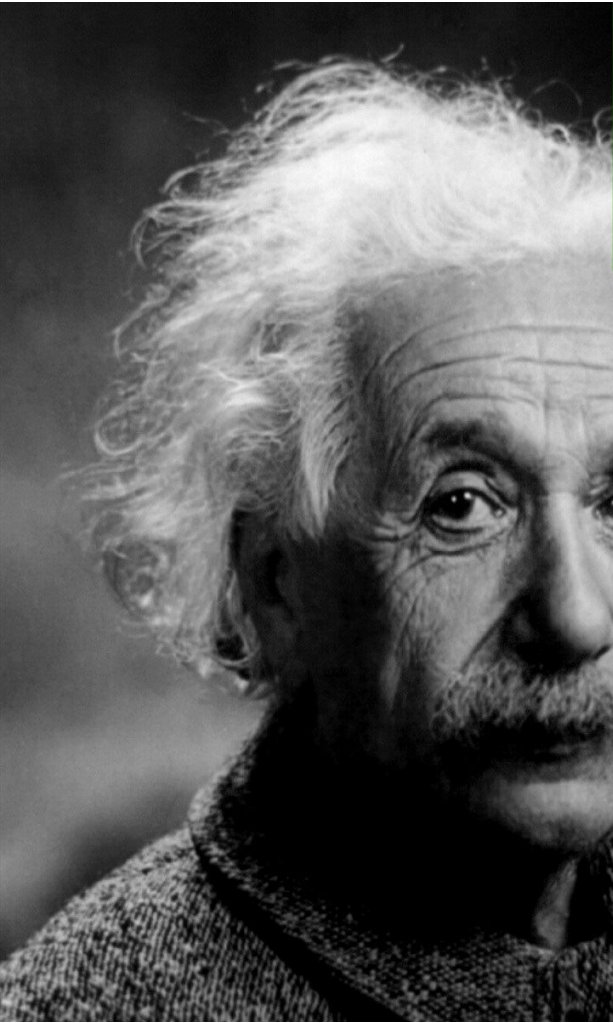




Heuristics

- Use mental shortcuts to make decisions & form judgments
- Based on past experience
- Just like with solving problems, heuristics can be the quickest way, but aren't always correct



A black and white portrait of Albert Einstein, showing his characteristic wild, white hair and mustache. He is looking slightly to the right of the camera with a thoughtful expression. He is wearing a dark, textured sweater.

“On a Heuristic Point of View Concerning
the Generation and Transformation of Light”
Albert Einstein

Albert Einstein

Recognition Heuristic

- Who will win in the soccer match: Manchester United vs. Shrewsbury Town? (Ayton & Onkal, 1997)
 - Which has a greater population: San Diego or San Antonio? (Goldstein & Gigerenzer, 2002)
 - Turkish participants as accurate as British in the former; German participants more accurate than American in the latter
-

Anchoring & Adjustment Heuristic

Step 1: Consider an initial estimate of the quantity you are trying to judge. This is the “anchor.”

(People often know that this initial estimate isn't perfectly accurate.)

Step 2: Adjust the initial estimate in the direction that corrects for assumed sources of error.

- *Psychological Fact: Adjustments are typically too small!*
- *Result: Final judgment is overly influenced by the anchor, i.e., the final estimate is biased towards the anchor.*



Roger Bannister

Examples of availability heuristic:

- **Is it more likely that you get killed by a falling airplane or a shark attack?**



A



B

Developer: Lehman Benson III, University of Arizona, lehmanb@email.arizona.edu, 2006

