Decision making

• Making a choice of some kind
  – Happens all the time, at many levels
• Mental processes that influence our choices:
  – Heuristics (rules of thumb)
    • Often lead to good choices efficiently, but can also fail
  – Biases
  – Emotion
  – Reasoning about probabilities

Anchoring and adjustment

• Is the Mississippi longer or shorter than 500 miles?
  • How long is it? _____ miles

• Is the Mississippi longer or shorter than 3000 miles?
  • How long is it? _____ miles

Availability heuristic

• Which causes more deaths per year in the US:
  – Homicide or suicide?
  – Accidents (all unintentional injuries) or heart disease?
• US deaths per 100,000 in 2015:
  – Homicide = 5.7, suicide = 13.3
  – Accidents = 43.2, heart disease = 168.5

Anchoring and adjustment

• Anchor:
  – A number in the scenario
• Adjustment:
  – A change to the anchor in what seems like the correct direction
    • Requires some sense of the correct direction

Availability heuristic

• Estimating frequency based on how easy it is to think of examples or scenarios
  – How “available” they are in memory
  – Memory represents frequency of encountering a stimulus, so this makes some sense
Representativeness heuristic

- Kathy is outspoken and very bright, and is deeply concerned with issues of discrimination and social justice
- Which is more likely to be true?
  - (a) Kathy is a lawyer
  - (b) Kathy is a public-interest lawyer

Loss aversion bias

- Materials: School mug, list of dollar amounts
  - Dollar amounts ranged from $0 to $9.25
- Two conditions (between subjects):
  - Choosers: Shown the mug, then asked, for each dollar amount, to choose the mug or the cash
  - Sellers: Given the mug, then asked, for each dollar amount, whether they’d sell it for that amount
- Median mug values:
  - Choosers = $3.12, Sellers = $7.12

Confirmation bias

- Giving excess weight to evidence that is consistent with your beliefs
- And insufficient weight to evidence that’s inconsistent

Emotion

- Patient Elliot had an operation
  - Lesioned his ventromedial prefrontal cortex
  - VPFC takes input from amygdala

Two CT scans

- Normal brain
- Terri Schiavo’s brain (liquefied)
Afterwards

- IQ, language, and other cognitive functions tested normal
- In interviews, Elliot was thoughtful, cooperative, and attentive
- But also unusually calm
  - E.g., watching films of atrocities: “I know this is horrible – I just don’t feel the horror.”

Afterwards

- And, he lost his job, his wife, and his money
  - Spent forever deciding what to wear
  - At work, couldn’t prioritize
  - Lost his money to a con artist
- Had lost the ability to make good choices
  - Suggesting that emotion plays a positive role
    - That we often go with “gut feelings”
    - Still lots of unanswered questions about this

Reasoning about probability

- Suppose someone tests positive for marijuana use
  - What’s the probability he or she actually uses marijuana?
- Depends on several factors
  - The hit rate of the test
    - Suppose this is 99%
  - The false alarm rate of the test
    - Suppose this is 5%
  - The base rate of marijuana use in the population
    - The estimated proportion of users
      - Suppose this is 7%

Reasoning about probability

- If 100 people take the test, how many will test positive?
  - The 7 who use marijuana (hits)
  - Plus 5 who don’t (false alarms)
- If someone tests positive, what’s the probability he or she actually uses marijuana?
  - 7 out of 12, or 58%