Some Basic Induction Biases 2019

Bias

A bias is a slant, an inclination to inference in a way that leads to inductive error.

Heuristic

A mental shortcut

As such, they incline us to inductive error

The Halo Effect

Consider the following analogical induction:

$J = \{p_1, p_2, p_3 \ldots p_n\}$

$G = \{p_1, p_2, p_3 \ldots p_{n+1}\}$

George is kind, personable, attractive, goes to Georgetown U, and is **generous (4+1)**.

John, whom I just met, is kind, personable, attractive, goes to Harvard, …I infer that he will be willing to give to our cause.

You meet someone at a party and find him personable and easy to talk to. Now his name comes up as someone who could be asked to contribute to a charity. What do you know about John's generosity?

Ans: You know virtually nothing, because there is simply no evidence to believe that people who are agreeable in social situations are also generous contributors to charities.

You make the inference that because he is likeable, and in your experience likeable people have also been generous, you conclude that this person is generous.

You are predisposed to believe that this person is a generous person.

The Halo Effect continued

Now that you believe he is generous, you probably like him even more than you did earlier, because you have added generosity to his pleasant attributes (by mere inference, or analogical induction).

As Daniel Kahneman writes: “Real evidence of generosity is missing in the story of …, and the gap is filled by a guess that fits one’s emotional response to her.”

If you like the Prime Minister or President's politics, you probably like his voice and his appearance as well. The tendency to like everything about a person—including things you have NOT observed—is known as the halo effect.

The Horn Effect: the opposite of the Halo Effect

If you do not like the Prime Minister's politics, you probably don't like his voice and appearance as well.

Take note when a person finds a particular political opponent repulsive. Ask yourself:

Is the reaction proportionate to what is actually known of the candidate? In the vast majority of cases, it is not. The information about the candidate is very incomplete, but the reaction (whether it is love or hate) would suggest a knowledge that is certain and complete.

I.e., Trump derangement syndrome

The Fallacy of Bifurcation

In short, the black and white fallacy.

We have a tendency to simplify reality in ways that lead to error in judgment. But reality is complex beyond what we currently understand. However, one way we simplify is bifurcation (either/or).

- If he didn’t vote Democrat, then he is a Republican.
- "America - Love It Or Leave It". A slogan implying that a true patriot must support everything done by America.
- Equating anti-semitism with criticism of something Israel does (i.e., the occupation)

Bifurcation (offshoots)

When we idolize anyone, we typically fall into **the fallacy of bifurcation** *(close cousin of the Halo effect)*

If someone (i.e., a scholar) we admire is often right, we incline to believe that everything he says is right. It's simpler if I belong to a single school of thought. He's either completely right or completely wrong.

- "Us and Them" mentality. It's either us or them.
- Fundamentalists fall into bifurcation.
- Those who fall into bifurcation are uncomfortable with uncertainty.

Belief Perseverance

Bifurcation tends to beget “belief perseverance”. One is inclined to ignore evidence and persevere in one’s beliefs, despite evidence to the contrary.

Paradigmatic vs. Evidence Based Thinkers.

Paradigm: a cognitive model, a cognitive framework, a habitual way of seeing the world.

The Bandwagon Effect

The inclination or tendency to adopt a conceptual framework (paradigm) by virtue of the fact that “everyone else” has done so.

Group think.

i.e., Ted Talks exhibit group think (certain people are never invited).

In the 90s: Iraq War was almost universally condemned. Today, people hesitate to support decision to pull out of Syria. Why this difference? Group think.

When someone is hired by a corporation, it is easy to fall into group think (team player)

Affect Heuristic (another close cousin of the Halo Effect)

Heuristic: a mental shortcut (or rule of thumb).

The tendency to inference on the basis of “feeling” (affect), rather than on reason.

“He’s so charming, and he makes me feel so good about myself”

(former girlfriend of “dirty John”)

Representativeness heuristic

This is the tendency to estimate (infer) the probability of an event by comparing it to an existing prototype that already exists in the mind. The prototype is what we have judged to be the typical example of a particular event.

