging
- Hard to tell whether someone has chosen the best option
- Can be confounded with tastes...
  - a seemingly bad choice could in fact maximize preferences
  - observing violations of WARP can take a lot of data
- …or with lack of available information -
  - ex post bad choices could have been rational given ex-ante information
- Though see (for example) Abaluck and Gruber [2011]

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Choice Mistakes

- The lab offers the opportunity to observe choice while controlling preferences and information
- Makes 'mistakes' obvious and easy to observe
- Can measure how mistakes change with the environment

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Example 1: Caplin, Dean and Martin [2011]

- Subjects presented with a *large* number of alternatives
- *Small* cognitive cost to understanding the value of each alternative
  - E.g. Choosing which flight to take
- Generate an environment in which subjects systematically fail to choose the highest value alternative

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Leaving Money on the Table

Which of the following would you choose?

4	2
3	13
20	11
15	8
8	10

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Leaving Money on the Table

Which of the following would you choose?

4+6+10-11-23+9	2+3+6-11-14+9+10
3+9-17-99+102-6+15	6+18-19-55+70
20-27+7-19+2+3-5	11+2-5+7-8-9+10
15-5-5+6+16+17-20-9	8+9+10-11+8+2+6-32
8+8+9-13-9-6+7	10-9+17-23+10+2+15

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Example 1: Caplin, Dean and Martin [2011]

- Subjects choose between sums
- Dollar value of option is the value of the sum
- 'Full information' ranking obvious, but uncovering value takes effort
- 6 treatments
  - 2 x complexity (3 and 7 operations)
  - 3 x choice set size (10, 20 and 40 options)
- 22 Subjects, 657 choices
- No time limit

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Caplin, Dean and Martin [2011]

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Caplin, Dean and Martin [2011]

Failure rate

	Complexity	
Set size	3	7
10	7%	24%
20	22%	56%
40	29%	65%

Average Loss ($)

	Complexity	
Set size	3	7
10	0.41	1.69
20	1.10	4.00
40	2.30	7.12

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Example 2: Caplin and Dean [2014]

- Subjects presented with a *small* number of alternatives
- *Large* cognitive cost to understanding the value of each alternatives
  - e.g. choosing which of two available jobs to take
- Generate an environment in which subjects systematically fail to choose the highest value alternative

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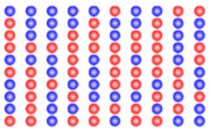
Choice Environment

- Subjects presented with 100 red and blue balls on a screen



- Must choose between `acts'
- Payout of act depends on number of red balls on the screen
- 'Full information' ranking obvious, but uncovering value takes effort
- No time limit

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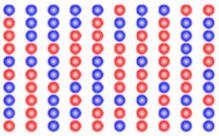
Choice Environment



Act	Payoff 49 Red Dots	Payoff 51 Red Dots
a	10	0
b	0	10

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Treatments

Decision Problem	U(a(49))	U(a(51))	U(b(49))	U(b(51))
1	2	0	0	2
2	10	0	0	10
3	20	0	0	20
4	30	0	0	30

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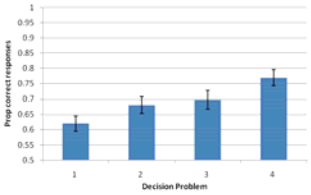
Aggregate Results



- Things to note (also true at the individual level)
  - Choice is stochastic (they make the correct choice some of the time)
  - Subjects do better than chance
  - Accuracy increases as incentives change
- Implies
  - Subject gather some information, but this information is imperfect
  - The amount of information gathered is endogenous to reward

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Random Choice

- If a decision maker is maximizing a stable utility function they should always choose the same thing from any choice set

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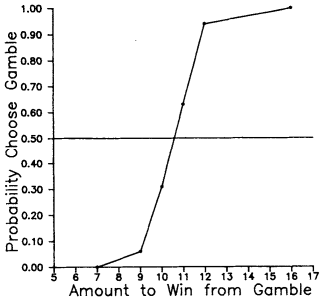
Nogee [1951]



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Random Choice

- As the quality of the lottery is increased, the probability of choosing it increases
- But it increases smoothly, not discretely as the utility maximization model would suggest
- Reminiscent of perceptual experiments
  - Which of two weights is heavier?
- See also
  - Agranov, Marina, and Pietro Ortoleva. "Stochastic choice and preferences for randomization." *Journal of Political Economy* 125.1 (2017): 40-68.

