

Decision Making in Groups & Organizations

Executive Education Course – Day 2
November 23-24, 2014

Carnegie Mellon University Qatar

Agenda

- Systems of thinking during decision making
- Psychological evidence on heuristics and biases we all succumb to at some point
 - More than we probably have time for – we'll see how it goes.
- De-biasing strategies.

About me

John Gasper, PhD

- Time at CMU-Pittsburgh:
 - B.S. – Logic and Computation
 - M.S. – Decision Science
 - Ph.D. – Political Economy
- Visiting Fellow, Harvard University's Institute for Quantitative Social Science 2006-2008
- Visiting Fellow, Oxford University's Center for Experimental Social Science 2014

About me

John Gasper, PhD

- Time at CMU-Qatar: Aug-2010 – present.
- Courses:
 - Regression and Forecasting
 - Policy Analysis
 - Decision Analysis
 - Game Theory for Business
 - Behavioral Decision Making
 - ...and many more.

Decision Evaluation

- Suppose I bought a lottery ticket and won \$10,000
 - Was buying the ticket a good decision? Why or Why Not?
- How do you measure the quality of a decision?
 - Outcome Quality vs Decision Process Quality.
 - Soundness of the decision-making process determines the quality of the decision, not the attractiveness of the outcome.

Evaluating the Process

- Making the optimal decision is tough.
 - **Optimal Decision Analysis:** more on this later, but not always feasible or applicable.
 - **Satisficing:** making a choice that is “good enough” rather than optimizing to find the ideal choice (Herb Simon 1956).
 - **Heuristics:** Decision aids or “shortcuts” that we rely on to make complex decisions manageable.

- What might affect our decision-making processes
 - System 1 vs System 2 thinking
 - System 1: fast / frequent / immediate information processing
 - System 2: slow / calculating / effortful.

Recap – Racing exercise

- What were some common behaviors / tendencies we saw in yesterday's exercise?

Overconfidence

- One of the most pervasive and robust biases
- Forecasting is crucial to business.
 - Sales, number of people to hire, time to project completion, etc
- Overconfidence associated with many things:
 - Excessive trading (Odean 1998)
 - Excessive entrepreneurial entry (Camerer & Lovallo 1999)
 - Excessive M&A activity (Malmendier & Tate 2005)
 - To many non-business activities like wars and political failures

Three broad types

1. Overprecision

- Tendency to be too sure judgments and estimates are accurate.
- Overly narrow confidence intervals.
- Too certain that we know the truth

2. Overestimation

- Tendency to think we're better than we really are (smarter, more attractive, etc.)
- Leads to underestimates of time required for projects, and that we have more control than we do

3. Overplacement

- Tendency to think we rank higher than others
- Can lead to too much competition in negotiations, lawsuits, markets, etc.

Overprecision

- We didn't do so well on the questions.
 - But no general relationship between overconfidence and intelligence.
- Do experts do better?
 - Yes and no. Yes, their estimates are usually closer. But they often give narrower confidence intervals. So can have a similar "hit rate." (McKenzie, Liersch, & Yaniv 2008)
 - Professional forecasts by financial officers: Returns fell inside the 80% confidence interval about 33% of the time (10K forecasts).
 - People who are the most accurate are ones who get **regular feedback**: pro odds makers, weather forecasters

Overestimation

Thinking we're better than we really are (don't worry we all do it)

- Leads to several common biases:
 - Planning Fallacy: Why are so many things late and over budget?
 - Overestimate the speed at which projects will be completed.
 - Underestimate the costs and risks involved
 - Most common on larger complex projects

Benefits of Overconfidence

While overconfidence can lead to massive problems, there are also documented benefits:

1. People see more confident leaders as more competent. (Radzevick & Moore, 2011).
 - This is probably true in both politics and in business – easy to find examples: political leaders & decisive CEOs
2. Some psychologists have argued that optimism enhances resilience and well-being (Taylor and Brown, 1988).

