JDMLab
Judgment and Decision-Making Laboratory
https://jdmlab.dpss.psy.unipd.it/

Psychology, Decision Making, and Education to a Circular Economy
School of Science
2023-2024

HEURISTICS

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HEURISTICS

- There are three main heuristics we use to make decisions:
  - Representativeness heuristic.
  - Availability heuristic.
  - Anchoring and adjustment heuristic.

HEURISTICS

- These heuristics are like mental “shortcuts” that people use in an unconscious way.

- As a result, they are very difficult to avoid because we only realize we used them after they affected our judgments.

REPRESENTATIVENESS HEURISTIC

- The representativeness heuristic is used to answer questions like:
  - What is the likelihood that object A belongs to class B?
  - What is the likelihood that the event A originates from process B?

- Likelihoods are assessed on the basis of how much A is representative of B.
  - *If* A is highly representative of B *then the likelihood that A originated from B is judged as high*.

REPRESENTATIVENESS HEURISTIC

- People make mistakes when they judge whether a particular event belongs to a specific process or category.

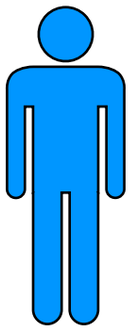
- In other words, likelihood judgments are made based on how much an event is representative of the process being evaluated...

  In doing these evaluations people end up NEGLECTING **sample size** or **the laws of probability**.

- For a large part, research on this heuristic was made by Kahneman and Tversky who were at the forefront in studying the *Theories of Judgments Distortion.*

REPRESENTATIVENESS HEURISTIC

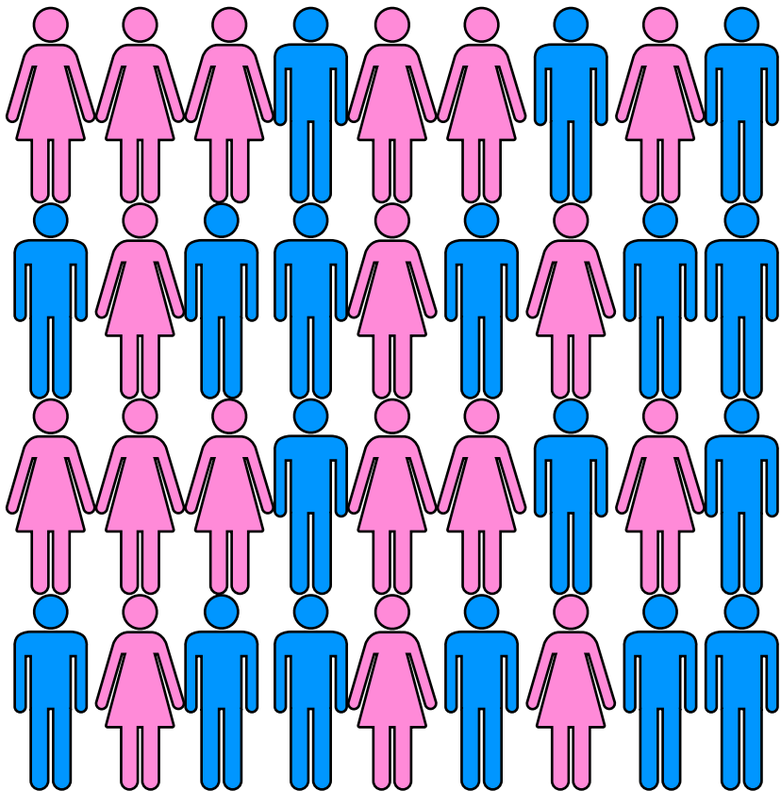
Base rates



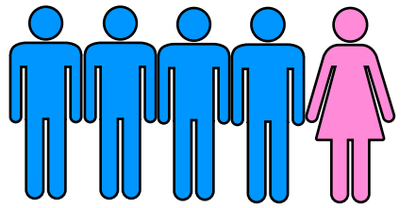
This is John. He likes to look at things rationally and love mathematics. He has a logical mind and his friends are all geeks and tech savvy.

Is John a psychology or an engineering grad student?

Psychology grad students



Engineering grad students



Although John's description resembles that of an engineer, he is more likely to be a psychology grad student because there are many more students enrolled in that program than in the engineering one.