Mrs. Jones loves quiet, and she loves to read, and she wears reading glasses. She is more likely to be:

a) farmer

b) librarian

Base Rate Neglect

Representativeness heuristic involves the statistical fallacy of “base rate” neglect.

ratio: 20 : 1 = farmer (20 people to every farmer)

ratio: 50 : 1 = librarian (50 people to every librarian).

Pia is thirty-one years old, single, outspoken, and smart. She was a philosophy major. When a student, she was an ardent supporter of Native American rights, and she picketed a department store that had no facilities for nursing mothers. Rank the following statements in order of probability from 1 (most probable) to 6 (least probable). (Ties are allowed.)

___ (a) Pia is an active feminist.
___ (b) Pia is a bank teller.
___ (c) Pia works in a small bookstore.
___ (d) Pia is a bank teller and an active feminist.
___ (e) Pia is a bank teller and an active feminist who takes yoga classes.
___ (f) Pia works in a small bookstore and is an active feminist who takes yoga classes.

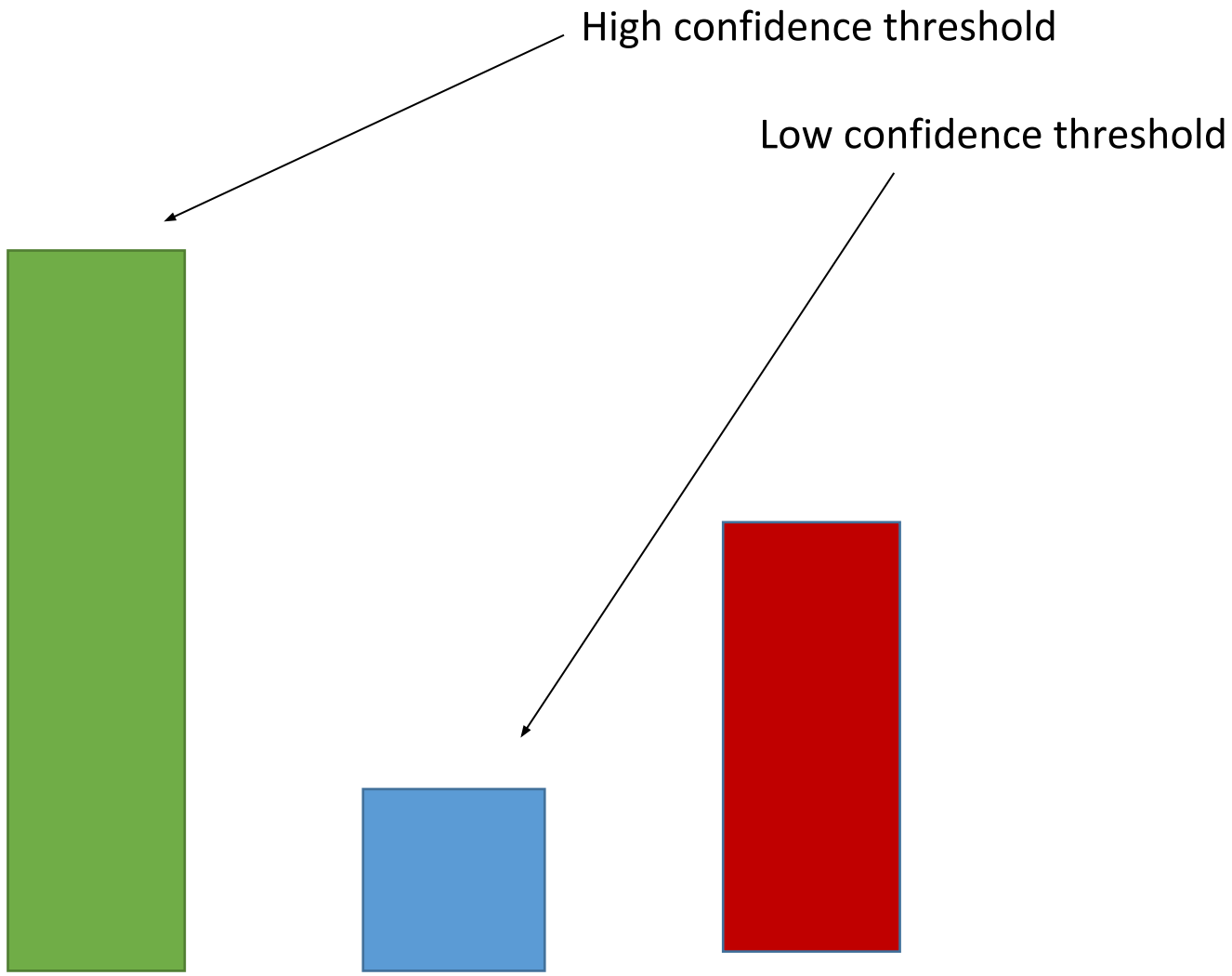
P(A&B) ≤ P(A), and P(A&B&C) ≤ P(A&B) ≤ P(A). In other words, b) and c) imply a), and so there is a far greater probability that Jill is a bank teller than that she is a bank teller and an active feminist. Thus, the P(a) ≥ P(b) ≥ P(c).