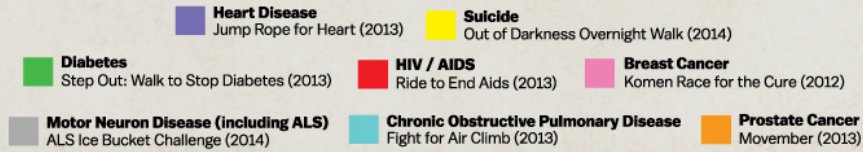
My stance: both (1) and (2) are probably true but come at a major MAJOR cost or risk.

- Is good to be a confident (and hence perceived competent/good) leader who bankrupts the company?

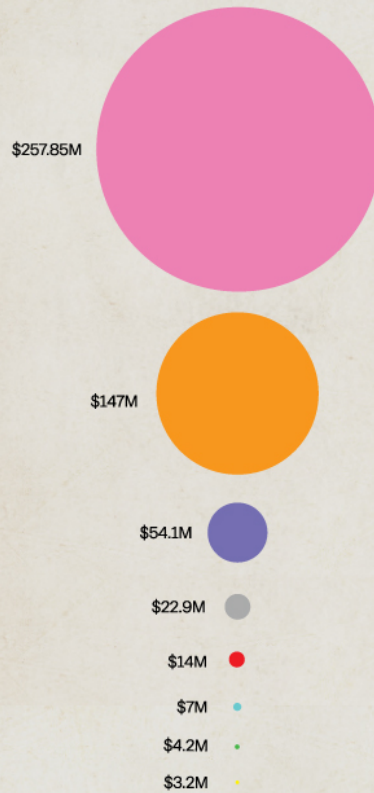
Estimating risks?

- Most decisions we make every day involve risk (to some degree – some more than others)
- For a good decision analysis, we need to know the risks. How do we estimate them?

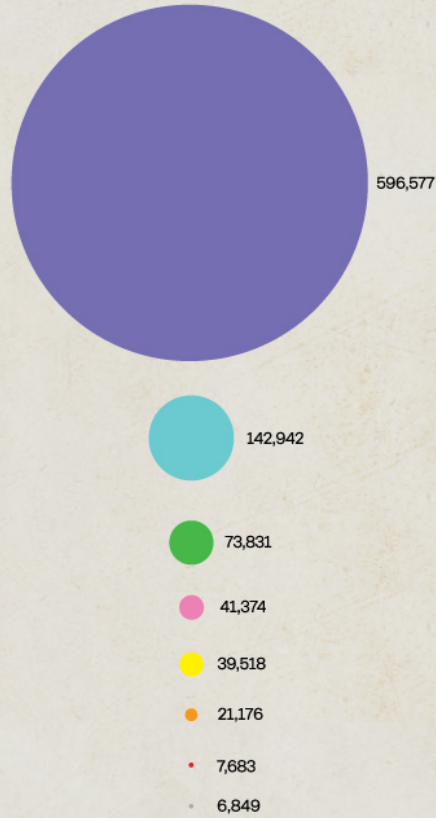
WHERE WE DONATE VS. DISEASES THAT KILL US



MONEY RAISED



DEATHS (US)



Source: CDC (2011)



Availability Heuristic: Ease of Recall

- We judge events that are more easily recalled to be more numerous or common.
- Many times the Availability heuristic works well
 - Easy things to remember are often important; quickly recalling them for inference is a good thing
 - Can lead to systematic bias:
 - Estimating death rates / risks that we face
 - Airline security decisions
 - Performance evaluations

Availability Heuristic: Retrievability

Which is more common (a) or (b):

(a)

(b)

_____ n _ _____ i n g

- Only 17 (21%) of you said (b) is less likely than (a)
- Things that are easier to retrieve from memory are judged more common

How we remember matters

- How easily we remember events influences our judgments.
- Recency can effect the Availability Heuristic
 - More recent events are seen as more likely
- Lots of interesting research on how people remember (e.g., vacations, customer experiences)
 - Yes, first impressions matter but probably less than you think.
 - Peak – End rule: a combination of peak experience and ending experience.