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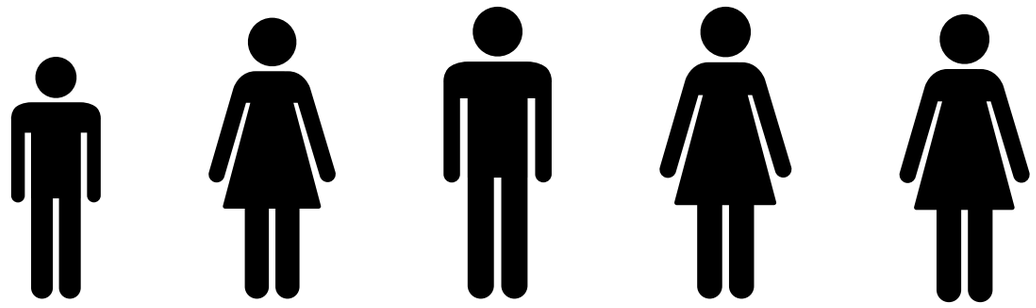
REPRESENTATIVENESS HEURISTIC

Sample size

Sample 1



Sample 2

Five people randomly selected don't tell us anything about the average height of the population to which they belong. The smaller the sample the more outliers have an impact on the measurement - one very tall or very short individual will have a large impact on the average value we obtain.

REPRESENTATIVENESS HEURISTIC

Misconception of chance

H T T T T T

H T H T H T

Which sequence of coin tosses is the most likely?

(It's impossible to say because the sequences are too short and not representative of a random process - it's not impossible to get six heads in a row!).

CONJUNCTION FALLACY

