Behavioral Economics

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Lecture 4: Beliefs

Today's Topics

1. Experiment and Exam-like Exercise.
2. Short introduction.
3. Heuristics.
   - Representativeness
   - Availability
   - Adjustment and Anchoring
4. Overconfidence
5. Applications

1. Experiment and Exam-like Question

Experiment Exercise

- Consider the following asset:
  - it yields 1 euro if it rains on January 16 in Rotterdam at (exactly) 1 pm and 0 euro otherwise.
- We organize a market for this asset. Each agent can buy or sell one unit of the asset.
- For each of the following prices, could you indicate whether you are willing to buy the asset, to sell it, or neither to buy not to sell?

Price	I buy	I don't buy I don't sell	I sell
0	✓		
0.1	✓		
0.2	✓		
0.3	✓		
0.4		✓	
0.5		✓	
0.6			✓
0.7			✓
0.8			✓
0.9			✓
1			✓

Experiment Results

	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00
Temperatuur	2,3° C	2,6° C	2,8° C	2,8° C	2,7° C	2,3° C	1,4° C	1° C	0,7° C
Weer	Bewolkt	Bewolkt	Bewolkt	Bewolkt	Gedeeltelijk bewolkt	Zonnig	Zonnig	Gedeeltelijk bewolkt	Helder
Neerslag	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm
Kans op sneeuw	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vochtigheid	53%	50%	48%	49%	50%	52%	57%	61%	64%
Windsnelheid	17.3 km/u	18.4 km/u	18.7 km/u	18.7 km/u	16.6 km/u	14 km/u	12.2 km/u	11.9 km/u	11.5 km/u
Windvlaag	23.9 km/u	24 km/u	24.3 km/u	24.4 km/u	22.2 km/u	20.2 km/u	20.1 km/u	20 km/u	19.5 km/u
Wind graad	262°	263°	261°	260°	259°	253°	241°	230°	216°
Windrichting	W	W	W	W	W	WSW	WSW	SW	SW

Experiment Results

Price	**0**	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1**
Fraction Buy	0.947	0.684	0.473	0.394	0.289	0.184	0.078	0.052	0.078	0.026	0.026
Fraction Don't Buy or Sell	0.052	0.105	0.157	0.236	0.210	0.236	0.157	0.131	0.078	0.078	0.078
Fraction Sell	0	0.210	0.368	0.368	0.5	0.578	0.763	0.815	0.842	0.894	0.894

Exam-like exercise

Imagine the following situation: we conducted an experiment using the question in the previous slide. The market was organized for real such that some subjects really bought the asset and the other sold it short and had to actually give 1 Euro to the buyers because it rained on January 16. We have observed that for some prices, some people were neither willing to buy nor willing to sell the asset. In another part of the experiment, we have observed that these people had a linear utility (i.e.,$u(x) = x$).

1. Are the subjects with a linear utility risk averse?

- **Answer.** The subjects are not risk averse if we assume that they are Expected Utility maximizers under risk. Indeed, under EU, risk aversion is equivalent to concavity of the utility function. Here, the function is linear. Therefore, they are risk neutral.

Exam-like exercise

Imagine the following situation: we conducted an experiment using the question of the previous slide. The market was organized for real such that some subjects really bought the asset and the other sold it short and had to actually give 1 Euro to the buyers because it rained on January 16. We have observed that for some prices, some people were neither willing to buy nor willing to sell the asset. In another part of the experiment, we have observed that these people had a linear utility (i.e.,$u(x) = x$).

2. For each possible price, indicate what will be the final payments of a buyer if it rains and if it doesn't rain, and the final payments of a seller if it rains and if it doesn't rain. Assume that a subject has a linear utility. For each price (displayed in the table), give the expected utility of buying and of selling if the subject thinks that the probability of rain is
   - 0.3
   - 0.5
   - 0.7 (Hint: use a table)

Exam-like exercise

- For a buyer:
  - If it rains, she gets 1 Euro but had to pay 0.3. Her final payment is thus 0.7.
  - If it does not rain, her final payment is the price she paid (therefore, -0.3).
  - Her utility depends on how likely she thinks raining is. If the probability is 0.3, her EU is $0.3 \cdot 0.7 + (1–0.3) \cdot (-0.3) = 0$.
  - If the probability is 0.5, her EU is $0.5 \cdot 0.7 + (1–0.5) \cdot (-0.3) = 0.2$.