In other words, there are more bank tellers in the city of Toronto than there are bank tellers that are also active feminists, and there are more bank tellers that are active feminists than there are bank tellers who are active feminists and take yoga classes

Ideological Immune System

Our coordinated system of psychological defences against evidence that contradicts our entrenched views.

Confidence thresholds

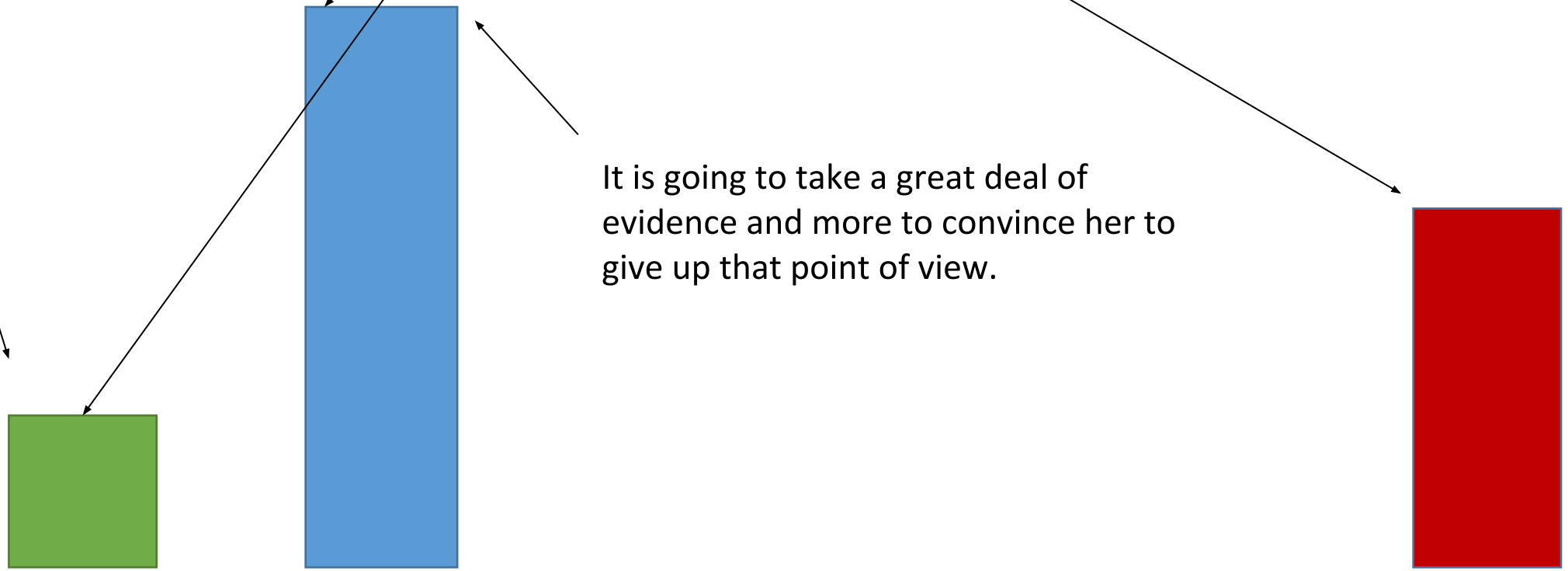

High confidence threshold
Low confidence threshold

Rejection Thresholds

It didn't take much for me to reject that hypothesis (my rejection threshold is very low)

Rejection threshold

It is going to take a great deal of evidence and more to convince her to give up that point of view.

