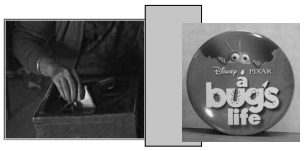
Decision making

- Making decisions
- Optimal decisions
- Violations of rationality

What is a decision

- Person must have a goal
- There must be many ways to satisfy the goal
- There is a set of options
  - Consideration set: Set of options being evaluated
- Options are evaluated in some way
- Eventually one of the options is selected



What is a good decision?

- Economists have worried about good decisions.
- *Rational* decision making
  - What is the optimal choice?
  - Decisions should be consistent
- Law of contradiction
  - Reasoning processes that use the same information should reach the same conclusions
    - Those that do not are irrational
- Example: Transitivity
  - If you prefer A to B, and B to C…
  - Then you should prefer A to C.

A brief foray into economics

- Much research in the 1970s and 1980s was devoted to comparing human performance to the expectations of economic models
- Economic models of choice
  - Expected value theory
  - Expected utility theory
- Expected value theory
  - People calculate the potential value of each option
  - Pick the option with the highest expected value

Raffle with 10% chance to win $5.00

EV = .10 * $5.00 = $0.50

Expected value (cont.)

- Simple example

Which gamble would you rather play?

A: 20% chance of winning $5.00
B: 30% chance of winning $4.50

EV(A) = .20 * $5.00 = $1.00
EV(B) = .30 * $4.50 = $1.35

Expected value suggests you should choose B

- This seems reasonable

Problem with expected value

- Not every dollar has the same subjective value
  - Graduate student: $100 would allow student to eat better food or to buy new clothes
  - Lawyer: $100 would not need to be spent on necessities
- Example: Lotteries
  - People often play the lottery
  - Pay $1.00 for a 1/52,000,000 chance to win $10,000,000
    - Expected value of this gamble is less than $1.00

Expected utility

- What can an option be used for?
  - That is the expected utility of an option
- Consider the lottery
  - The expected utility of $1.00 may be low
    - There is not much you can do with $1.00
  - The expected utility of the prize may be high

•You could do a lot with that kind of money
•The low probability of winning does not completely outweigh the high utility of the prize
•There is also the pleasure in dreaming about winning

Formal setup for EU model

- The Expected Utility model:

$$EU = \Sigma (weight_i * utility_i)$$

- Expected Utility is a rational model
  - Obeys the law of contradiction
- All choices are transitive
  - Everything is evaluated relative to a global scale.

Problems with Expected Utility

- The Allais Paradox

A:	A 100% chance to win $1,000
B:	An 89% chance to win $1,000 A 10% chance to win $5,000 A 1% chance to win $0

C:	An 11% chance to win $1,000 An 89% chance to win $0
D:	A 10% chance to win $5,000 A 90% chance to win $0

The first second set of options is derived from the first by removing an 89% chance to win $1,000.

Certainty Bias

- The Allais paradox is an example of a certainty bias
- People often prefer the certain $1,000
- Also true in non-monetary situations

Imagine that the US 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 program are as follows:

Program A: 200 people will be saved.

People tend to pick Program A

Program B: A 1/3 chance 600 people will be saved, and a 2/3 chance that no people will be saved.

Gains and losses

- The previous example suggests people are *risk averse* for gains
  - They do not want to risk losing a possible gain.
  - What happens for losses?

Imagine that the US 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 program are as follows:

Program A: 400 people will die

People tend to pick Program B

Program B: A 1/3 chance no people will die, and a 2/3 chance that 600 people will die.

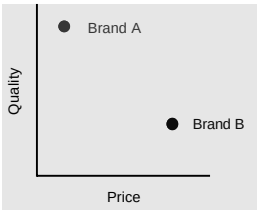
People are *risk seeking* for losses

Framing effects

- Kahneman and Tversky
- People treat gains and losses differently
  - Losses loom larger than gains
    - The same situation feels worse when framed in terms of losses than when framed in terms of gains.
  - May not be true in all cultures
- Practical application
  - When making a decision, try to frame the options both in terms of losses and gains.
  - See whether your opinions about the options changes

Context effects

- Expected utility predicts that each option is evaluated individually.
  - Adding more members to the consideration set should not influence people's preferences.
- The attraction effect

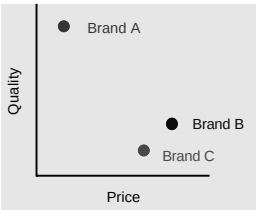


Imagine you are initially indifferent between Brand A and Brand B

(You like them equally well)

What happens if a new brand is added?

The Attraction Effect



Brand C is asymmetrically dominated.

- It has a higher price and lower quality than B
- It has a lower price and lower quality than A

The number of people who choose B increases.

Somehow, C attracts choices to B

Was the introduction of "New Coke" in the 1980s a case of a real-life attraction effect?

Preference Reversals

- Different measures of preference may sometimes lead to different outcomes.

A:	11/12 chance to win 12 chips 1/12 chance to lose 24 chips
B:	2/12 chance to win 79 chips 10/12 chance to lose 5 chips

- Slovic & Lichtenstein
- Some people asked to choose a bet
  - Tended to choose A
- Some people asked how much they would pay
  - Gave a higher price for B

Preference reversals

- Very robust effect
  - Slovic and Lichtenstein did their study on the floor of a casino
- There seems to be a *compatibility effect*
  - Giving a price increases the weight given to the money prize
  - Making a choice increases the weight given to probability.

Summary

- Economic theory affects psychological research
  - Expected Value and Expected Utility
    - These are "rational" models
  - Studies have tested rationality of decision making
    - In many cases, people do not appear to obey economic models
- So far, we have just discussed some violations of economic models
  - Next class, we will look at what people are doing.