- 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.

- Linda is a teacher in an elementary school.
- Linda works in a library and takes yoga lessons.
- Linda works as an assistant at the psychiatry division.
- Linda is a member of the League of Women Voters.
- Linda is a bank teller.
- Linda is an insurance seller.
- Linda is a bank teller and she is active in the feminist movement.

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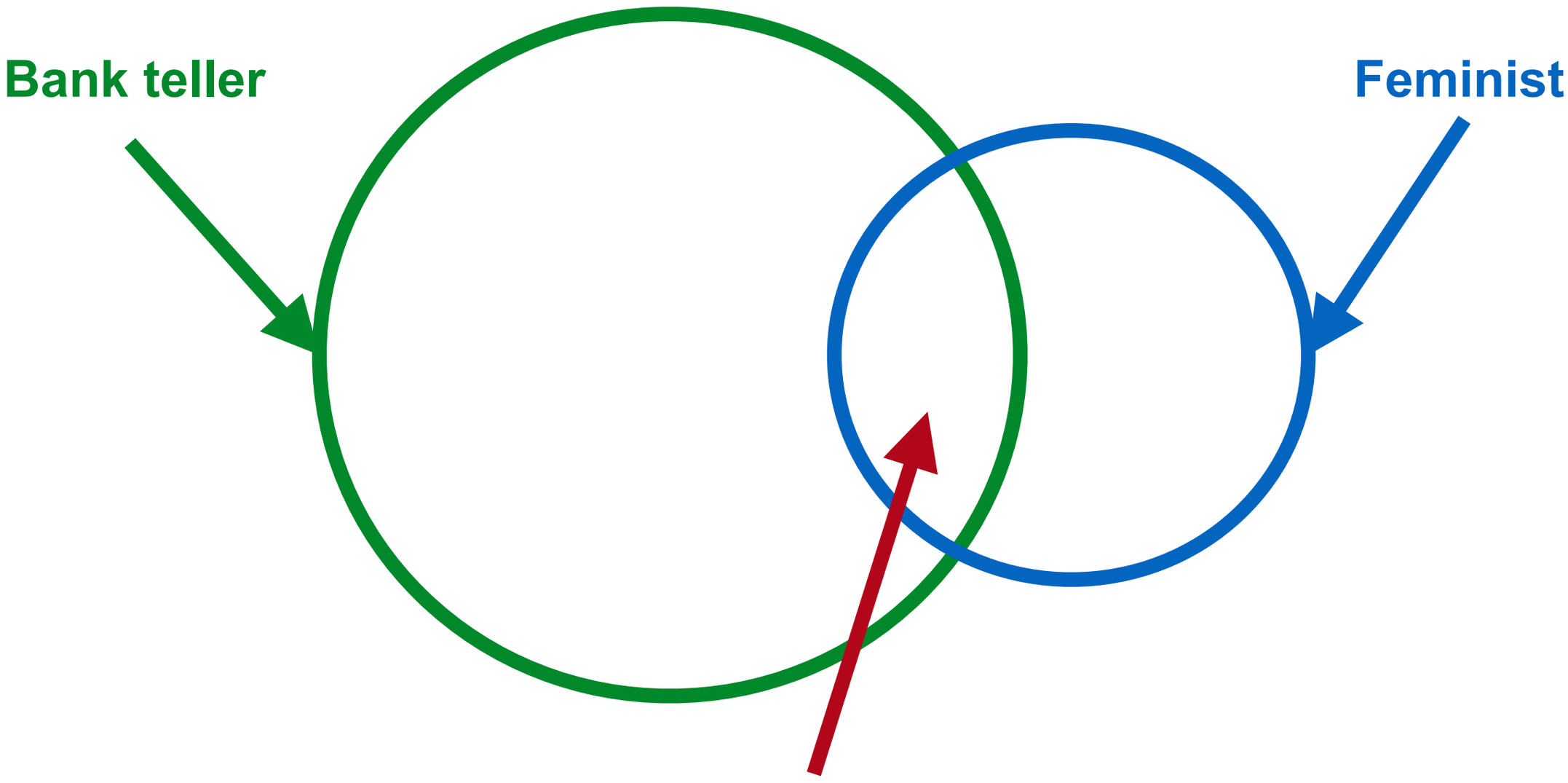
- Linda works as an assistant at the psychiatry division.
- Linda is a member of the League of Women Voters.
- **Linda is a bank teller. (B)**
- Linda is an insurance seller.
- **Linda is a bank teller and she is active in the feminist movement. (B&F)**

