P11B: Part 2

Thinking and Language

Test 1

- 70 questions, highest = 59, lowest = 21
  1. Mean = 45
  2. Standard Deviation = 8 (68% of class fell ±8 of mean)
  3. So, what’s my grade?
     Calculated at end of quarter:
     15% As, 25% Bs, 45% Cs, 10% Ds, 5% F

Test 1

- Where you did well
  - The “reader” questions (only 4 though).
    Very nice. Average was about 83%
  - Lectures—moderately well. Average was about 74%
- Where you had trouble
  - The textbook (these were hard questions).
    Average was around 64%
Lecture Outline

Part 1: Types of Thinking
- Judgment
- Decision-Making
- Reasoning
- Problem Solving

Part 2: Thinking and Emotion

Cognitive Economizing
- Organizing knowledge in a logical manner
  - Nodes = individual pieces of information, connected to one another
  - When one node activated, similar ones also activated

Four (related) types of thinking
- Judgment
- Decision-making
- Reasoning
- Problem Solving
Differ in terms of “goals”—what outcome being sought—although also overlap

1. Judgment

- Drawing conclusions from evidence we’ve collected (our experiences)
- Goal: extrapolate from evidence to reach a new conclusion

1. Judgments

- Theoretically, should evaluate ALL pieces of evidence to come up with judgment
- That takes a long time and a lot of effort
1. Judgments

- Heuristics:
  - shortcuts to judgment
  - Rules of thumb
  - Cues

Heuristics and Decision-Making

Daniel Kahneman
Amos Tversky

Two judgment heuristics

- Availability
- Representativeness
Availability

- Use “frequency estimate” to generate conclusion
  - In theory, summarize all experiences and use these to form conclusion
  - In reality, we can't remember all experiences, so how easily things come to mind is a proxy

Availability

- Ease of coming to mind works pretty well
- Errors can occur
  - Examples:
    - Doctors order more abdomen ultrasounds for stomach aches after they diagnose someone with stomach cancer
    - We believe people more likely to be murdered than die of stomach cancer

Krueger et al. (2006)

- 1561 intro psych students
  - Took midterm
  - Afterward
    - Independent judges coded number of answers changed and direction
    - Students rated whether it is better to stick with first instinct or change answer
Representativeness heuristic

- Using categorization to generate conclusion
  - Each member of a category is representative of category
  - If know category, know person
  - We classify people/objects according to how typical they are of category

Representativeness

- Categorization tendencies can lead to errors
You are in a hotel lobby filled with 100 people, all of whom are engineers or lawyers. You select a person at random.

What is the likelihood that he is an engineer?

- **Condition I:** 70 engineers 30 lawyers
  
  A. 70%
  
  B. 30%
  
  C. 100%

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You are in a hotel lobby filled with 100 people, all of whom are engineers or lawyers

- **Condition I:** 70 engineers 30 lawyers
  
  - **Condition II:** 30 engineers 70 lawyers
  
  You select a person, George, at random. George is good at math, attentive to detail, not very people-oriented

  What is the likelihood that George is an engineer?
You are in a hotel lobby filled with 100 people, all of whom are engineers or lawyers.

- **Condition I:** 70 engineers 30 lawyers
- **Condition II:** 30 engineers 70 lawyers

You select a person, George, at random. George is good at math, attentive to detail, not very people-oriented.

What is the likelihood that George is an engineer?

Participants give same mean percentage irrespective of experimental condition: about 90%!!!

George is a 30 year old man. He is married with no children. A man of high ability and high motivation, he promises to be quite successful in his field. He is well-liked by his colleagues.

- **Condition I:** 70 engineers 30 lawyers
- **Condition II:** 30 engineers 70 lawyers

What is the likelihood that George is an engineer?

Irrespective of condition: about 50%!!!

1. Judgment Summary

- Use evidence/experience to generate a conclusion
  - because going beyond what’s known, risk for error is present
- We don’t have time/energy to evaluate all prior experience, so we rely on heuristics
  - Availability
  - Representativeness
2. Decision-making

- How we use knowledge/evidence to make decisions about actions
- Ideally
  - Weigh all potential outcomes
  - Assess likelihood of different outcomes
  - Assess risks of outcomes

2. Decision making

- Key influences
  - Framing
  - Number of options

Which is heavier? A pound of gold or a pound of feathers?
A. Gold
B. Feathers
Framing

- How outcome is framed affects what decisions we make
  - Airport security:
    - Would you like to undergo an agent-conducted personal exam or machine-conducted body scan?
    - Would you like to undergo a full-body pat-down by an agent or a quick and easy body scan in our machine?

Framing

- Loss aversion
  - When outcomes framed as potential losses, we’re more likely to take risks
  - When outcomes framed as potential gains, we’re less likely to take risks

Outcomes are the Same

A. A plan with no lifetime limit on benefits (80%)

B. A plan that limits total benefits in your lifetime to $1 million, but saves you $1000 per year (54%)

A. A plan that limits the total amount of benefits in your lifetime to $1 million.
Is having lots of options a good thing?