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Too Much Choice

- Example: Iyengar and Lepper [2000]
- Set up a display of jams in a local supermarket
- Two treatments:
  - Limited choice – 6 Jams
  - Extensive choice – 24 Jams
- Record what proportion of people stopped at each display
- And proportion of people bought jam conditional on stopping

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Iyengar and Lepper [2000]

- Slightly more people stopped to look at the display in the extensive choice treatment:
  - 60% Extensive choice treatment
  - 40% Limited choice treatment
- Far more people chose to buy jam, conditional on stopping, in the Limited choice treatment
  - 3% Extensive choice treatment
  - 31% Limited choice treatment

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Iyengar and Lepper [2000]

- Clear Violation of IIA
  - If 'don't buy' was chosen in the 24 jam set, should also have been chosen in the 6 jam setchoice
- Interpretation:
  - Large choice sets are 'demotivating'
  - People do not want the effort of making a decision
  - Therefore 'opt out' of making a choice altogether

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Other Examples

- Iyengar and Kamenica [2010]
  - Subjects offered choice between Lotteries
  - 120 subjects, 2 Conditions

Gamble #	If heads	If tails
Extensive condition		
1	$5.00	$5.00
2	$4.50	$7.75
3	$4.00	$8.25
4	$3.50	$8.75
5	$3.00	$9.50
6	$2.50	$10.00
7	$2.00	$10.50
8	$1.50	$11.25
9	$1.00	$11.75
10	$0.50	$12.50
11	$0.00	$13.50
Limited condition		
1	$5.00	$5.00
2	$3.50	$8.75
3	$0.00	$13.50

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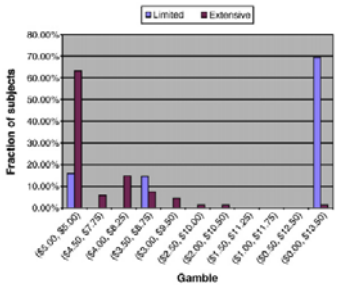
Iyengar and Kamenica 2010

- Results



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Iyengar and Kamenica 2010

- Risk Aversion or Simplicity?

Extensive condition						
Gamble #	If ⚀	If ⚁	If ⚂	If ⚃	If ⚄	If ⚅
1	$0.00	$0.00	$0.00	$10.00	$10.00	$10.00
2	$1.50	$9.25	$8.75	$7.00	$0.75	$1.25
3	$4.25	$5.50	$9.75	$8.50	$0.00	$0.75
4	$1.00	$2.00	$6.75	$7.50	$5.75	$4.75
5	$5.50	$1.00	$0.75	$6.50	$7.50	$6.75
6	$0.00	$0.00	$8.75	$2.75	$9.75	$8.00
7	$9.75	$3.00	$7.00	$6.50	$0.50	$1.50
8	$9.50	$1.50	$1.50	$2.50	$3.25	$10.00
9	$5.50	$8.50	$3.25	$0.00	$8.50	$2.50
10	$9.25	$7.75	$3.75	$2.00	$3.25	$2.00
11	$1.25	$4.50	$8.50	$8.75	$4.50	$0.75

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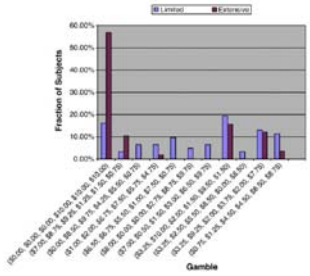
Iyengar and Kamenica 2010

- Results



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Too Much Choice

- Some debate over replicability
  - See Chernev, Alexander, Ulf Böckenholt, and Joseph Goodman. "Choice overload: A conceptual review and meta-analysis." *Journal of Consumer Psychology* 25.2 (2015): 333-358.
- However, see Dean, Stoye and Ravindran "A better test for choice overload"

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Status Quo Bias

- Idea: more likely to choose an object because it is the 'status quo'
- What is a 'status quo'?
  - Something that you have chosen before
  - The way things currently are (status quo bias)
  - What happens if you do nothing (inertia/omission effect)

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Example: Madrian and Shea [2001]

- Observe behavior of workers in firms that offer 401k plans
  - Tax free pension savings
  - Generally considered to be a Good Thing
- Two types of plan:
  - Opt in: if no action is taken when joining firm , then do not take part in the plan
  - Opt out: if no action is taken when joining firm, then are automatically enrolled in scheme
- Compare uptake in different plans

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Madrian and Shea [2001]

- Many more employees take part in 401k plan under automatic enrollment
  - 86% Opt out
  - 37% Opt in
- Effect reduced with tenure
- Also, people are more likely to take up the default fund, and invest the default amount

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Madrian and Shea [2001]

- Interpretation: Violation of rationality, as choice over {enroll, not enroll} is dependent on initial position
- Status quo bias: stick with what you are initially given

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Endowment Effect

- Kahneman, Knetch and Thaler [1990]
  - 44 subjects
  - 22 Subjects given mugs
  - The other 22 subjects given nothing
  - Subjects who owned mugs asked to announce the price at which they would be prepared to sell mug
  - Subjects who did not own mug announced price at which they are prepared to buy mug
  - Experimenter figured out 'market price' at which supply of mugs equals demand
  - Trade occurred at that market price using Becker-DeGroot-Marschak procedure