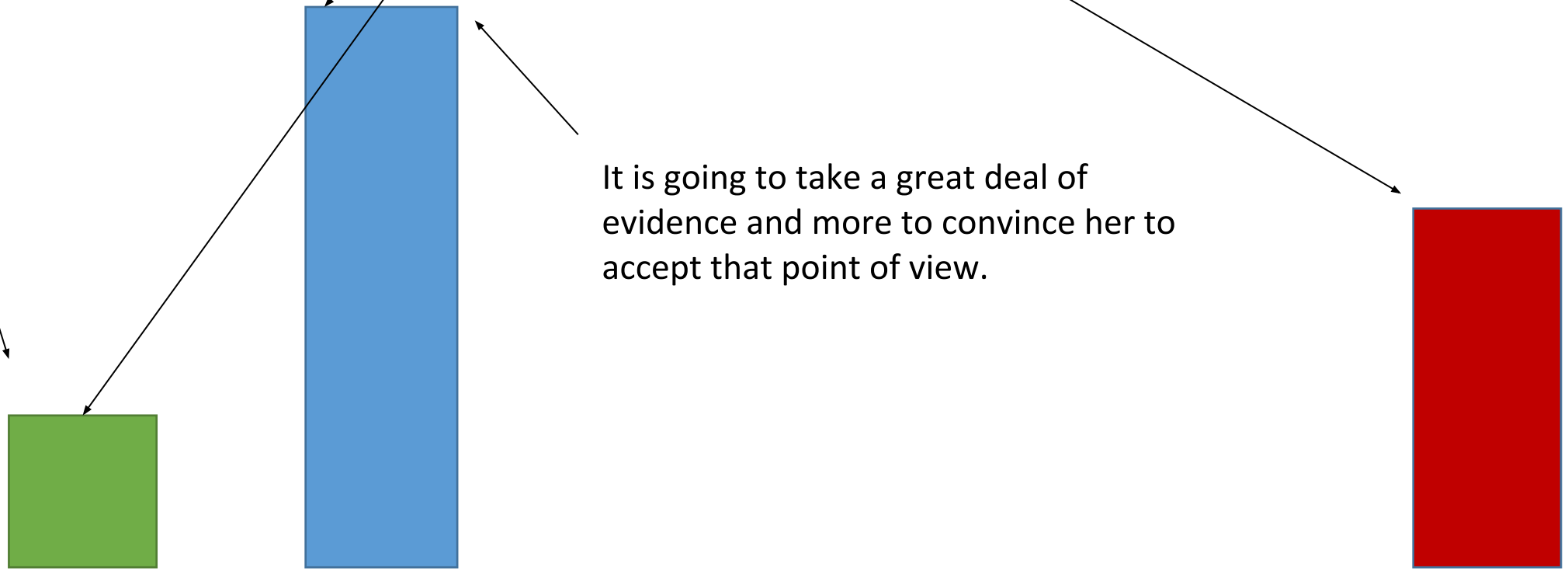


Acceptance Thresholds

It didn't take much for me to accept that hypothesis (my acceptance threshold is very low)

Acceptance threshold

It is going to take a great deal of evidence and more to convince her to accept that point of view.



Priming and Anchoring

1. Mary just purchased a new washing machine. It is much more efficient, it is quieter than the old washing machine, and it has a larger load capacity.