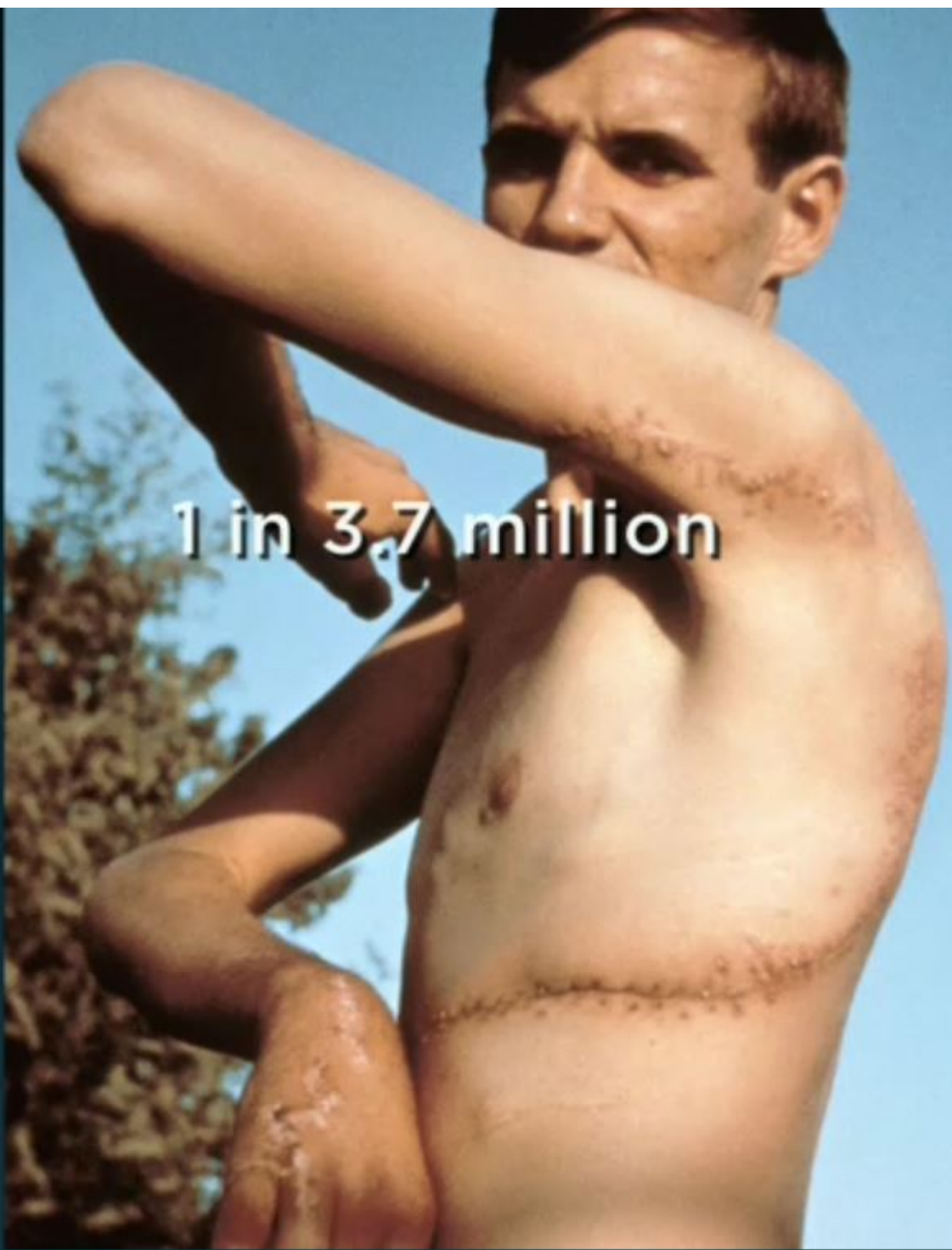
http://sitemaker.umich.edu/dec.btr/files/benson_overview.pdf

An illustration of a woman with long black hair, wearing a red top, applying powder to her face with a brush. A thought bubble above her head contains text. The background features a grey pattern of white silhouettes of people and a red diagonal band with a pattern of numbers.