Representativeness Heuristic:

Lisa is 33 and is pregnant for the first time. She is worried about birth defects such as Down syndrome. Her doctor tells her that she need not worry too much because there is only a 1 in 1,000 chance that a woman of her age will have a baby with Down syndrome. Nevertheless, Lisa remains anxious about this possibility and decides to obtain a test, known as the Triple Screen, which can detect Down syndrome. The test is moderately accurate: **When a baby has Down syndrome, the test delivers a positive result 86% of the time.** There is, however, a small “**false positive**” rate: **5%** of babies produce a positive result despite not having Down syndrome. Lisa **takes the Triple Screen and obtains a positive result** for Down syndrome.

Given this test result, what are the chances that her baby has Down syndrome?

Representativeness Heuristic: Base Rates

Given this test result, what are the chances that her baby has Down syndrome?

	Your Answers
0-20%	31.58%
20-40%	9.21%
40-60%	9.21%
60-80%	26.32%
80-100%	23.68%

- Actual probability? 1.69%

Representativeness Heuristic: Base Rates

What went wrong?

- Most people would say that it's very likely that the baby has Down syndrome – **they focus on the test and neglect the prior, or base rate, information: Down syndrome is rare.**
- Background vs Foreground information
 - The base rate of Down syndrome was in the background, neglected
 - The results of the test were in the foreground, more readily accessible

Representativeness

Results of a recent survey of 74 Fortune 500 CEOs indicate that there may be a link between childhood pet ownership and future career success. Fully 94% of them had possessed a dog, or cat, or both as youngsters

The respondents asserted that pet ownership had helped them develop positive character traits that make them good managers today: responsibility, empathy, generosity, and good communication skills.”

-Management Focus, November 1984

- What's wrong?
- How about this: “Fully 100% of the CEOs brushed their teeth as children...”
 - Why not make that assertion?

Linda... the feminist.

Linda is 31 years old, single, outspoken, and very smart. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and she participated in antinuclear demonstrations.

- Rank the following
 - ___a. Linda is a bank teller.
 - ___b. Linda works in a bookstore and takes yoga classes.
 - ___c. Linda is active in the feminist movement.
 - ___d. Linda is a psychiatric social worker.
 - ___e. Linda is a bank teller who is active in the feminist movement.

Conjunction Fallacy

Linda is 31 years old, single, outspoken, and very smart. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and she participated in antinuclear demonstrations.

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Conjunction Fallacy

1. Linda is active in the feminist movement.
2. Linda is a bank teller.
3. Linda is a bank teller who is active in the feminist movement.