  For a seller:
  - The final payments and utilities of a seller are the opposite of those of a buyer. If the final payment of a buyer is 0.7, the final payment will be -0.7.

Exam-like exercise

Price	Buying					Selling				
	If it rains	If it does not rain	EU if the probability is			If it rains	If it does not rain	EU if the probability is		
			0.3	0.5	0.7			0.3	0.5	0.7
0	1	0	0.3	0.5	0.7	-1	0	-0.3	-0.5	-0.7
0.1	0.9	-0.1	0.2	0.4	0.6	-0.9	0.1	-0.2	-0.4	-0.6
0.2	0.8	-0.2	0.1	0.3	0.5	-0.8	0.2	-0.1	-0.3	-0.5
0.3	0.7	-0.3	0	0.2	0.4	-0.7	0.3	0	-0.2	-0.4
0.4	0.6	-0.4	-0.1	0.1	0.3	-0.6	0.4	0.1	-0.1	-0.3
0.5	0.5	-0.5	-0.2	0	0.2	-0.5	0.5	0.2	0	-0.2
0.6	0.4	-0.6	-0.3	-0.1	0.1	-0.4	0.6	0.3	0.1	-0.1
0.7	0.3	-0.7	-0.4	-0.2	0	-0.3	0.7	0.4	0.2	0
0.8	0.2	-0.8	-0.5	-0.3	-0.1	-0.2	0.8	0.5	0.3	0.1
0.9	0.1	-0.9	-0.6	-0.4	-0.2	-0.1	0.9	0.6	0.4	0.2
1	0	-1	-0.7	-0.5	-0.3	0	1	0.7	0.5	0.3

Exam-like exercise

3 Can this explain why some people don't want to sell or to buy the asset for some prices?

- **Answer** If a subject is an EU maximizer and thinks the probability of rain is 0.3, she will get a positive EU by buying the asset for all prices below 0.3 and by selling the asset otherwise. At 0.3, she would be indifferent between selling and buying. But there is no price interval with more than one price where she would be willing neither to sell nor to buy the asset.
- We can see from the table in the previous slide that this is the case whatever her beliefs are.

Exam-like exercise

4 What is ambiguity aversion? How can it be observed? (give one example)

- **Answer** Ambiguity attitude is the change of behavior between risk and ambiguity. It is the impact of not knowing the probabilities associated with the outcomes of a prospect. Most people dislike not knowing the probability associated with the outcomes of a prospect: this phenomenon is called ambiguity aversion.

Exam-like exercise

5 Can expected utility represent ambiguity aversion? Cite one model that can represent it.

- **Answer** No, Expected Utility cannot accommodate ambiguity aversion. But Max-min Expected Utility can.

Exam-like exercise

6 Assume now that these people's preferences can be represented by Max-min Expected Utility. Further assume that they think the probability of rain is somewhere in [0.3,0.7]. Using the previous table, determine whether, for each price, they are willing to buy or to sell the asset. What can you conclude from the experiment?

- **Answer** A Max-min Expected Utility (MEU) agent has a set of possible probabilities in mind and maximizes the minimum expected utility she can get.
- If she thinks the set of possible probabilities of rain is [0.3,0.7], we can determine the minimum expected utility of each situation by comparing the EU at 0.3 with the EU at 0.7.
- We will then maximize this minimum, considering also the possibility not to buy or sell anything (expected utility of 0)