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Endowment Effect

- Kahneman, Knetch and Thaler [1990]
- Prediction: As mugs are distributed randomly, we should expect half the mugs (11) to get traded
  - Consider the group of 'mug lovers' (i.e. those that have valuation above the median), of which there are 22
  - Half of these should have mugs, and half should not
  - The 11 mug haters that have mugs should trade with the 11 mug lovers that do not
- In 4 sessions, the number of trades was 4,1,2 and 2
- Median seller valued mug at $5.25
- Median buyer valued mug at $2.75
  - Willingness to pay/willingness to accept gap

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Endowment Effect

- Violation of rationality in the sense that value of object changes with ownership
  - E.g. If seller, choose {mug} from {mug, $4}
  - If buyer, choose {$4} from {mug, $4}
- Interpretation: Subjects place extra valuation on an object simply because they own it
- Related to 'Loss Aversion'
  - Losses loom larger than gains

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Framing Effects

- Framing effects refer to changes in the choices people make based on 'inconsequential' changes in the options
- We describe these as violations of rationality because we think really of these are the same object
  - Under one frame x is chosen from A
  - Under another y is chosen from A
- Depends on the definition of 'inconsequential'

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Bushong et al. [2010]

- Students presented with a series of snack foods,
- Selling price for each of these goods elicited using the Becker-Degroot-Marshak mechanism.
- Three conditions that varied in how the snack foods were described.
  1. Written description.
  2. Picture of snack food
  3. Open container of the snack food.
- Average bidding prices were not significantly different in the first two treatments, but were much higher in the third ($1.16 vs $0.71)

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Bertrand et al. [2010]

- Field experiment in South Africa.
- A subprime consumer lender randomized both the advertising content and interest rate in direct mail offers to 53,000 former clients.
  - a photograph on the letter,
  - reference to the interest rate as special or low,
  - suggestions for how to use the loan proceeds,
  - a large or small table of example loans,
  - inclusion of the interest rate as well as the monthly payments,
  - a comparison to a competitors' interest rate,
  - mention of speaking the local African language,
  - and mention of a promotional raffle prize for a cell phone.
- Significant effect on loan take up. Individually, the inclusion of a photo and a table of example loans where the important determinants.

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Huber, Payne and Puto [1982]

- Subjects were asked to choose between two types of beer.
  - $1.80 per six pack, and had a quality rating of 50.
  - $2.60 per 6 pack, but had a quality rating of 70.
- 43% of people chose the first option and 57% chose the second.
- Third option was added that was dominated by the first option
  - $1.80 and a quality rating of 40
- Increase the proportion of people choosing this option to 63%

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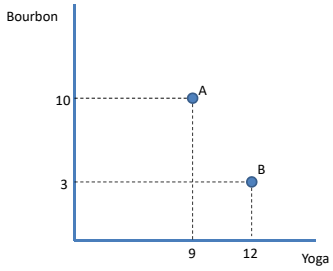
Asymmetric Dominance Effect



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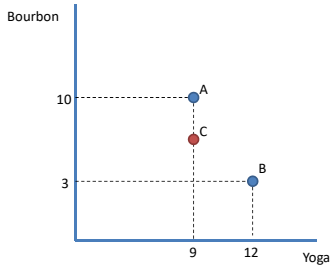
Asymmetric Dominance Effect



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Simonsen [1989]

- Subjects were offered a choice between two types of calculator battery.
  - Lifespan of 12 hrs and a 2% probability of corrosion.
  - Lifespan of 14 hrs and a 4% probability of corrosion.
- 43% chose the second battery.
  - Subjects were then told about a third option,
  - 16 hr life expectancy and a 6% probability of corrosion
- Under this condition, 60% of people chose the 14 hr/4% battery.

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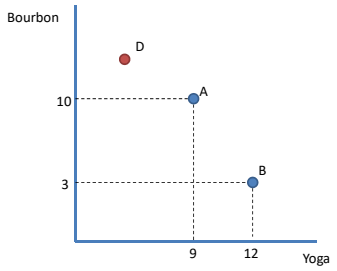
Context Effects



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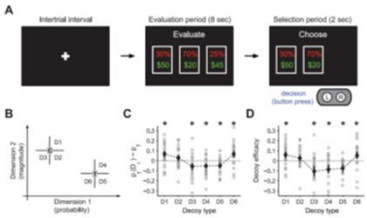
Soltani, De Martino and Camerer [2012]



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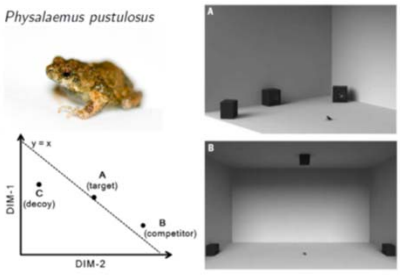
Context Effects



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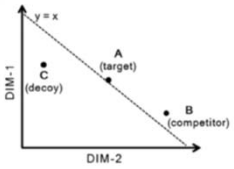
Context Effects



Menu	A	B	C
$\{A, B\}$	.37	.63	–
$\{B, C\}$	–	.69	.31
$\{A, C\}$	.84	–	.16
$\{A, B, C\}$	.55	.28	.17
$\{A, B, \emptyset\}$	.61	.39	–

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