Fill in the missing letter

S O __ P

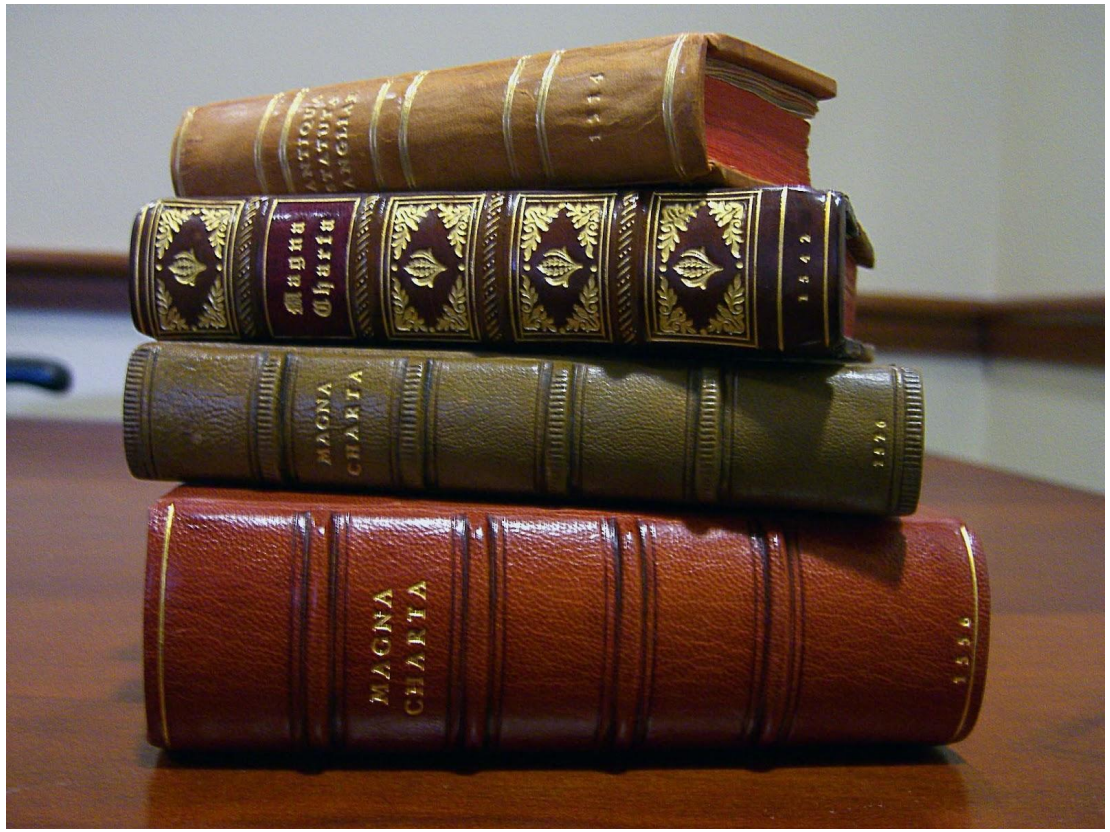
Meet Alan: He is:

intelligent – industrious – impulsive – critical – stubborn – envious.

1. The most popular reality shows today are cooking shows: ie., Masterchef, My Kitchen Rules, Hell's Kitchen. Wouldn't you like to be one of the judges that gets to eat a bit of everything?

Fill in the missing letter:

