Reasoning and emotion

Reasoning

- Drawing conclusions from premises
  - If the premises are true, what logically follows?
  - If the logical prediction turns out to be false, then the premise(s) are false
    - A way to check our beliefs (premises)
- People don’t follow logical rules that well
  - So what guides their decisions?

The four-card task
(aka Wason selection task; Wason, 1962)

- Premise: If the card has a vowel on one side, then it has an even number on the other side
- What cards would you turn over to test if this premise is true?
  - A and 6 are the most common choices
  - A and 7 are the logically correct choices

- Premise: If one side vowel, other side even
- If you turn over A and other side is...
  - ... even, this is consistent with the premise
  - ... odd, this is inconsistent with the premise
    - Means the premise is false (logically)
- Either way, learn something

- Premise: If one side vowel, other side even
- If you turn over 6 and other side is...
  - ... a vowel, this is consistent with the premise
  - ... a consonant, this is also consistent
    - The “if” part means the premise doesn’t apply to cards with a consonant on the letter side
- Less to learn:
  - Can’t learn whether whether the premise is false

- Premise: If one side vowel, other side even
- If you turn over 7 and other side is...
  - ... a vowel, this is inconsistent with the premise
  - ... a consonant, this is consistent with the premise
- Either way, learn something
Concrete content helps

Premise: If you are legally drinking beer, then you are 21 or over
• Alice lands in Oz, and wants to see whether this is the law. What “checks” should she perform?
  – If a person is drinking beer, card them (A)
  – If a person looks young, sniff their glass (7)

Ambiguity hurts

• Linguistically, if is ambiguous
• If you are legally drinking, you are 21
  – If identifies a sufficient condition
• If you are 21, you can legally drink
  – If identifies a necessary condition
• If the card has a vowel on one side, then it has an even number on the other side
  – Not clear what if identifies

A book about Elliot, a patient
• Had an operation to resect a tumor
• Lesioned his orbitofrontal cortex
• Afterwards, tested normal on IQ, language, and other tests in a standard cognitive battery
  – But couldn’t feel emotion
  – “I know this is horrible – I just don’t feel the horror”

Emotion

• After the operation, Elliott lost his job, his family, and all his money
• Could no longer make good decisions
  – Spent forever deciding what to wear
  – At work, couldn’t prioritize
  – Lost his money to a con artist

Affected region

Orbitofrontal cortex

Amygdala

Hippocampus
Emotion

• Damasio's *somatic marker* hypothesis:
  – “Felt emotion” plays a large role in judgment and decision making

• Hypothetical mechanism:
  – Perceive or imagine scenario
  – Amygdala evaluates the representation
  – Body responds with a physiological changes
  – Orbitofrontal cortex reads the changes