Exam-like exercise

Price	Buying			Selling			Maximize the minimum
	EU if the probability is		Minimum EU	EU if the probability is		Minimum EU	
	0.3	**0.7**		**0.3**	**0.7**		
0	0.3	0.7	0.3	-0.3	-0.7	-0.7	Buy
0.1	0.2	0.6	0.2	-0.2	-0.6	-0.6	Buy
0.2	0.1	0.5	0.1	-0.1	-0.5	-0.5	Buy
0.3	0	0.4	0	0	-0.4	-0.4	Buy
0.4	-0.1	0.3	-0.1	0.1	-0.3	-0.3	**Neither Buy or Sell**
0.5	-0.2	0.2	-0.2	0.2	-0.2	-0.2	
0.6	-0.3	0.1	-0.3	0.3	-0.1	-0.1	
0.7	-0.4	0	-0.4	0.4	0	0	Sell
0.8	-0.5	-0.1	-0.5	0.5	0.1	0.1	Sell
0.9	-0.6	-0.2	-0.6	0.6	0.2	0.2	Sell
1	-0.7	-0.3	-0.7	0.7	0.3	0.3	Sell

Exam-like exercise

- What can you conclude from the experiment?
  - We can conclude from the experiment that many participants were not EU maximizers because they did not want to buy or sell the asset for more than one price.
  - The results, however, **were consistent** with MEU.

2. Short Introduction

Short Introduction

- Do you think an asset management firm, managing billions of dollars, can provide and guarantee a 10% return every year for 20 years?
  - A Yes
  - B No

Short Introduction

- Who can think it is possible?
  - A No one!
  - B Homer Simpson
  - C Mister Spock
  - D Banco Santander (Spanish), Bank Medici (Austrian),... $\Rightarrow$ They invested in Maddoff's fund!

Short Introduction

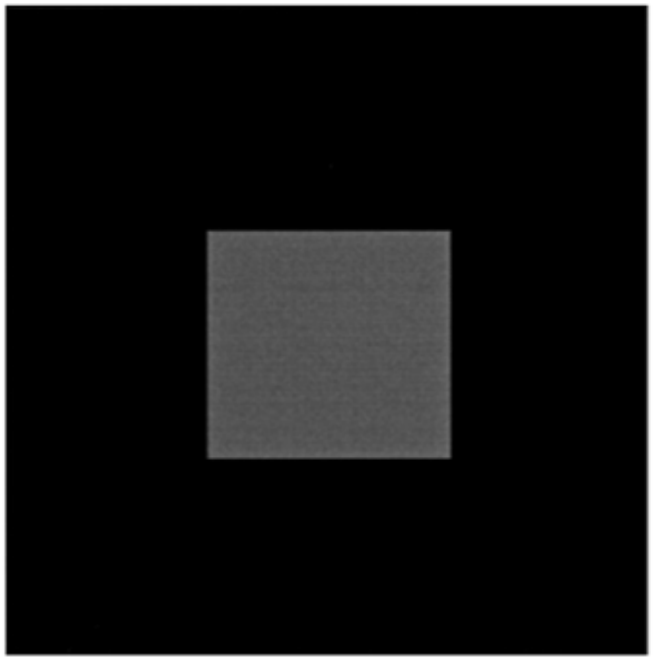
- In this session:
  - we will see how people's (probability) judgments can be systematically biased...
  - ... and how some of these biases can be introduced in models to make better predictions.

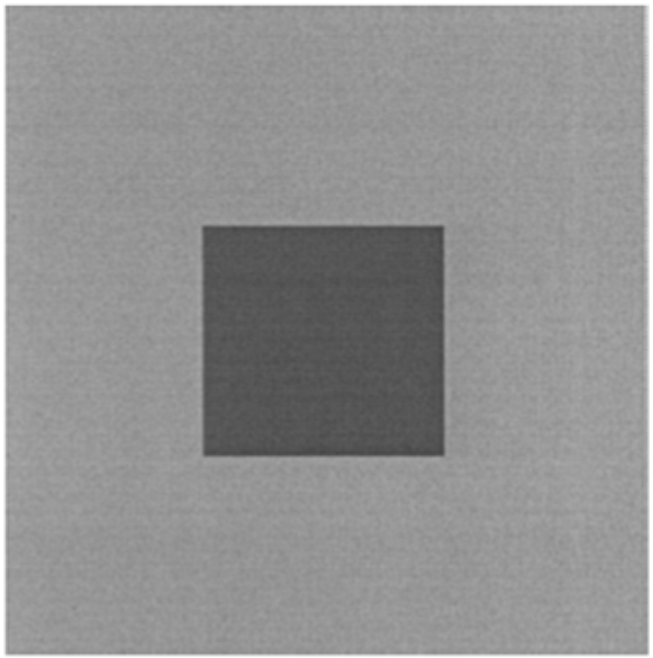
3. Heuristics.

