

Thought and Reasoning

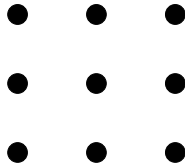


1. Mental sets and insight
2. Common reasoning errors
3. How do we make decisions?
4. Emotion affects reasoning

Today's Music Selections:

Mental Set

1. Draw 9 dot pattern
2. Without lifting your pen off of the page and without retracing any line, draw 4 straight lines that connect all 9 dots



Representativeness Heuristic

Linda is 31 years old, single, outspoken and very bright. As a student, she was deeply concerned with issues of social justice, and also participated in anti-nuclear demonstrations.

Using a scale from 0 (definitely not) to 100 (definitely true), what is the probability that Linda is...

- (1) a bank teller?
- (2) a manager at a grocery store?
- (3) a feminist and a bank teller?

Representativeness Heuristic

Likelihood of Membership =
(Shared Features) X (Category Size)

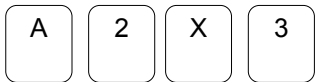
Availability Bias

Are there more 4-letter English
words with R in the 3rd or 1st place?

-- R _ R _ _ _

Confirmation Bias

*Verify Rule: If there is a vowel on one side, there is an
even number on the other side.*



Each card has a letter on one side and a digit on the
other. Which cards do you need to turn over to verify if
the rule is true?


Expected Utility Theory

$$EU(A) = [p(A) \cdot v(A)] + [p(\bar{A}) \cdot v(\bar{A})]$$

The expected "utility" of an outcome is:
 The **likelihood** and **value** of the outcome
 plus
 The **likelihood** and **value** of its alternatives

Expected Utility Theory

$$EU(A) = [p(A) \cdot v(A)] + [p(\bar{A}) \cdot v(\bar{A})]$$



If it comes up heads I'll give you \$10. If not, you give me \$3. Should you take the bet?

$$EU = [p(\text{Head}) \cdot v(\text{Head})] + [p(\text{Not Head}) \cdot v(\text{Not Head})]$$

$$EU = [.5 \cdot (\$10)] + [.5 \cdot (-\$3)]$$

$$EU = \$5.00 - \$1.50 = \$3.50$$

Expected Utility (EU) explains human decision-making as

Gains and Losses
 How much is it worth?
Incomplete

Relativism

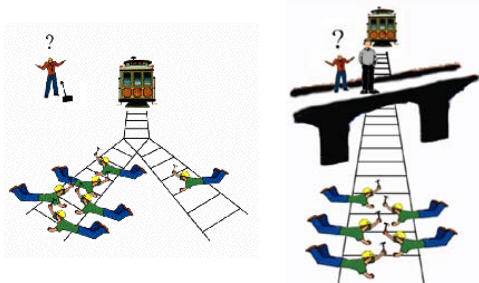
How much is it worth *given where I am right now?*

Relativism

How much is it worth given where I am right now?

1. Presentism: Immediate over long-term rewards
2. Intertemporal intransitivity: Subjective value depends on *when* (time)
3. Sunk costs: Prior decisions influence present decisions
4. Increasing values have decreasing impact
5. Loss Aversion: Losses hurt more than gains feel good
6. Numbers of options change expectations

The Trolley Problem



Summary

Mental sets can stifle problem solving

Heuristics (short-cuts) usually work well, but can sometimes lead us awry

Decisions do not always conform to the logical expectations of Expected Utility Theory

Relativism plays an important role in decision making

Emotion and reason are intertwined