S O __ P

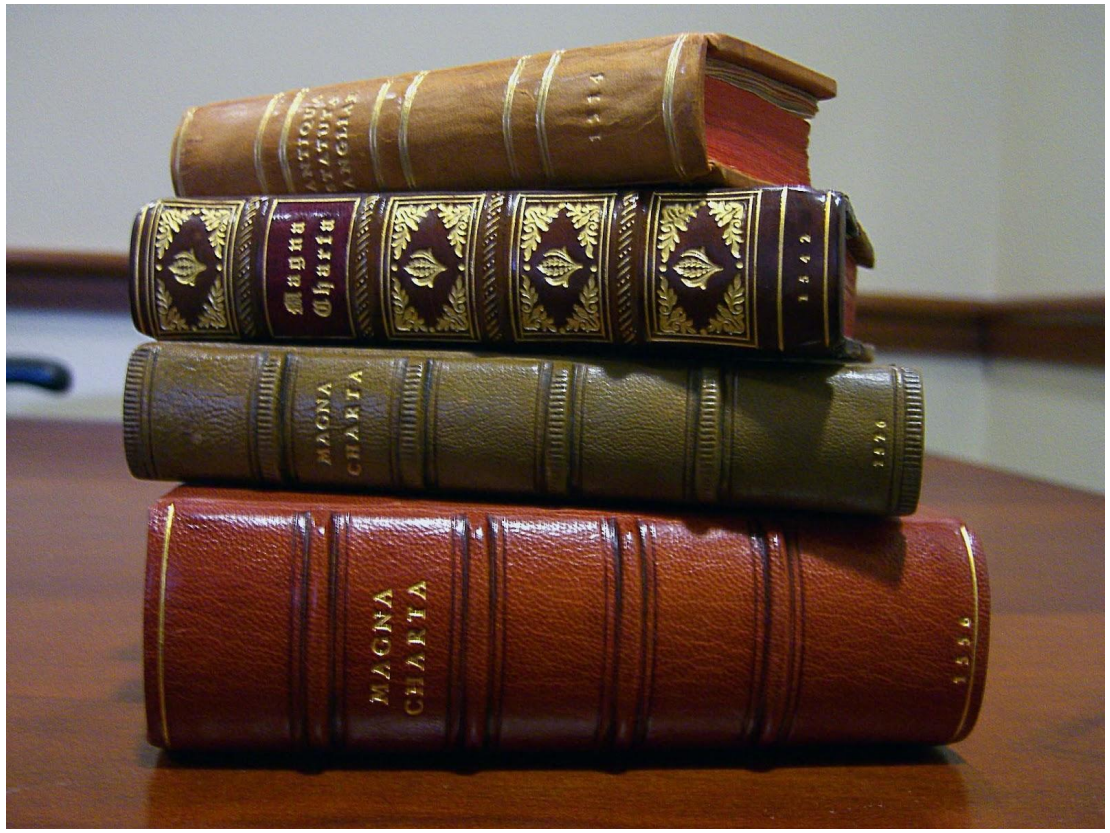


The above are some rare books discovered in a used bookstore in Los Angeles, California. I believe that the total price charged for these four books was:

Circle your response

a. Over $150 b. Under $150

Estimate their worth: $ _____



The above are some rare books discovered in a used book store in Los Angeles, California. I believe that the total price charged for these four books was:

Circle your response

a. Over $800

b. Under $800

Estimate their worth: $ _____

Meet Ben. He is:

envious – stubborn – critical – impulsive – industrious – intelligent.

Who would you hire to teach your children?

A. Alan (the first candidate)?

Or,

B. Ben (the second candidate)?

The Narrative Fallacy

The narrative fallacy addresses our limited ability to look at sequences of facts without weaving an explanation into them, or, equivalently, forcing a logical link, an arrow of relationship upon them. Explanations bind facts together. They make them all the more easily remembered; they help them make more sense. Where this propensity can go wrong is when it increases our impression of understanding.

Nassim Nicholas Taleb, The Black Swan

Which is more probable?

A) A massive flood somewhere in America in which more than a thousand people die
B) An earthquake in California, causing massive flooding, in which more than a thousand people die.

1. A study of new diagnoses of kidney cancer in the 3,141 counties of the United States reveals a remarkable pattern. The counties in which the incidence of kidney cancer is lowest are mostly rural, sparsely populated, and located in traditionally Republican states in the Midwest, the South, and the West. What do you make of this? (Daniel Kahneman, Thinking, Fast and Slow, "The Law of Small Numbers").

    a. This is probably due to the fact that rural people breathe clean air, drink clean water, they have access to fresh food without additives and preservatives, etc.
    b. It has to do with the fact that these are Republican states, and people who vote Republican are less likely to come down with kidney cancer for the simple reason that they tend not to favor government intervention, and so are less reckless in their eating habits, etc.
    c. There is no cause.