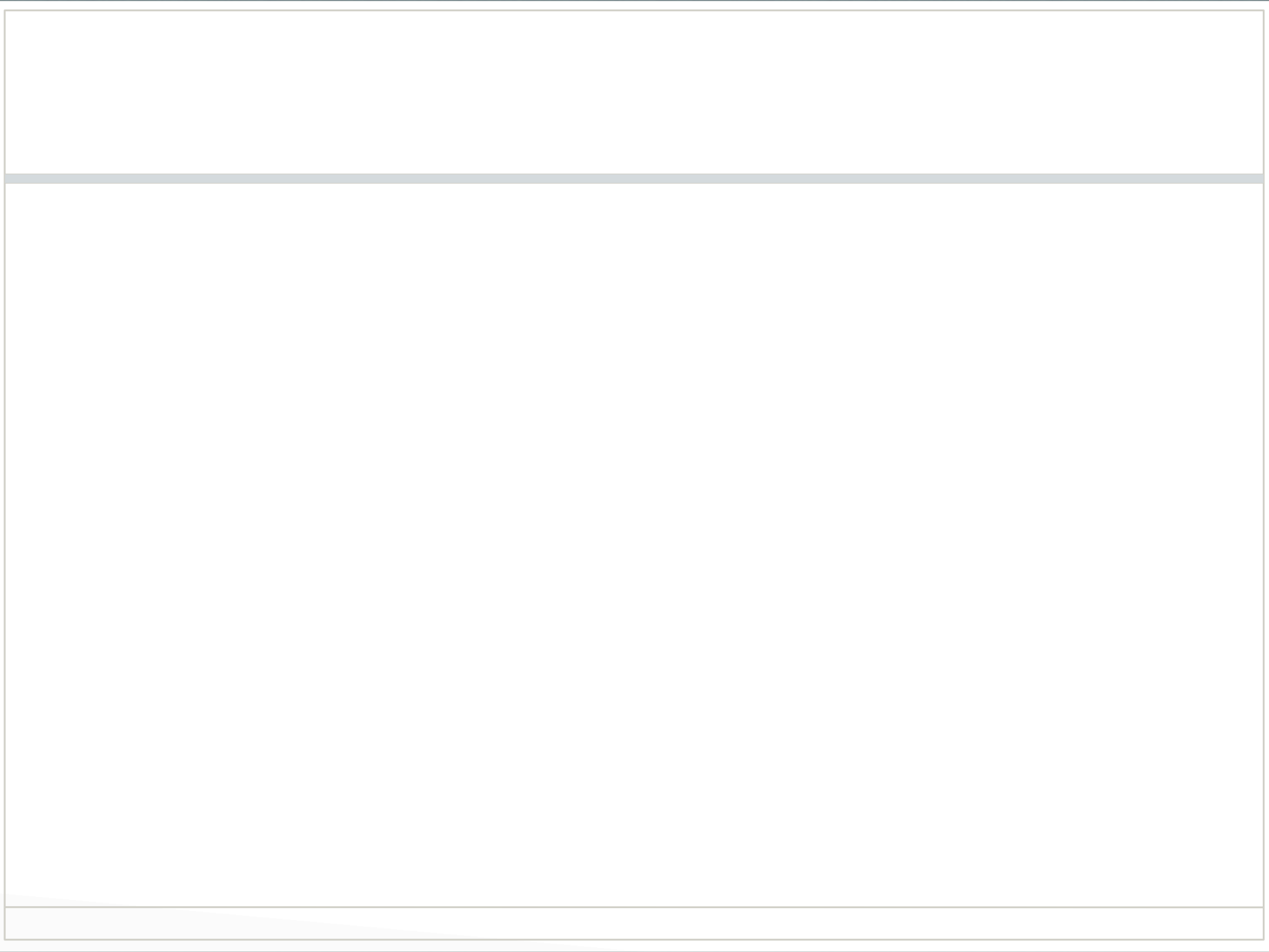
Most people rank 3 more likely than 2 or 1. Actually, 56% of you

Can't be. Why?

- The conjunction of two events is always equal or less probable than the individual events: $P(A \& B) \leq P(A)$ and $P(A \& B) \leq P(B)$
- But...conjunction often provides or completes the "story"

Implications:

- People find it very difficult to reason about isolated events
- People in business often reason by anecdote (*e.g.*, case studies, "war stories"), but such reasoning is often grossly biased when it comes to communicating probabilistic information



Anchoring & Adjustment

- ▶ Confirmation bias is one form of biased information search, but there are others

Anchoring and Adjustment:

- ▶ Estimate $8 * 7 * 6 * 5 * 4 * 3 * 2 * 1$?
 - ▶ Median estimate of 2250 (KT 1974)
- ▶ What is $1 * 2 * 3 * 4 * 5 * 6 * 7 * 8$?
 - ▶ Median estimate of 512 (KT 1974)

Anchoring and Adjustment

The Effects of Anchoring on Real Estate Prices

Northcraft and Neale (1987)

Apparent Listing Price (\$)	Mean Estimates (\$) Given by Real Estate Agents			
	Appraised Value	Recommended Selling Price	Reasonable Purchase Price	Lowest Offer
\$ 119,900	\$ 114,204	\$ 117,745	\$ 111,454	\$ 111,136
\$ 129,900	\$ 126,772	\$ 127,836	\$ 123,209	\$ 122,254
\$ 139,900	\$ 125,041	\$ 128,530	\$ 124,653	\$ 121,884
\$ 149,900	\$ 128,754	\$ 130,981	\$ 127,318	\$ 123,818

Actual real estate agents were shown a house and given a 10-page packet of information in which only one number was varied for the experiment: the listing price. Although all the agents found the listing price to be too high, they anchored on this (arbitrary) value. The arbitrary listing price shifted their appraisals by more than \$10,000!