- We like options
- But...
  - More options = more comparisons
  - People sensitive to disadvantages
  - More comparisons = more “notices” of disadvantages, so less satisfaction

Quiz: What should Emma ask her daughter in the morning?

a. Would you like to wear the green shirt or yellow shirt with the red pants?
b. What do you want to wear with the red pants?
2. Decision-Making Summary

- Using existing knowledge to decide how to act
  - Affected by how decisions framed, our evaluation of risk/potential gains, and how many options available

3. Reasoning

- Determining what implications follow from a set of beliefs
- Resembles Aristotle’s syllogistic reasoning
  - Begin with theory, determine what should logically follow if that theory is true (Deductive reasoning)

10 questions for Nobel Laureate Daniel Kahneman

http://www.youtube.com/watch?v=I4zSc21Yl60
Deductive Reasoning

General beliefs → Specific conclusions

• Identify conclusions that necessarily follow our beliefs
• Hypothesis testing
• Based in logic (though not error proof)
• Studied via conditional reasoning tasks

Conditioned Reasoning Tasks

- If….Then….

Wason's (1972) Four Card Task

If a card has a vowel on one side, then it has an even number on the other side

A. A only  
B. A & 6  
C. A & 7  
D. all cards
**Answer: A & 7**

- The only way to falsify an "if X, then Y" statement ("if vowel, then even number") is by finding an instance of "X and not Y" ("vowel and odd number").
- 6 and J are irrelevant, because these cards cannot combine a vowel and odd number.

If a card has a vowel on one side, then it has an even number on the other side.

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**Card Task Made Concrete**

If patrons have a beer, then they have a stamp on their hand.

A. Has beer
B. Has beer, has stamp
C. Has beer, no stamp
D. All cards

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**Deductive Reasoning**

- We reason better on every day, familiar "schemas" than abstract ones
  - If I study hard, then I will get a good grade
Common Errors

- Confirmation bias: weigh evidence in favor of our views more strongly than evidence contrary to our views

Confirmation Bias?


3. Reasoning Summary

- Drawing implications from our beliefs
  – Useful—we use our general beliefs as a guide for how to interpret and respond to information
  – Faulty logic, incorrect inferences, biases can lead to poor reasoning
4. Problem solving

- We know the “outcome” we want, decisions involve how best to get there
  - What sequence should we use
- Important influences: type of problem, breadth, definition, complexity, expertise

Thinking: How we go about solving problems?

- Algorithms
- Insights
- Heuristics

algorithms

- step-by-step procedure; guarantees a solution; follows highly structured formula
  - Subroutines
- Highly accurate
Cup A is bigger than Cup C
Cup D is bigger than Cup C
Cup B is bigger than Cup A
What cup is smallest?
Algorithm: Do all comparisons.

A-B  B-C
A-C  B-D
A-D  C-D

**But, do you have to do all?**

Algorithms

– step-by-step procedure; guarantees a solution; follows highly structured formula
  • Subroutines
  – Highly accurate
– Not often used
  • too time and labor intensive
  • Not always necessary

Insights

– Sudden flashes of inspiration
– After period of seeming ignoring problem, come up with solution
– Suggests thought and planning going on outside of conscious awareness
Kohler (1965)  
*The Mentality of Apes*

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Heuristics

- Back to these common strategies
  - Short-cuts, Rules of thumb
  - e.g., Using past behavior, evidence, knowledge, as a guide
- Automaticity
  - Reliance on well-rehearsed/known subroutines

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4. Problem Solving Summary

- How we go about achieving a particular outcome
- Specific goal we have influences strategies we use to get there
  - Some strategies complex, time consuming; others simple, heuristics or automatic
Part 2: Thinking and Emotion

- Does emotion impede (or help) thinking?
  - When evaluating emotionally charged information, are our decisions better or worse?
  - Can we reason better in emotional situations than in neutral situations?
  - Are our judgments clouded by experiencing emotion?

Evaluating emotionally charged information

- Many decisions require prediction about “future states”
- Ideal, we know ourselves well, so we are good at predicting how we will feel in response to an upcoming event
- **Affective Forecasting**: Predictions about future emotion

Affective Forecasting

- We are actually really poor at this.
Affective Forecasting: Negative Events

- Do we overestimate or underestimate how bad we will feel about future negative events?
  a. Underestimate
  b. Overestimate


- Followed 69 students 9 months.
- All in relationship at start (26 broke up)
  - Completed weekly questions
    - “In general, I am pretty happy these days.”
    - “I would be extremely upset if my relationship with XX ended”
    - “I am extremely upset that my relationship with XX ended”

[Graph showing decrease in distress over weeks since breakup]
Affective Forecasting: Positive Events

- We also overestimate how good we will feel about future positive events, like getting a dog and finishing school.
  - We are happy when those things happen, but not as happy as we predict we will be.