A study of new diagnoses of kidney cancer in the 3,141 counties of the United States reveals a remarkable pattern. The counties in which the incidence of kidney cancer is highest are mostly rural, sparsely populated, and located in traditionally Republican states in the Midwest, the South, and the West.

a. The high cancer rates are directly due to the poverty of the rural lifestyle—no access to good medical care, a high-fat diet, and too much alcohol, and too much tobacco.

b. It has to do with the fact that these are Republican states, and people who vote Republican are more likely to come down with kidney cancer, because they believe in less government intervention, and so unregulated foods (that would be prohibited under a bigger and more watchful government) are allowed to enter the market.

c. There is no cause.

About as many boys as girls are born in hospitals. Many babies are born every week at City General Hospital. In Rural County Hospital, only a few babies are born every week. A normal week is one where between 45% and 55% of the babies are female. An unusual week is one where more than 55% are girls, or more than 55% are boys. Which of the following is true?

a. Unusual weeks occur equally often at City General Hospital and at Rural County Hospital.

b. Unusual weeks are more common at City General Hospital than at Rural County Hospital.

c. Unusual weeks are more common at Rural County Hospital than at City General.

The Law of Small Numbers

Take a pack of cards and pick 7 or 8 cards at random.

Calculate the percentage of each suit you chose. I chose:

4 clubs (57% are clubs)

2 hearts (29% are hearts)

1 diamond (14% are diamonds)

0 spades (0% are spades)

The Law of Small Numbers and the Narrative Fallacy

Rural areas are sparsely populated (fewer people, like fewer cards chosen out of a deck), so we can expect unusual occurrences of say Kidney cancer or a disproportionate number of boys born in rural hospitals, etc. The reason has nothing to do with water, fresh food, or lack of clean water, tobacco, etc. It is the result of the law of small numbers. 57% of my sample cards were clubs. But only 25% of the whole deck are clubs.

We tend to insert arrows of causality between series of facts. That gives us the feeling that we have explained it

Narrative Construction

https://www.youtube.com/watch?v=lSkpPaiUF8s&t=3s

Debiasing Strategies

- Skeptical empiricism:

This describes a general posture that starts with consistent questioning, as well as a refusal to engage in broad theorizing, and an appreciation for the real possibility of unexpected events (Kelly, 2018).

Debiasing

Be wary of educational programs or curriculums that present only one dominant view. A good debiasing technique is to promote freedom of expression, free speech, and rail against the concept of political correctness. How do we know that the prevailing political narrative is true? The prevailing political narrative in the early part of the 20th century in Germany turned out to be very wrong. How do we know we are right?

Examples of Dominant Viewpoints that have held sway or currently hold sway

Israel bad -------- Palestinians good

Palestinians bad ---------- Israel good

Indigenous good ---------- White/European/Christian bad

Corporations bad ---------- Small business good

Socialism (free things) good ---------- Capitalism bad (benefits the rich only)

Left good (compassionate) ---------- Right bad (intolerant)

The reality of the situation is far more complex.

Debiasing (information awareness)

Keep in mind that we are always working with incomplete information. New information can and often does change the validity of our conclusions. For example:

We thought that if you have this disease (p), then you will have symptoms q, r, s, t.
We now know (after 40 years of research) that you will also have symptom u, such that if you do not have symptom u, you do not have this disease.

If p → [q, r, s, t]
q, r, s, t
p (you probably have the disease. But….)

New information gives us a revision:

p →[q, r, s, t, u]

q, r, s, t, ~u **or** ~[q, r, s, t, u]

~p (oops, you really don't have the disease)

However, our new information may also turn out to be a revision the other way (a diminishing).

We thought that being an A student meant being able to do: q, r, s, t. We now know, after much experience, that an A student in grade 12 can be reasonably expected to achieve [q, r]

$p \rightarrow [q, r, s, t]$
$q, r,$ (i.e., $\sim [q, r, s, t]$
$\sim p$ (at the start of IB, we inferred that Jack is not a good student)

Revision:

$p \rightarrow [q, r]$
$q, r,$
p (oops! We were wrong. Jack probably is actually quite brilliant)

Debiasing: Suspension of Disbelief.

- It is reasonable to commit to a point of view or a particular position, but develop the habit of “suspension of disbelief”.

- This means: Don’t be too **confident** that the position you are inclined to reject is wrong. Put that disbelief in suspension and look into it. You might be missing important information that in due time will falsify your current position.