Additionally, only 1 in 10 agents mentioned the listing price as a factor in their judgment

Anchoring & Adjustment

- When was the Taj Mahal completed?
 - I didn't expect anyone to know! (1653)
 - Even random numbers can anchor people – i.e., your telephone number!
 - ✓ 1+ your telephone number is a (weak but significant) predictor of your guess about the completion date!
- 1. People use an anchor (sometimes set arbitrarily) as a starting point
- 2. They adjust in what they believe to be the correct direction. They just don't move enough.

Anchoring: little things matter..

V1: John is envious, stubborn, critical, impulsive, industrious, and intelligent. In general, how emotional do you think John is? (*circle one number*)

Not Emotional at all

1 2 3 4 5 6 7 8 9

Extremely emotional

V2: John is intelligent, industrious, critical, impulsive, stubborn, and envious. In general, how emotional do you think John is? (*circle one number*)

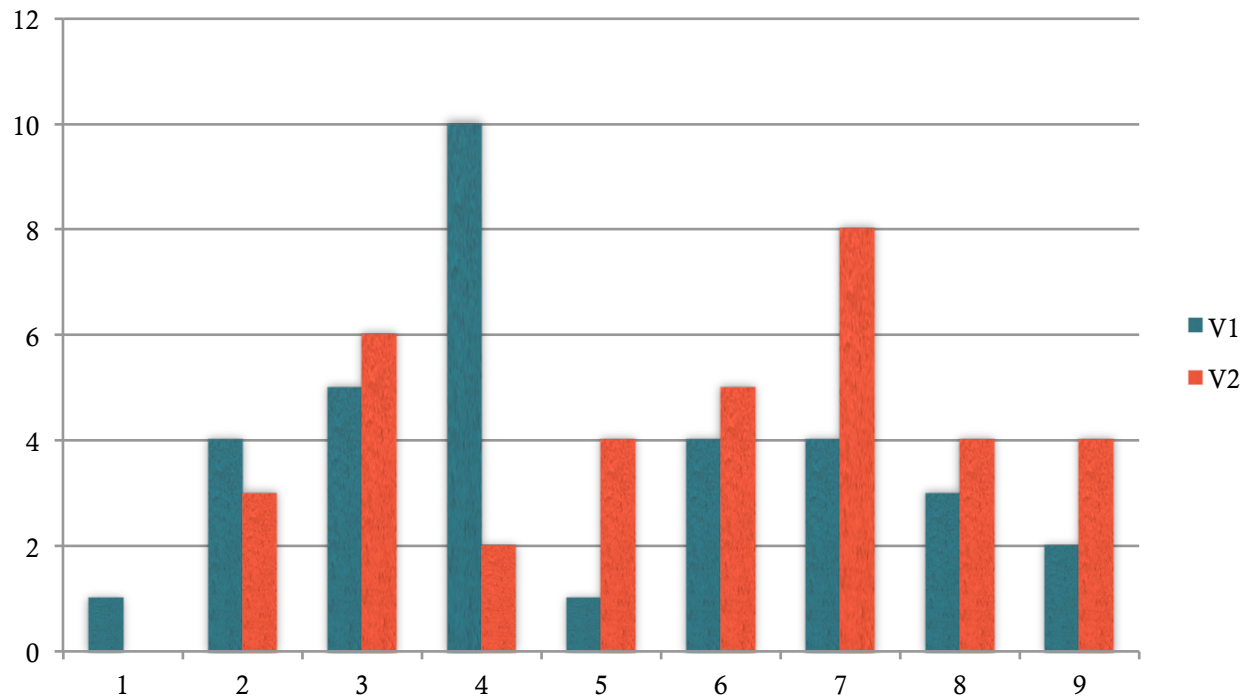
Not Emotional at all

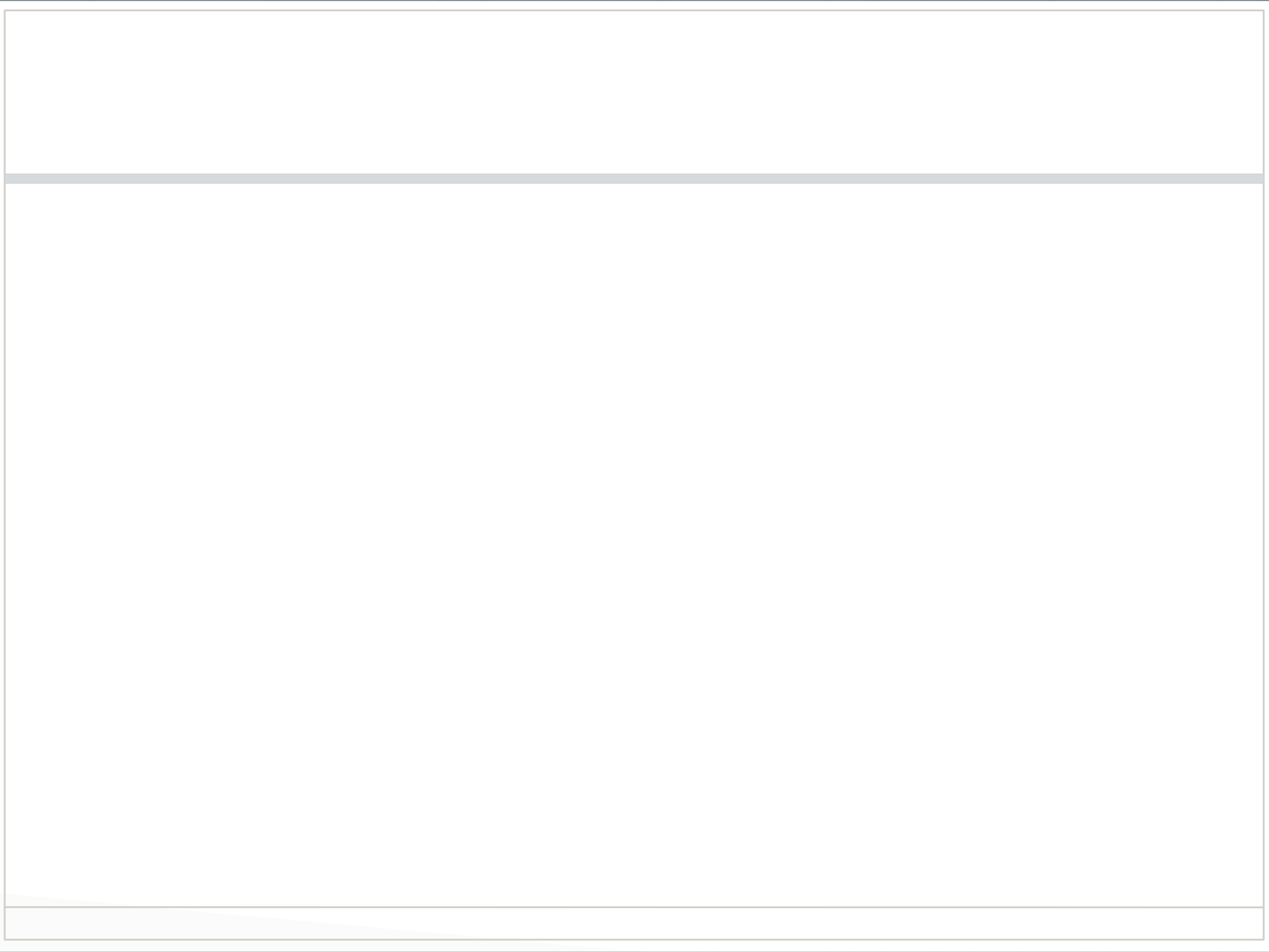
1 2 3 4 5 6 7 8 9

Extremely emotional

Anchoring: little things matter..