CONJUNCTION FALLACY



AVAILABILITY HEURISTIC

- The psychological processes behind the availability heuristic are particularly powerful and pervasive. Some of them are:

  - Likeness-driven associations.

  - Perceptual errors (some events are easier to remember and remain impressed in our memory).

  - Memory is selective.

AVAILABILITY HEURISTIC

- *When judging the likelihood of an event people try to remember or mentally generate examples that can be used as useful hints.*

- Since this a psychological phenomenon, we already know it wont follow precisely the rules of randomness (no normal distribution).

    - For instance, vivid events look more frequent than they actually are: think about terrorist events or people who hurt you.

AVAILABILITY HEURISTIC

THE AVAILABILITY HEURISTIC†

THINGS THAT COME TO MIND EASILY WE THINK OF AS MORE COMMON AND MORE IMPORTANT

	EASY TO RECALL	HARD TO RECALL	CAN LEAD TO
	PLANE CRASHES	SAFE FLIGHTS	FEAR OF FLYING
	COLD SPELL	GRADUAL WARMING	IGNORING CLIMATE CHANGE
	WINNING TICKETS	NORMAL TICKETS	BUYING MORE

. . . AT THE EXPENSE OF THINGS THAT MAY BE MORE COMMON BUT THAT DON'T EASILY COME TO MIND

† AND BIAS

sketchplanations

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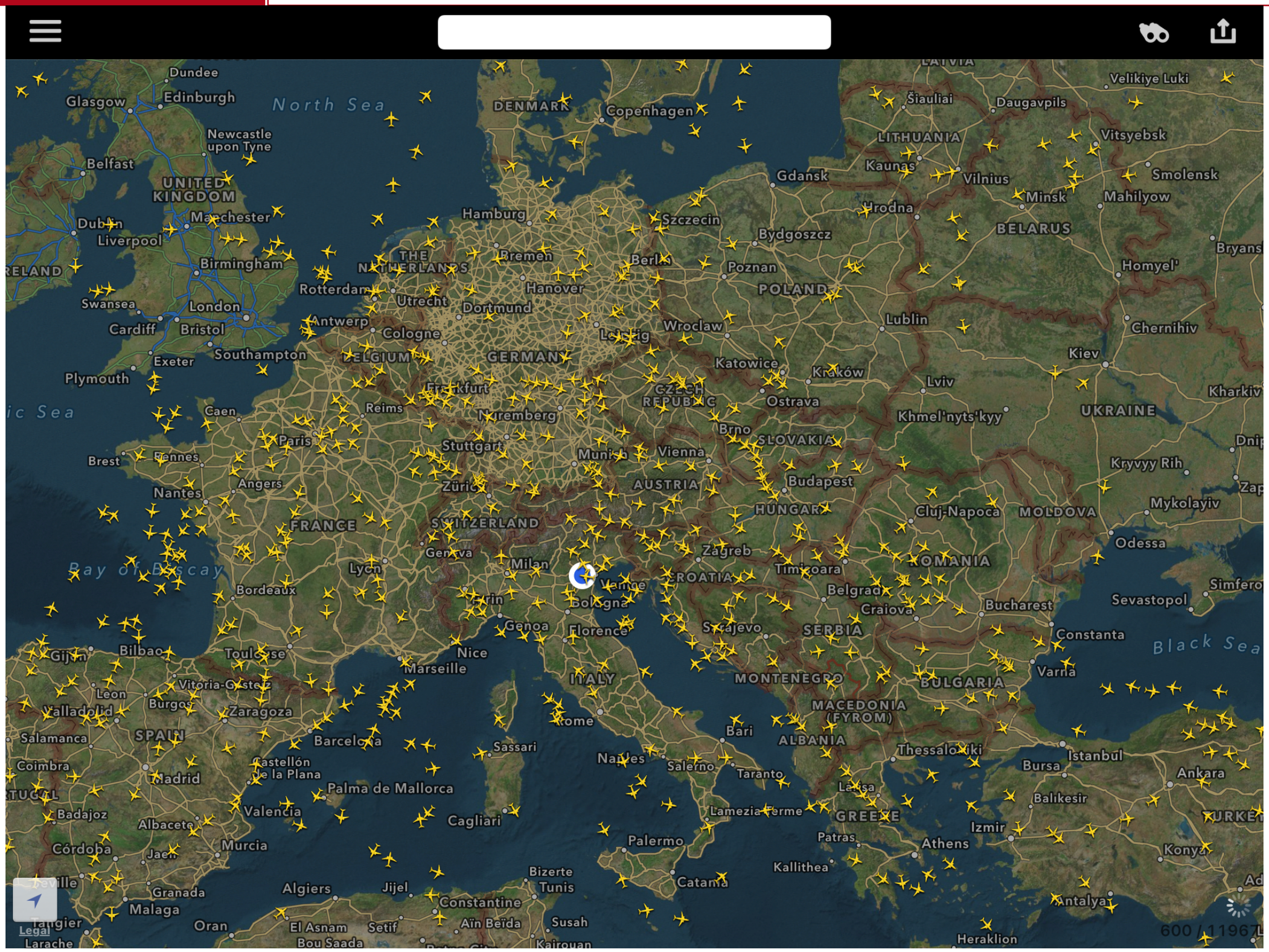
AVAILABILITY HEURISTIC