Heuristics and Biases

- Tversky and Kahneman (1974) in *Science.*
  - Heuristics and Biases in judgments.
- Heuristics.
  - Simple, efficient, and useful rules that people use to make decisions and judgments.
  - But heuristics may lead to systematic errors: cognitive biases.
- (Cognitive) Bias
  - Tendency to make errors in always the same direction.
    - (otherwise, would cancel out in statistical terms)
  - Optical illusions are based on such biases.
    - **We use the context to interpret what we see.**
    - This makes sense. It is a useful heuristic, which is efficient in many situations.
    - But it creates optical illusion (= systematic perception errors)

Optical Illusions (1)





Optical Illusions (2)

Optical Illusions (2)

Optical Illusions (2)

Optical Illusions (3)

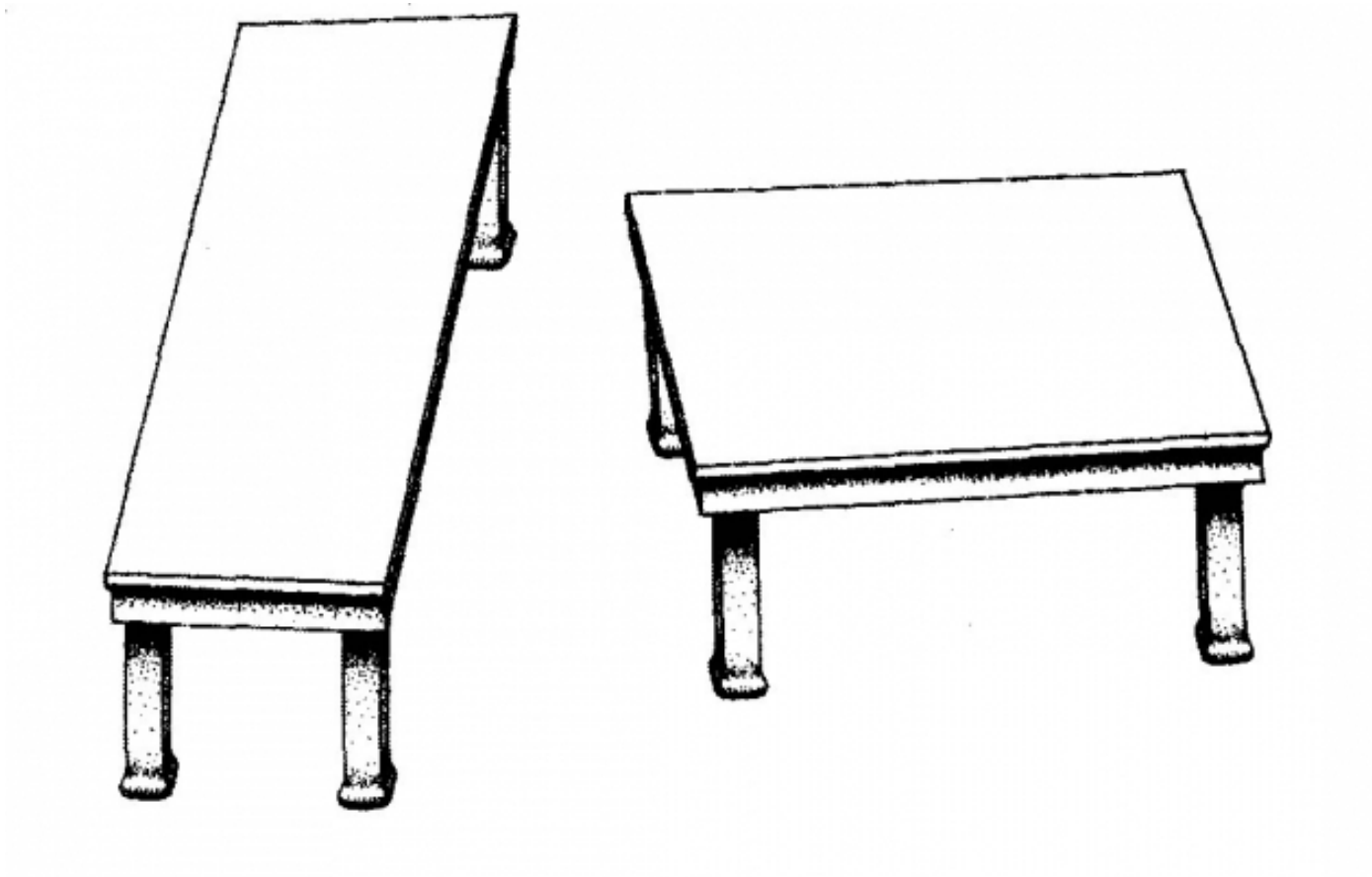


Figure: Shepard Tables

check out https://www.opticalillusion.net/optical-illusions/shepards-tables-whats-up/

Judgements under Uncertainty

- 3 famous heuristics (and their associated biases).
  - Representativeness.
  - Availability.
  - Adjustment and Anchoring.
  - (But others could be studied)
- One big phenomenon: Overconfidence
  - Decomposed in 5 biases
  - Part of it can be explained by the Adjustment and Anchoring heuristic

Judgements under Uncertainty

- **Question 1** Imagine we are tossing a fair coin 6 times. Which of the 3 sequences is the more likely to appear? (H = Head, T = Tail)
  a) H - T - H - T - T - H
  b) H - H - H - T - T - T
  c) H - H - H - H - T - H
  d) none
- **Results**: 66 % of you chose d), 29 % chose a), 2.5% chose b), and 2.5% chose c).
- Typically, most people choose a) but the right answer is indeed d).

Judgements under Uncertainty

- **Question 2** You are at a roulette table and for the last 4 rounds, the ball stopped on red numbers.
  a) I will definitely bet on red in the next round.
  b) I will definitely bet on black in the next round.
  c) I might bet on red or black, a bit randomly.