- The data were a little too noisy, but you can still notice a difference:





Framing

- A “decision frame” is the decision-maker’s conception of the acts, outcomes, and contingencies associated with a particular choice
 - Gain vs Loss
 - Allow vs Forbid

Framing: Examples

	Percentage Choosing Each Answer	
	Open Question	Closed Question
Quality of Public Schools	1	32
Pollution	1	14
Legalized Abortion	0	8
Energy Shortage	0	6
All other responses	98	40

Schuman and Scott (1987)

How you ask can determine the answer

Question	Mean Answer
Do you get headaches frequently, and if so, how often?	2.2/week
Do you get headaches occasionally, and if so, how often?	0.7 week
How long was the movie?	130 minutes
How short was the movie?	100 minutes
Favor aid to Nicaraguan rebels "to prevent Communist influence from spreading"	58% Yes
Favor assistance to "people trying to overthrow the government of Nicaragua"	24% Yes

Loftus (1975), Harris (1973), and Budiansky (1981)

Framing: Gains vs Losses

Qatar is preparing for the outbreak of an unusual Asian disease that 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 programs are as follows. (*Circle one*)

A. If Program A is adopted, 200 people will be saved.

B. If Program B is adopted, there is a 1/3 probability that 600 people will be saved and a 2/3's probability that no one will be saved.

Which plan do you favor? **Plan A** or **Plan B**

Qatar is preparing for the outbreak of an unusual Asian disease that 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 programs are as follows. (*Circle one*)

A. If Program A is adopted, 400 people will die.

B. If Program B is adopted, there is a 1/3 probability that no one will die and a 2/3's probability that 600 people will die.

Which plan do you favor? **Plan A** or **Plan B**

No mathematical difference. Just “saved” vs “lost”