I must buy this
anti-aging powder,
Nina says it's
very **effective!**

**Anecdotal
Evidence**
is information
based on
nonfactual data.

1 in 3.7 million





47 times per year



3 to 9 injuries

1 to 3 deaths

Escalating Commitment

- Management research suggests that we are prone to a particular type of bias when decisions are approached serially (one decision on top of another) – namely, a tendency to escalate commitment!

Representativeness heuristic

- Kahneman and Tversky (1982) explained these results using the **representativeness** heuristic
 - tendency of people to judge probabilities or likelihoods according to how much one thing resembles another
- Linda is more representative of a feminist bank teller than just a bank teller alone, so people give the second answer

Sympathetic Magic

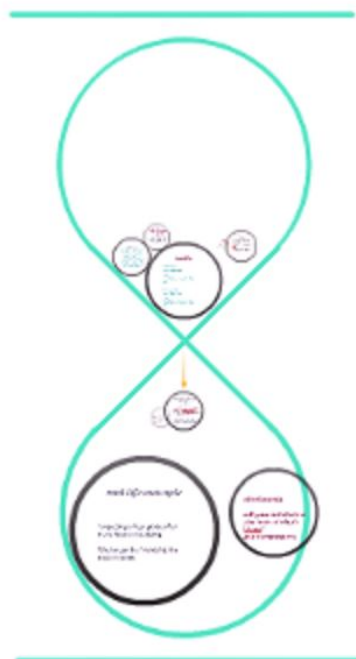
- Peruvian Indians molded images of fat mixed with grain to imitate the persons whom they disliked or feared
- They then burned the effigy on the road where the intended victim was to pass.
- This they called burning his soul.

**Homeopathy: "Like Cures
Like"—
frequently unasked
questions?**

**...or, some of what you wanted to know and did not
have a chance to ask.....**

the effort heuristic

13.04.2016





THE
WISDOM OF CROWDS

Why the Many Are Smarter Than the Few

JAMES SUROWIECKI



"Dazzling . . . the most brilliant book on business, society and everyday life that I've read in years"
Malcolm Gladwell,
author of *The Tipping Point*

A NEW YORK TIMES BUSINESS BESTSELLER

"As entertaining and thought-provoking as *The Tipping Point* by Malcolm Gladwell. . . . *The Wisdom of Crowds* ranges far and wide."