  d) I would never be at a roulette table in the first place, so this question is completely stupid!
- **Results**: 55% of you chose c), 18 % chose b), 16% chose d), and 11% chose a).
- Most people typically choose b) but the right answer is indeed c).

Representativeness

- Representativeness heuristic
  - "the degree to which an event is similar in essential characteristics to its parent population, and reflects the salient features of the process by which it is generated"
  - When judging whether object A belongs to class B, or event A originates from process B, or process B will generate event A....

    Probabilities are evaluated by the degree to which A **resembles** B.

Representativeness

- **Misconceptions of chance**
  - In **Question 1** most people think "$H - T - H - T - T - H$" is the more likely sequence, but the correct answer is "none".
    - People expect that a sequence of events generated by a random process will represent the essential characteristics of that process even when the sequence is short.
    - People expect that the essential characteristics of the process will be represented, not only globally in the entire sequence, but also locally in each of its parts.
  - In **Question 2** most people would choose "definitely bet on black in the next round."
    - Chance is commonly viewed as a self-correcting process in which a deviation in one direction induces a deviation in the opposite direction to restore the equilibrium.
  - **Gambler's Fallacy**

Judgements under Uncertainty

- **Question 3**: There are two programs in a university. Boys are a majority (65%) in program A, and a minority (45%) in program B. There is an equal number of classes in each of the two programs, and there are 100 students in each class. You enter a class at random, and observe that there are 55 boys. What is your best guess? Does the class belong to program A or to program B?
  a) Program A
  b) Program B
- **Results**: 91% of you chose a) and 9% chose b).
- Most people typically choose a) but the right answer is b) :) (finally!)

