Heuristics & Bias
in
Judgement & Choice

Jessie Le and Shubham Singhal

Key Concepts and Theories

Rational Decision Making

Ideal Rational Decisions   Bounded Rational Decisions

The Two–System View

System 1 - Intuition

System 2 - Reasoning

The Two-System View

- Describe what you see from the picture on the right

The Two-System View

- Complete the phrase "bread and …."

The Two-System View

- Multiplication: 17*24

The Two-System View

System 1

- Fast
- Automatic,
- Effortless
- Associative
- Implicit
- Emotionally charged
- Governed by habit
- Difficult to control or modify.

System 2

- Slow
- Serial
- Effortful
- Easily monitored and deliberately controlled
- Flexible
- Rule governed

Judgements & Choices

- A bat and a ball cost $1.10 in total. The bat costs $1 more than the ball. How much does the ball cost?

Heuristics

Availability

Which category happens more (for the cause of deaths)?

- Strokes or Accidents?
- Accidents or Diabetes?

Heuristics

Affect

- What do you think of tattoos?

Heuristics

Anchoring

- Is the height of the tallest Redwood Tree more or less 1200 feet?
- What is your best guess about the height of the tallest redwood?

Heuristics

Representativeness

- Tom W. is of high intelligence, although lacking in true creativity. He has a need for order and clarity, and for neat and tidy systems in which every detail finds its appropriate place. His writing is rather dull and mechanical, occasionally enlivened by somewhat corny puns and by flashes of imagination of the sci-fi type. He has a strong drive for competence. He seems to have little feel and little sympathy for other people and does not enjoy interacting with others. Self-centered, he nonetheless has a deep moral sense.
- Categories to be judged:
  - The categories were business administration, computer science, engineering, humanities and education, law, library science, medicine, physical and life sciences, and social sciences and social work.

Choices

Expected Utility Theory

Equal Chances to have
1 million or 7 million
Or
Have 4 million

Utility:
1 million - 10
7 million - 84
4 million - 60

Choices

Bernoulli Errors

Current Reference:
Anthony : 1 million
Becky: 4 million

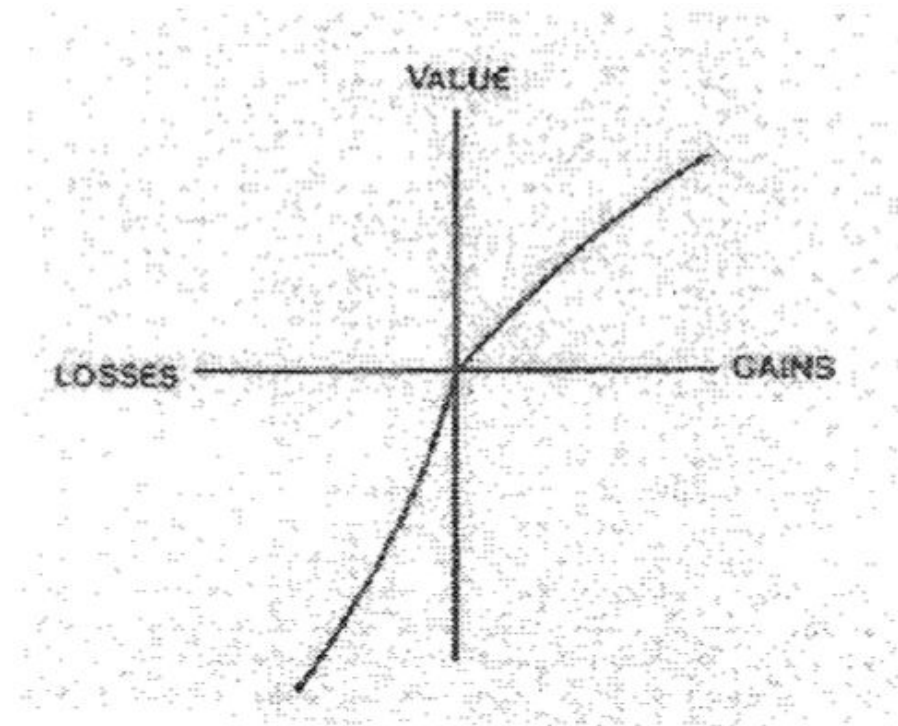Gamble: 1 million or 4 million
Or 2 million for sure

Choices

Prospect theory

- Evaluation w.r.t reference point
- Diminishing returns
- Loss Aversion

Choices

Prospect theory

Choices

Gain | Losses

- Which would you choose?
  - Lose $100 with certainty
- Or
  - 50% chance to win $50
  - 50% chance to lose $200
- Would your choice change if your overall wealth were higher by $100?

Choices

Loss-Averse

50% chance to lose $100 and 50% chance to win $150

Will you choose the gamble?

50% chance to lose $100 and 50% chance to win $1000

Will you choose the gamble?

Choices

Framing effect

- Imagine that the United States is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed.
- Assume that the exact scientific estimates of the consequences of the programs are as follows:
    - If Program A is adopted, 200 people will be saved.
    - If Program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved.
- Which one of the two programs would you favor?

Choices

Framing effect

Which one of the two programs would you favor in both scenarios?

Scenario 1:

If Program A is adopted, 200 people will be saved.

If Program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved.

Scenario 2:

If Program A' is adopted, 400 people will die.

If Program B' is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die.

MISC

- Expert intuition
- Prototype Heuristics
- Efficacy of System2
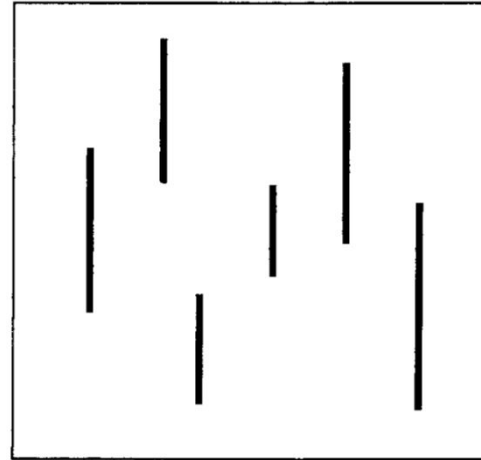
Applications

Applications

Insurance

	Monthly Price	Deductible
Plan A	10	150
Plan B	15	80

Applications

Insurance

	Monthly Price	Deductible	Real Payment
Plan A	10	150	10 * 12 + 150 = 270
Plan B	15	80	15 * 12 + 80 = 260

*we even have to take probability of loss into account. After considering that, best option is to choose with highest deductible

Applications

Tips

Applications

Deep learning application based on the two-system view

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Strengths and Weaknesses

Critiques

- Sound Theory
- Demonstration

- There is none comprehensive list of all the heuristics.
- Hard to correlate various concepts - difficulty in getting the big picture.

Further Discussion

References

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