—*The Boston Globe*

THE WISDOM
OF CROWDS

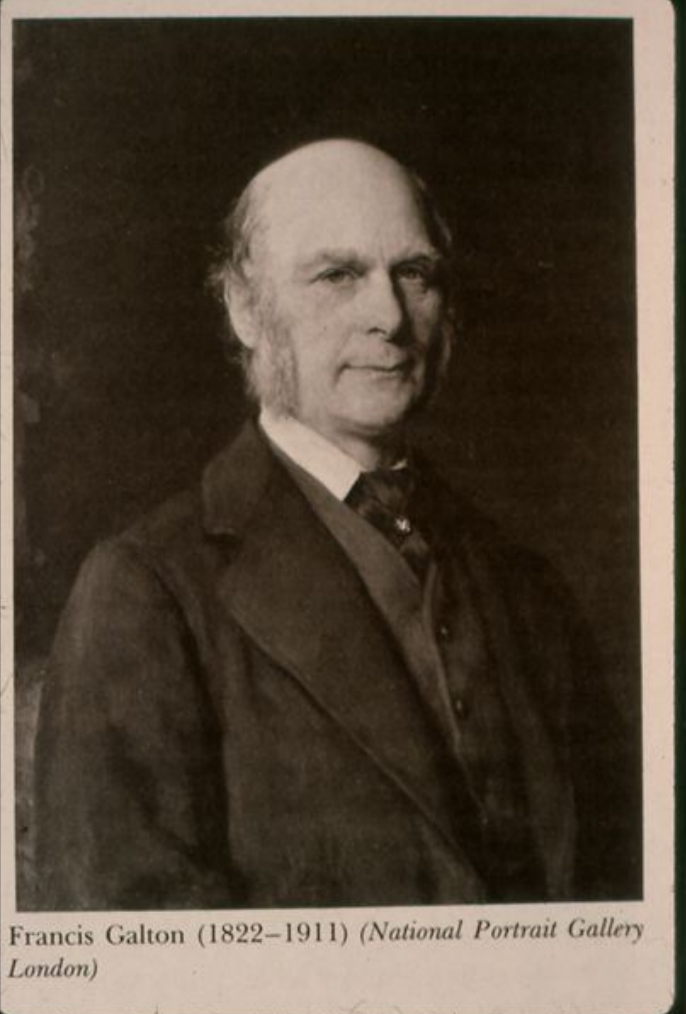
JAMES
SUROWIECKI

WITH A NEW AFTERWORD BY THE AUTHOR



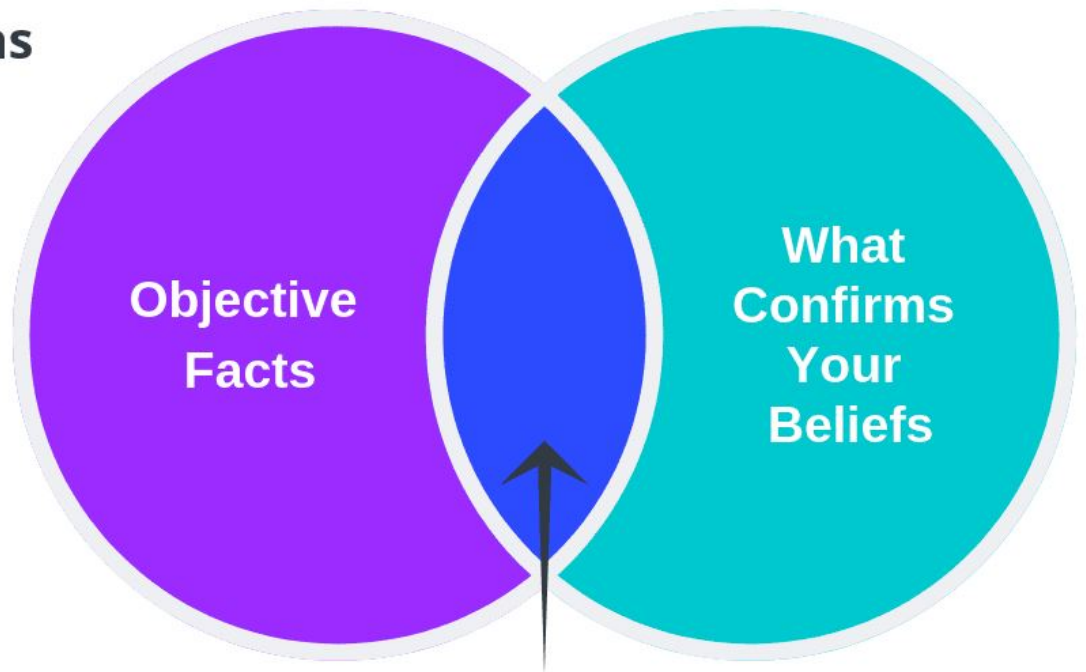
Francis Galton

First scientific theory
& measurement of
intelligence



Francis Galton (1822–1911) (*National Portrait Gallery London*)

Confirmation Bias



What You See

The Congruence Bias

- The tendency of experimenters to plan and execute tests on just their own hypotheses without considering alternative hypotheses.
- This bias is often the root cause of missed negative test cases. Testers write test cases to validate that the functionality works according to the specifications and neglect to validate that the functionality doesn't work in ways that it should not.
- Case Study: Your negative test case or boundary miss