Representativeness

- **Similarity of sample to population**
  - In **Question 3**, most people think "Program A" but the correct answer is "Program B"
  - **Elucidation**: The class is more representative of program A (more boys).
  - But it is more likely to belong to program B
    - Number of boys in a class of program A: $X_A \sim Bin(100, 0.65) \Rightarrow P(X_A = 55) = 0.0096$.
    - Number of boys in a class of program B: $X_B \sim Bin(100, 0.45) \Rightarrow P(X_B = 55) = 0.0108$.

Representativeness

- Representativeness makes sense with large numbers. . .
  - (very large samples are likely to be representative of the population according to the law of large number)
- . . . but not with small numbers.
- The representativeness heuristic is a problem when people apply it to small samples
  - Could be called "Law of small numbers":
    - Many people think that the law of large numbers applies to small numbers as well (Kahneman and Tversky, 1972).
  - E.g., people tend to think that samples should look like the general population, whatever their size.
  - Law of small numbers underlies misconceptions of chance

Judgements under Uncertainty

- **Question 4:** Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations. Which is more probable?
  a) Linda works in a bank
  b) Linda works in a bank and is active in the feminist movement.
- **Results**: 70% of you chose a) and 30% chose b).
- Most people typically choose b) but the right answer is indeed a).

Representativeness

- **Conjunction Fallacy**
  - In **Question 4**, most people think "Linda works in a bank is active in the feminist movement" but the correct answer is "Linda works in a bank."
  - The representativeness heuristic make people chose that answer, which is illogical
    - **Elucidation**: the conjunction of two events cannot be more likely than one of them

Availability

- **Question 5**: Suppose one samples a word (of 3 letters or more) at random from an English text. Is it more likely that the word starts with "r" or that "r" is the third letter?
  a) starts with 'r'
  b) Third letter
- **Results**: 61% of you chose b) and 39% chose a).
- Most people typically choose a) but the right answer is indeed b).

Availability

- **Availability heuristic**
  - People might assess the probability of an event "by the ease with which instances or occurrences can be brought to mind" (Tversky and Kahneman, 1974).
  - In many cases, it works well, but not always...
- In **Question 5** the right answer is "third letter", but it is easier to think of words starting with a letter than letters with r as the 3rd letter
  - 8,955 words in the English language start with 'r' while 22,809 have 'r' as the third letter.

Availability

- **Violation of set inclusion**
  - Tversky and Kahneman (1983).
  - After reading the same 4 pages of a novel, two groups had to evaluate the number of seven-letter words that end with:
    - Group A: ing
    - Group B: _n_
  - Median Results
    - Group A: 13.4
    - Group B: 4.7
  - This violates set inclusion!
    - the probability of a set must be more than the probability of any of its subset.

Adjustment and Anchoring

- "People make estimates by starting from an initial value that is adjusted to yield the final answer."
- This heuristic might lead to biases because:
  - The initial value may be suggested by the formulation of the problem or by the result of partial computations.
  - Adjustments are typically insufficient.

Adjustment and Anchoring

- **Question 6** (for half of you): How old do you think Gandhi was when he died?
  - **Result**: On average, you stated that Gandhi was 84.6 years old when he died.
- **Question 6** (for the other half): How old do you think Gandhi was when he died?
  - **Result**: On average, you stated that Gandhi was 67.8 years old when he died.
- What is the difference between groups?

Adjustment and Anchoring

- **Question 6** (for the first half):

  6X.1 Do you think Gandhi was **120 years old** when he died?

  a) Yes
  b) No

  6X.2 How old do you think Gandhi was when he died?

  - Of course you answered "No" in 6X.1.
  - But mean/median answer in 6X.2 is likely to be *relatively high*.