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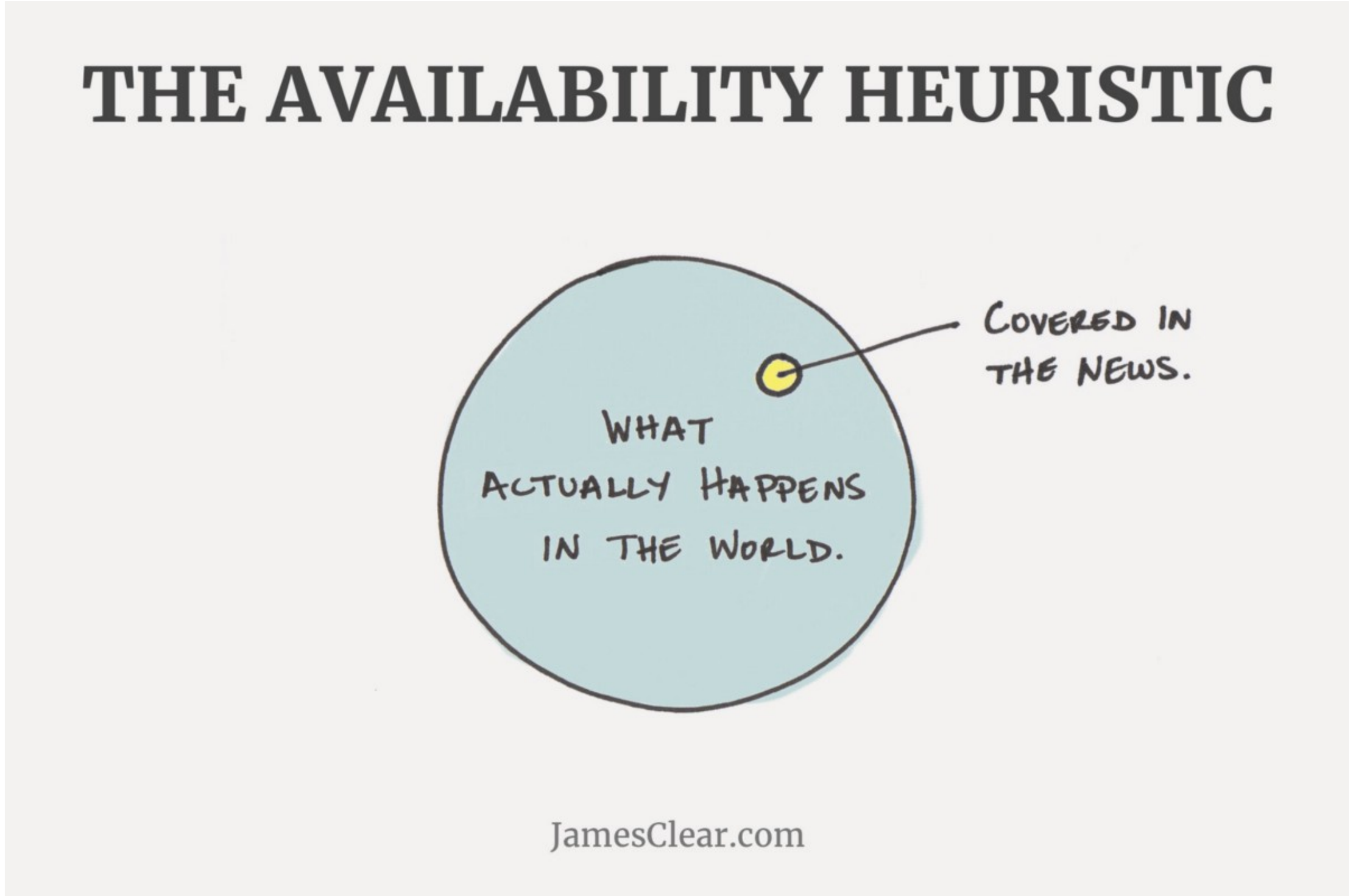
AVAILABILITY HEURISTIC



SHORT NOTE ON CORRELATION

- Short note on correlations:
  - Correlations help us understand potential relations between two variables:
    - A positive correlation tell us that as variable A increase in value, variable B increases as well.
    - A negative correlation tell us that as variable A increases in value, variable B decreases and vice versa.
  - **Correlations do not provide any information regarding the causal relation between the variables:**
    - For instance, based on a correlation we cannot state whether variable A produces an increase in variable B.
    - A correlation between firearms and criminality does not implies neither that firearms cause an increase in criminality nor that criminality produces an increase in people's willingness to buy and use guns.

SHORT NOTE ON CORRELATION

- Many people tend to see a causal relationship when there is just a correlation even if there is no objective evidence to support this conclusion.
    - If they were told that there is a correlation between the number of immigrants and the rate of criminality, it would be easy to infer the direction of such relationship.
- However, it's a correlation, there might be no causal relation between the two variable (or there might be a third one that actually links them).
    - And we make that inference even if no one tells us whether the relationship might exist or not.

SHORT NOTE ON CORRELATION

- Sometimes, there are correlations between variables that have clearly nothing to do with each other.

  - A correlation may happen by chance.

  - If we consider a number sufficiently high of variables, almost certainly we will find some correlation, although they may mean nothing at all.

    - This typo of relations are called “spurious correlations.”

    - When they are made up in our mind (and there might not be any correlation at all), they are labeled “illusory correlations.”