PREFERENCE



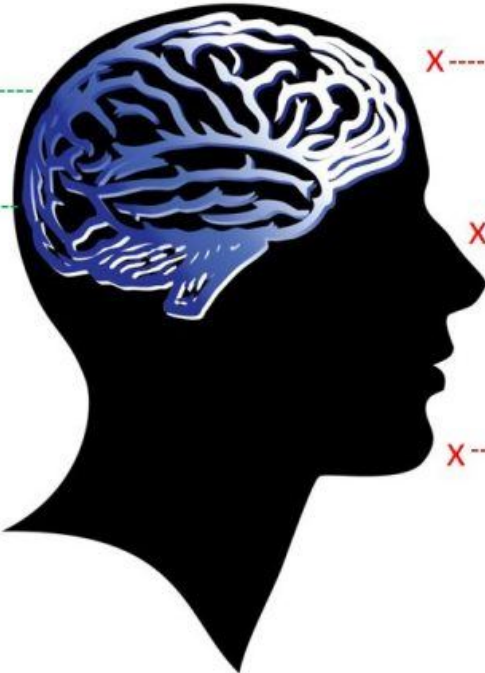
EXPOSURE

CHOICE-SUPPORTIVE BIAS

The fact you heard first



The decision you've made



Counterargument #1

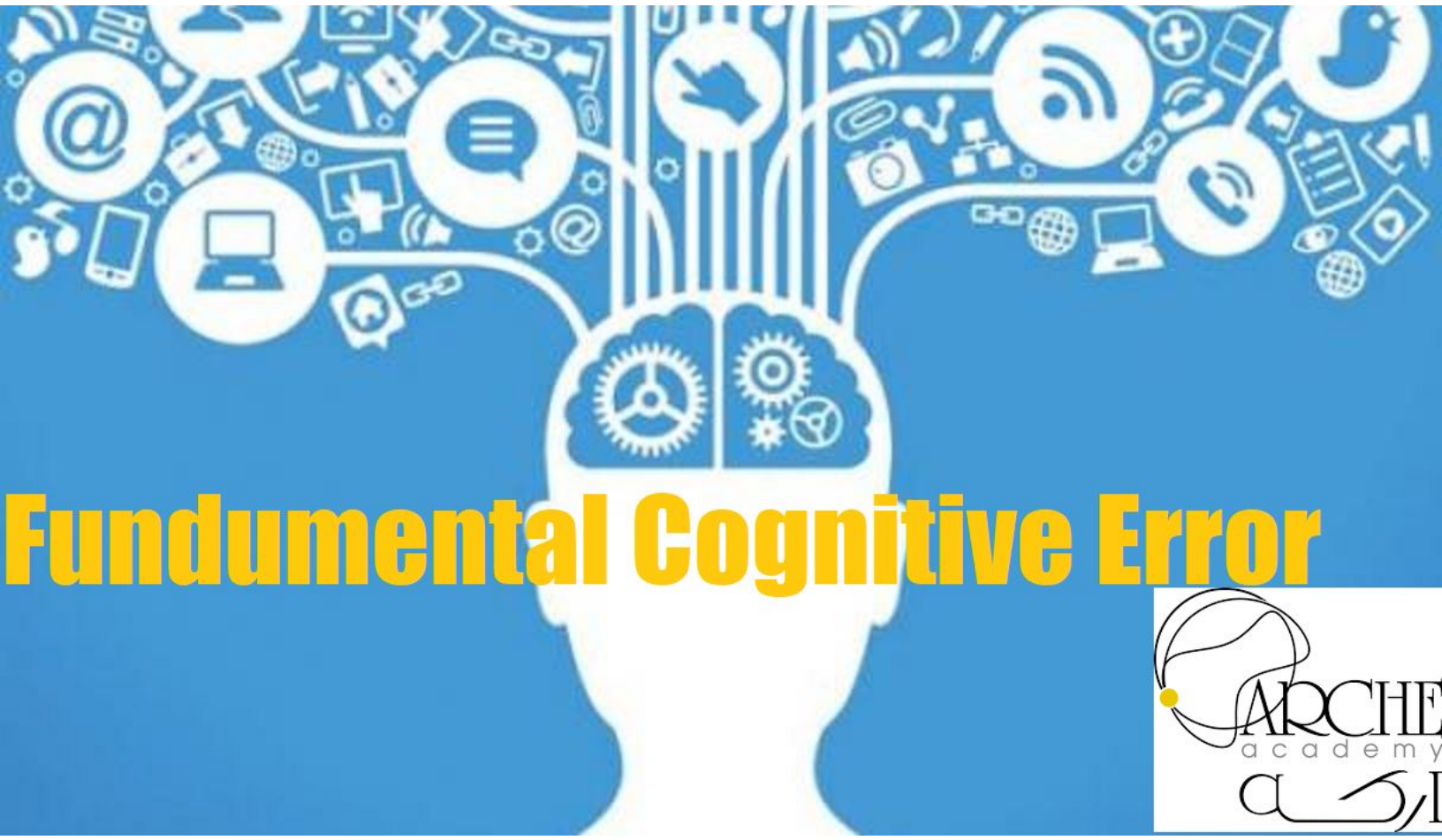


Counterargument #2



Counterargument #3





Fundamental Cognitive Error



Who did it?

	myself	someone else
<u>Outcome</u> positive	personality	circumstances
negative	circumstances	personality

The Barnum Effect

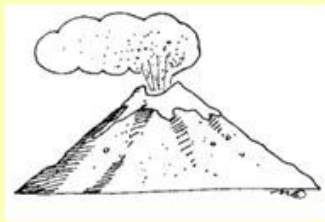
- The **Barnum effect**, also called the **Forer effect**, is a common psychological phenomenon whereby individuals give high accuracy ratings to descriptions of their **personality that supposedly are tailored specifically to them but that are, in fact, vague and general enough to apply to a wide range of people**

➤ **Flaws in design**

99% of species extinct



And



➤ **Lottery Fallacy** argues that given enough time or tries, conditions would eventually be perfect for existence.



Cold Reading Techniques

**That teaches you how to
read people's mind instantly**

Randomness to Probability

Clustering illusion

- a tendency to see clusters of meaningful patterns in a random jumble of info.
- Don't place too much emphasis on short-term performance

The Gambler's Fallacy

- **Gambler's Fallacy:** Assuming that a departure from what occurs on average will be corrected in the short run.
- Another way to think about the gambler's fallacy: because an event has not happened recently, it has become "overdue" and is more likely to occur.
- Example: The odds on a US Roulette table never change.
 - For each spin:
 - There is an 18 in 38 chance for a red number to "hit"
 - There is an 18 in 38 chance for a black number to "hit"
 - There is a 2 in 38 chance for a green number to "hit"
 - You suffer from the Gambler's Fallacy if you think that it is more likely for a black number to "hit" after a series of red numbers have hit.

Regression to the Mean

His pain got worse, he went to a doctor, and the pain subsided a little.

Therefore, he benefited from the doctor's treatment.



The frequency of accidents on a road fell after a speed camera was installed.

Therefore, the speed camera has improved road safety.

P1: MY BIKE BROKE
AFTER ALEX RODE IT

P2: USUALLY THE PERSON WHO
RIDES THE BIKE BEFORE IT
BROKE CAUSED IT TO BREAK

C:

THEREFORE, ALEX

LATIN FOR

**AFTER THIS, THEREFORE
BECAUSE OF THIS**

CAUSE



EFF

The Linda Problem

- **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 is a bank teller.

(B) Linda is a bank teller and is active in the feminist movement.



Disjunction Fallacy

- Suppose it is the year 2008*. What is the likelihood that:
 - (A) **Obama** wins the general election
 - (B) **Clinton** wins the general election
 - (C) **A Democrat** wins the general election
- According to laws of probability, when A and B are mutually exclusive events and D combines all these events:
 $P(A) + P(B) = P(C)$
- But sometimes the sum of the judged probabilities of individual events exceeds the judged probability of the general event
 $P(A) + P(B) > P(C)$
- This is an example of a **disjunction fallacy**

* assume that Edwards already dropped out of the race