Adjustment and Anchoring

- **Question 6Y** (for the others):

  6Y.1 Do you think Gandhi was **12 years old** when he died?
  - Yes
  - No

  6Y.2 How old do you think Gandhi was when he died?
  - Of course you answered "No" in 6Y.1.
  - But mean/median answer in 6Y.2 likely to be *relatively low*.

- **The first questions, (6X.1 and 6Y.1) created anchors!**
  - **And insufficient adjustment $\Rightarrow$ bias in answers to second question.**

Adjustment and Anchoring

- **Question 7**
  - Please write down the last two digits of your phone number: $X =$
  - Do you think the probability that it will rain in one week at noon in Rotterdam is higher than $X\%$?
    - Yes
    - No
  - What is the probability that it will rain in one week at noon in Rotterdam?

Adjustment and Anchoring

- **Question 7**
  a) last two digits of your phone number < 50 and you reported a probability $< 50\%$
     - (41% of you)
  b) last two digits of your phone number < 50 and you reported a probability ≥ 50 %
     - (14% of you)
  c) last two digits of your phone number ≥ 50 and you reported a probability $< 50\%$
     - (6% of you)
  d) last two digits of your phone number ≥ 50 and you reported a probability $\geq 50\%$
     - (39% of you)

Adjustment and Anchoring

- Fox and Clemen (2005) predict
  - Anchor to uniform distribution (ignorance).
  - And then insufficient adjustment.

  Study among MBA students

Adjustment and Anchoring

Figure 4 Stimuli Used in Study 4

(1) What is the last digit of your local telephone number? _____
If this number is *even*, please write "JSX" in the space provided above the tree on the *left* and "NASDAQ" in the space provided above the tree on the *right*.

If this number is *odd*, please write "NASDAQ" in the space provided above the tree on the *left* and "JSX" in the space provided above the tree on the *right*.

Index: _____

- Below 1,000 _____
- 1,000–2,000 _____
- 2,001–4,000 _____
- Above 4,000 _____

Index: _____

- 4,000 or below _____
- 4,001–8,000 _____
- 8,001–16,000 _____
- Above 16,000 _____

(2) For each tree above, please estimate the probabilities that the designated index will close in each specified range *on the last day of trading this year*. Be sure that the four probabilities for a given index sum to 100%.

(3) Please rate your familiarity with each of the two indices on a 0–10 scale (0 = I know nothing; 10 = I know it extremely well) by placing a number beside each index name that you wrote above.

Adjustment and Anchoring

Table 3 Results of Study 4

		NASDAQ			JSX		
Sample	Condition	≤4,000	>4,000	*n*	≤4,000	>4,000	*n*
Full data set	Low partition	**0.50**	0.50	49	**0.75**	0.25	52
	High partition	0.25	**0.75**	51	0.25	**0.75**	45
NASDAQ "experts"	Low partition	**0.25**	0.75	24	**0.75**	0.25	24
	High partition	0.32	**0.70**	24	0.25	**0.75**	23
NASDAQ "nonexperts"	Low partition	**0.80**	0.20	21	**0.75**	0.25	22
	High partition	0.12	**0.88**	22	0.23	**0.77**	18

Note. The first column indicates the relevant sample ("experts" and "non-expert" subsamples were segregated based on a median split of knowledge ratings). The second column indicates experimental condition as illustrated in Figure 4 ("low partition" refers to the condition in which the event ≤4,000 consisted of three intervals and "high partition" refers to the condition in which the event >4,000 consisted of three intervals). The third, fourth, sixth, and seventh columns list median judged probabilities of the designated events based on single judgments (light-face entries) and sums of the three separate judgments (bold entries). The fifth and eighth columns indicate the usable sample size for columns 3–4 and 6–7, respectively.

4. Overconfidence.

Overconfidence

- **Question 8**: (only if you have a driver license) Do you think you belong to the 30% of drivers with highest driving safety in this room?
  a Yes
  b No
- **Results**: 38% of you with a drivers licence chose a).