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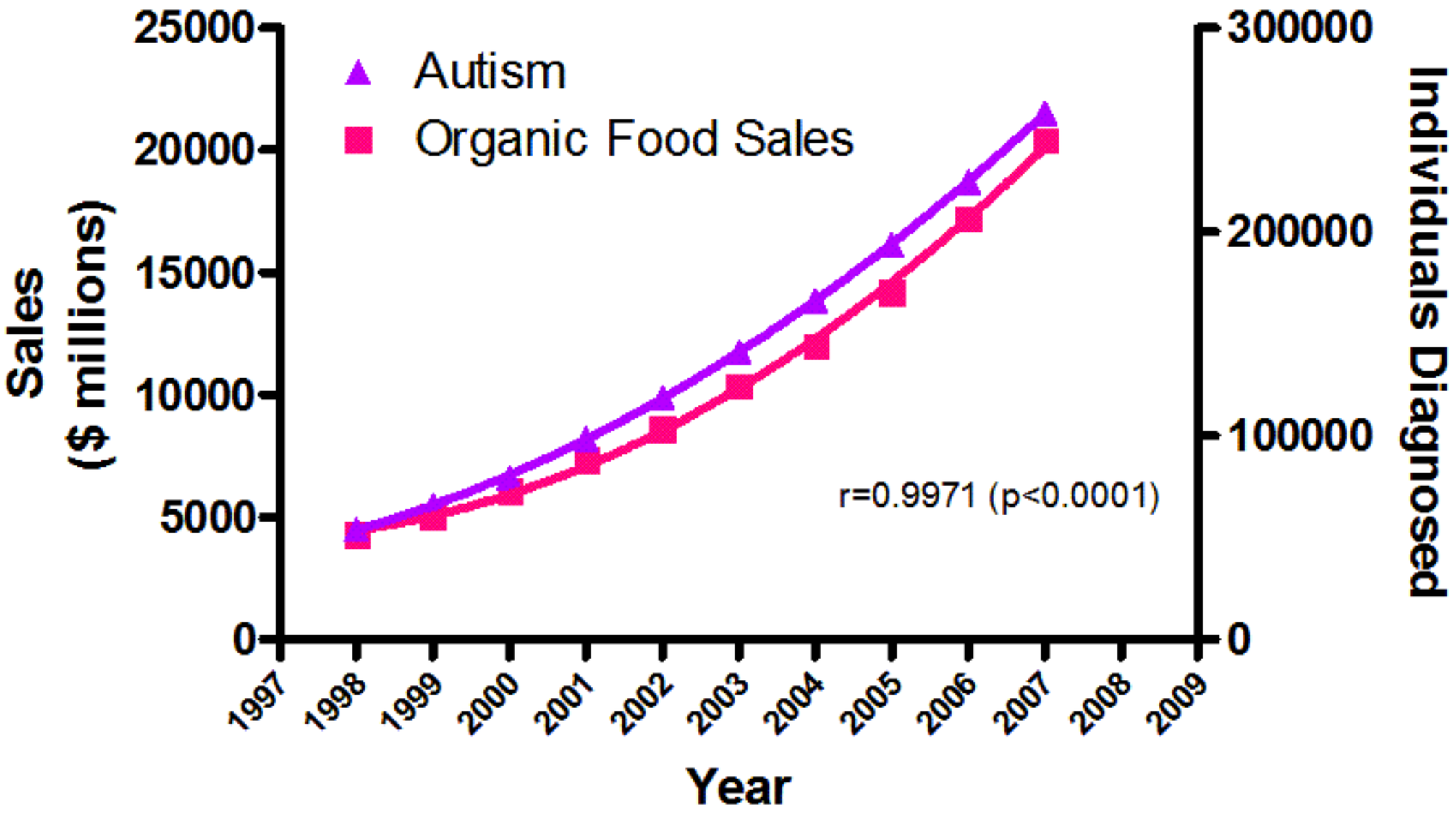
SHORT NOTE ON CORRELATION



Sources: Organic Trade Association, 2011 Organic Industry Survey; U.S. Department of Education, Office of Special Education Programs, Data Analysis System (DANS), OMB# 1820-0043: "Children with Disabilities Receiving Special Education Under Part B of the Individuals
with Disabilities Education Act