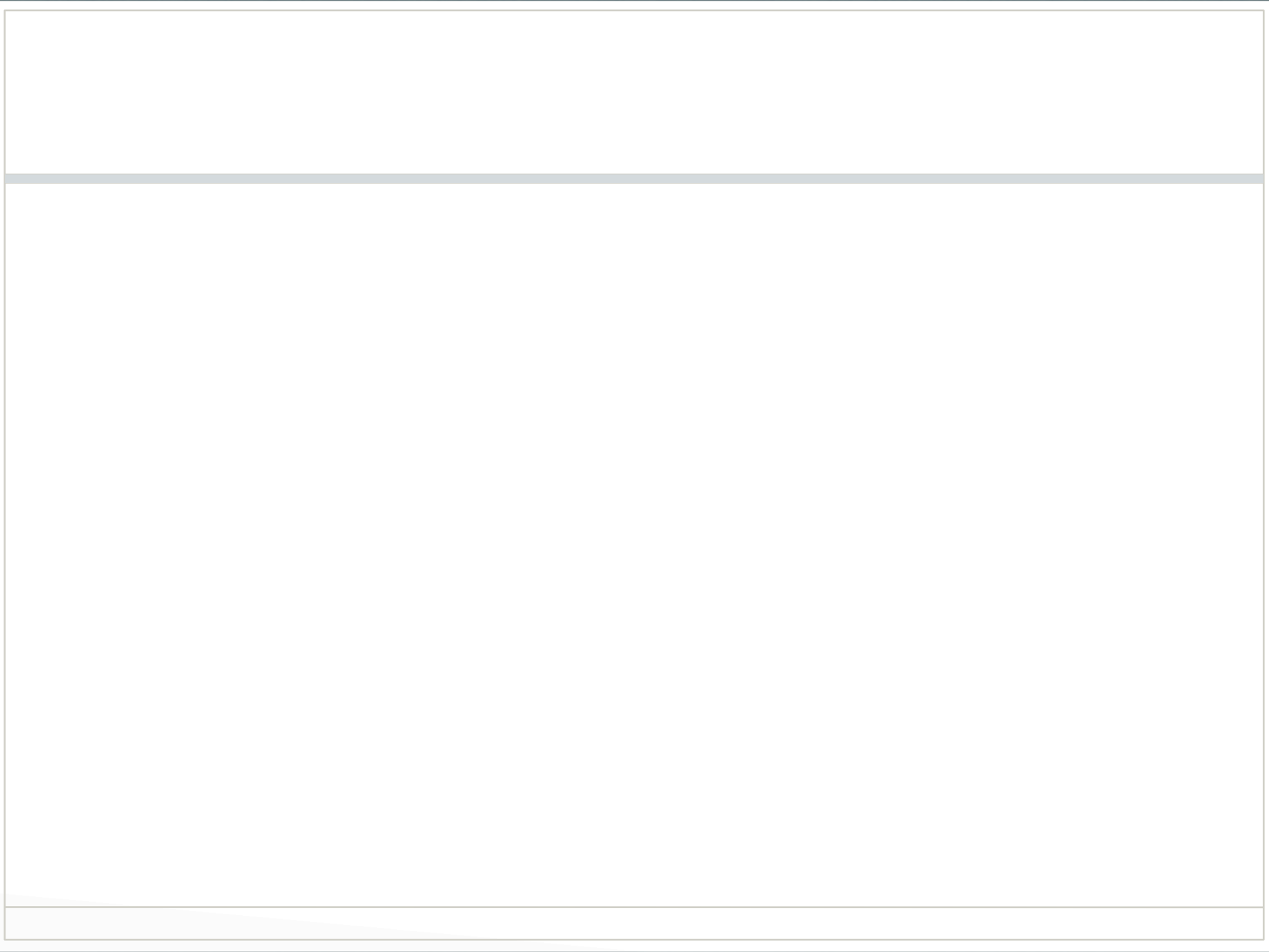
Gains vs Losses

- What did you choose?

	Program A	Program B
“saved” framing	51%	49%
“die” framing	35%	65%

→ How a decision-maker frames the choice can effect her choice

- Preference reversals
 - **Risk adverse when framed as a gain**
 - **Risk seeking when framed as a loss**



Hindsight Bias & Curse of Knowledge

- Hindsight:
 - People think they knew things when they didn't
 - Who does this?
 - Nearly every stock-picker and pundit. Everywhere.
(really: everyone)
- Curse of Knowledge
 - Once we know something, it's really hard to image that we didn't.
 - A main driver of communications failures

Fundamental Attribution Error (FAE)

- Tendency to over-attribute behaviors to personality-based factors
 - Personality/Dispositional Factors – Abilities, traits, motives
- Under-emphasize the role and power of situational influences on the same behavior
 - Situational Factors – Time of day, environmental conditions

Actor-Observer Bias

Other side of the FAE – what if I make a mistake?

- Actors attribute their own actions to situational requirements
- Observers attribute the same actions to personality traits (FAE)
- E.g., if *I* do poorly on an exam, it's because of something situational (I didn't sleep well last night); If *you* do poorly on the same exam, it's dispositional (you were lazy and didn't study enough)

De-biasing

Calibrating Overconfidence

How do you de-bias overconfidence?

1. Think: “Stop to consider reasons why your judgment might be wrong”
 - Note: do NOT ask why you might be right (opposite effect – increase confidence). Confirmation bias!
2. Try to estimate the likelihood of alternative outcome
3. Pre-mortem.
4. Assign a “devil’s advocate”
 1. It’s someone’s role to question / disagree / probe further.

Debiasing the FAE

- The Fundamental Attribution Error is called that because it's *Fundamental*.
 - It's incredibly common and hidden from our insight.
- How to debias or guard against it?
 - Reverse the actor-observer positions. How would *you* behave in a similar circumstance?
 - Consider what's not present. Have you omitted or under-emphasized important factors?

Group Think

Groups – *generally* – display a preference for consensus.

- Group cohesiveness drives members to suppress dissenting views.
- Problems?
- Strategies to guard against it?

Group Exercise

Break into small groups and come up with the following:

1. What types of organizational norms (or even rules) does your company implement to guard against some of these biases or potential errors in group decisions?