Overconfidence

- **Overconfidence** is a general phenomenon consisting of several biases
  - Sometimes confusing in the literature

Overconfidence

- **Question 9**: For the 10 following questions, we would like you to indicate your subjective 90% confidence interval for the right answer. Please give
  - a value such that there is only a 5% chance that the right answer is less than what you indicate (lower bound)
  - and a value such that there is only a 5% chance that the right answer is more than what you indicate (upper bound).
- **For each item, please check whether the right answer belongs to your confidence interval**

Overconfidence

	Questions	**Answers**
A	What is the equatorial circumference of the earth? (in km)	40,075km
B	In which year did Marco Polo die?	1324
C	How many inhabitants were in Bogota in 2023?	11,508000
D	How many deaths did the Titanic's sinking cause?	1517
E	How old is the Spanish king?	55
F	Which proportion of the Dutch population lives in Limburg? (in % end of 2021)	6.4%
G	How many feet are in a mile?	5280
H	How many kilometers one should drive to go Amsterdam from to Berlin? (According to maps)	663
I	How many members were there in the European Union in 2001?	15
J	What is the average weight of the Dutch Male population?	85 kg

Overconfidence

- **Question 9**: For how many questions did the right answer fall in your confidence interval?
  - 1 or 2
  - 3 or 4
  - 5 or 6
  - 7 or 8
  - 9 or 10

Overconfidence: Miscalibration

- **Miscalibration**: Overestimation of the precision of private information
- In **Question 9**, for how many questions did the right answer fall in your confidence interval?
  - We should find 9 on average.
  - But much less in practice
- Possible explanation: Anchoring and Adjustment

Overconfidence: Other biases

- Overestimation of one's own abilities.
  - E.g., people overestimate the number of right answers they have in a questionnaire
- Better-than-average (Better-than-median)
  - People have unrealistic positive views of the self.
  - **Question 8:** (only if you have a driver license) Do you think you belong to the 30% of drivers with highest driving safety in this room?
  - Svenson (1981): 82% of a group of students rank themselves among the 30% of drivers with highest driving safety.

Overconfidence: Other biases

- Illusion of control
  - People think they can control or influence outcomes even if they have no influence over it
    - Throwing a dice more softly to get a low number...
    - People who have successfully guessed the outcome of a series of coin tosses start believing they can actually better guess than the others...
- Unrealistic optimism
  - Sometimes found with smokers (and their risk of getting a cancer)...

5. Applications

Representativeness heuristic and economic outcomes

- Dohmen, Falk, Huffman, Marklein and Sunde (2009)
  - Measure ability in making probability judgments (similar to Question 2).
  - Find that education is positively related to this ability in making probability judgments even when controlling for cognitive abilities.
  - Find that the ability in making probability judgments is negatively related to long-term unemployment (even once controlled for education).

Overconfidence and contracts

- De la Rosa (2011) shows that when a worker is overconfident, the manager can take advantage of his bias
  - production $y = a + b \cdot e$, where $b, a > 0$
  - worker has erroneous beliefs and thinks that $y = \hat{a} + \hat{b} \cdot e$ with $\hat{b} > b$ and $\hat{a} > a$.
  - Because $\hat{b} > b$ she thinks her effort delivers more production than it actually does
    - if moderate, it can be motivating $\Rightarrow$ less compensation needed.
    - if severe, it can be demotivating $\Rightarrow$ more compensation needed!
  - Overconfidence exploited
    - if moderate $\Rightarrow$ low compensation.
  - Otto (2014) finds that optimistic CEOs receive lower compensation.

Overconfidence and Behavioral Finance

- Glaser and Weber (2007)
- 215 investors answered a questionnaire measuring
  - **Miscalibration**
    - 90% confidence interval for questions concerning economics and finance knowledge.
    - Volatility forecasts
  - **Better-than-average effect**
    - Estimating the percentage of other investors with better performance
  - Results:
    - Miscalibration: unrelated to measures of trading volume
    - Better-than-average:
    - Investors who think they are above average in terms of skills or past performance (but who are actually not) trade more.
  - Explains excessive trading in financial markets.

The End!

Today's recommendation

- Tom Misch's "Geography" (2018).