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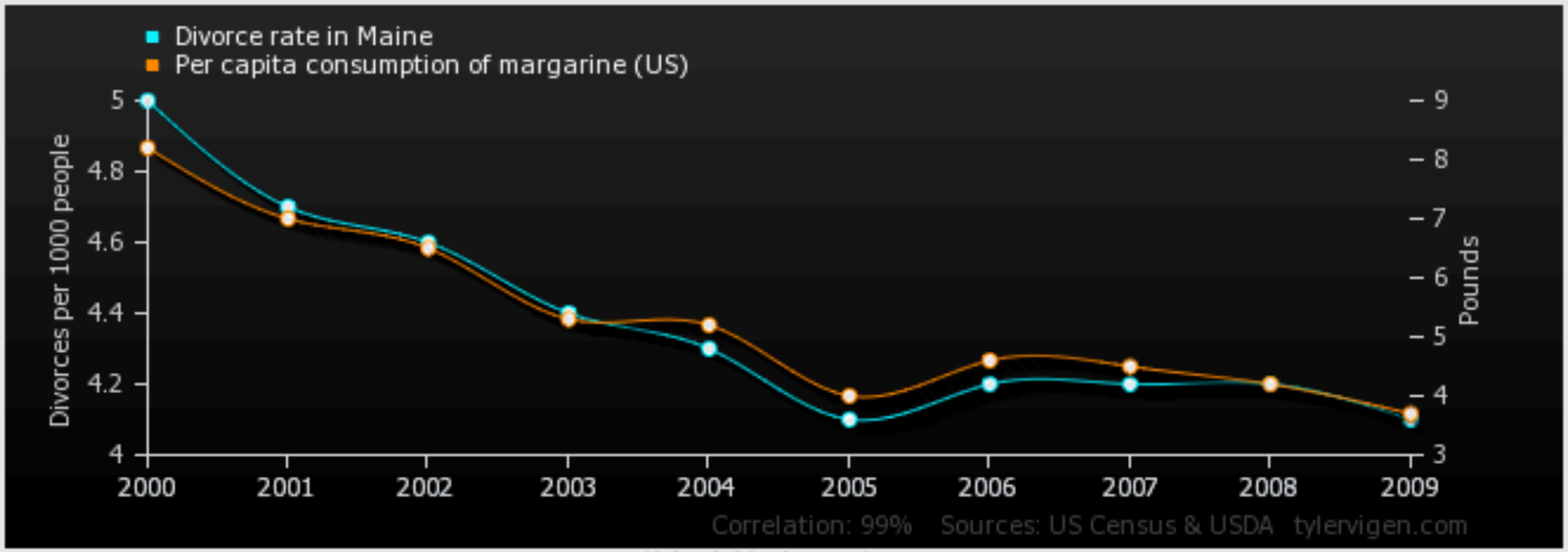
SHORT NOTE ON CORRELATION

Divorce rate in Maine
correlates with
Per capita consumption of margarine (US)



Upload this chart to imgur

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Divorce rate in Maine *Divorces per 1000 people (US Census)*	5	4.7	4.6	4.4	4.3	4.1	4.2	4.2	4.2	4.1
Per capita consumption of margarine (US) *Pounds (USDA)*	8.2	7	6.5	5.3	5.2	4	4.6	4.5	4.2	3.7

Correlation: 0.992558

Permalink - Mark as interesting - Not interesting

SHORT NOTE ON CORRELATION

ANCHORING AND ADJUSTMENT HEURISTIC

- Often, when we are asked for numerical estimates we tend to anchor to a particular value and then adjust the estimate in the direction we believe the correct answer is to be found.

- This happens when we are asked for a precise, numeric estimate on a subject we do not know well enough, therefore we are tempted to look around for a point to start from.

ANCHORING AND ADJUSTMENT HEURISTIC

- Tversky and Kahneman studies (as well as those of many other scholars) demonstrated that people can use these starting values even when:

  - They are told that the number was selected randomly.
  - When anchors are absolutely implausible (extremely high or low values)
  - When there are no available numbers, people create them (self-generated anchors).

ANCHORING AND ADJUSTMENT HEURISTIC

The anchoring heuristic is critically influenced by people's tendency to look for a confirmation to their initial hypotheses.

EXAMPLE:

1. Is the Po river longer or shorter than 10.000 Km?

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2. How long is the Po river?

ANCHORING AND ADJUSTMENT HEURISTIC

The anchoring heuristic is critically influenced by people's tendency to look for a confirmation to their initial hypotheses.

EXAMPLE:

1. Is the Po river longer or shorter than 10.000 km?
2. How long is the Po river?

CORRECT ANSWER: 652 km

ANCHORING AND ADJUSTMENT HEURISTIC

- EXAMPLE: Try to complete, in 5 second, the following operations going from left to right:

8 x 7 x 6 x 5 x 4 x 3 x 2 x 1

ANCHORING AND ADJUSTMENT HEURISTIC

- EXAMPLE: Try to complete, in 5 second, the following operations going from left to right:

1 x 2 x 3 x 4 x 5 x 6 x 7 x 8

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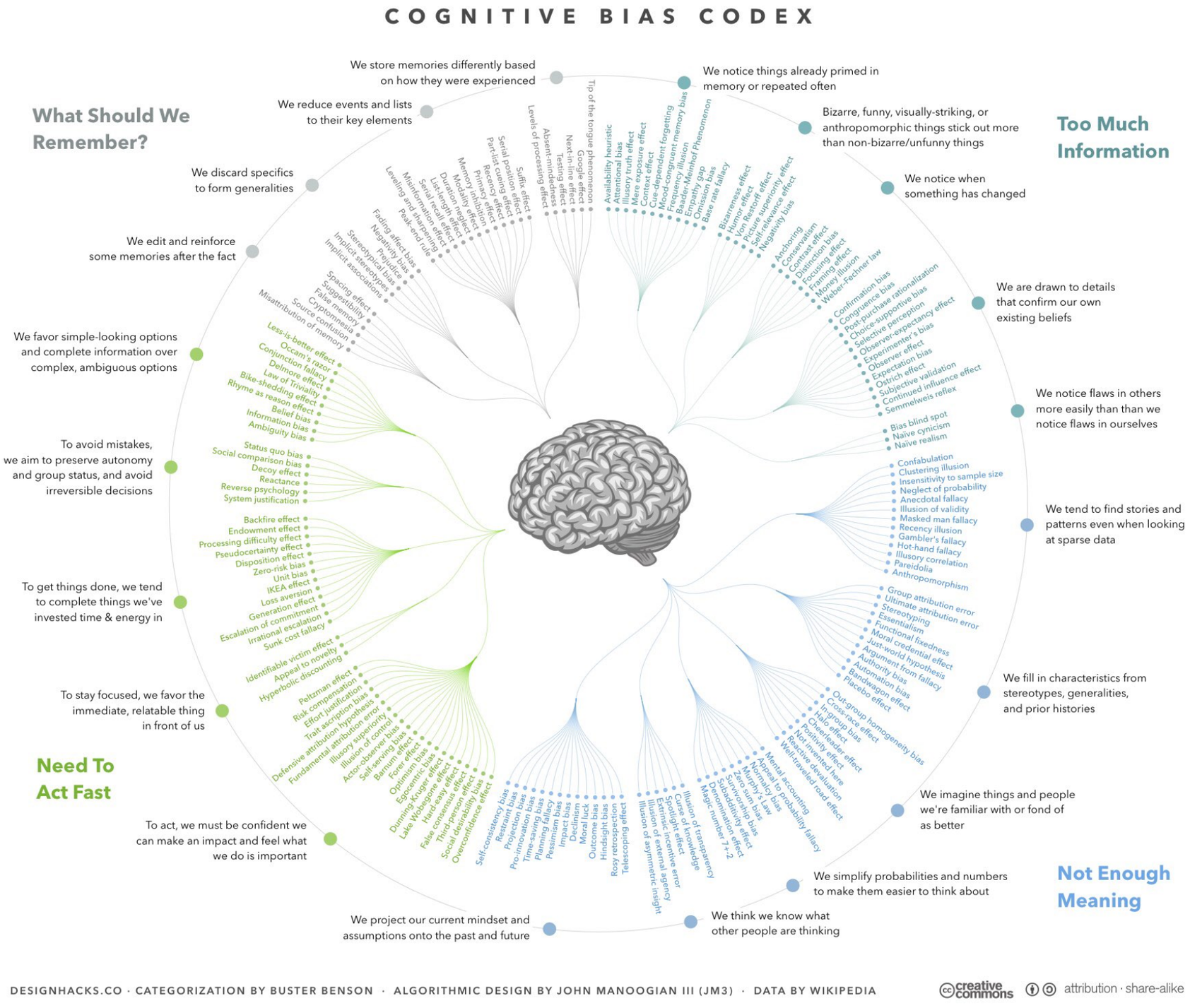
ANCHORING AND ADJUSTMENT HEURISTIC