

Recall

- Analyzing statistical data
 - We are very good at seeing patterns
 - Too good
 - We don't realize when a set of events might be random
 - We are very good at generating explanations
 - Too good
 - We generate explanations for patterns that aren't there
 - We suffer from the confirmation bias when analyzing data (recall 2x2 table)

Bias

- Advantages
 - Stops us from re-evaluating our entire belief scheme every time we are confronted with new information
 - Makes us resistant to wasting our time even considering ridiculous beliefs.
 - Helps us disambiguate certain kinds of information

C /-\ T versus T /-\ E

Perceptual bias



Bias (cont.)

- Disadvantages
 - Sometimes our current belief scheme is wrong but that belief scheme will be resistant to change
 - Basically, the confirmation bias we encountered before
- So, we must be able to distinguish *appropriate* and *inappropriate* biases

Appropriate bias

- More skeptical of miracles than events consistent with experience
- In short,
 - The more contradictory an event is to a well-confirmed theory... or
 - The more surprising an event...

The more likely it is to be untrustworthy

Appropriate bias

CONTRACTS ACQUISITIONS & ARBITRATION COMMITTEE

NATIONAL SECRETARIAT,

16, ELETOGABI ST, OFF ADEOLA ODEKU ST, VICTORIA

ISLAND, LAGOS-NIGERIA.

Dear Sir/Madam,

BUSINESS PROPOSAL: TRANSFER OF US\$ 30.5 M (THIRTY MILLION, FIVE HUNDRED THOUSAND UNITED STATES DOLLARS) & BUSINESS INVESTMENTS PARTNERSHIP.

First, I must crave your indulgence in receiving this email from me. But I must beg you to forgive me and read what I have to say. If you find this offensive, please forgive and disregard the contents. I am Victor Lar of the Contracts Acquisitions & Arbitration Committee (CAAC) set up by the present civilian Government of Nigeria to review contracts awarded by the past military administrations. In the course of our work at the CAAC, we have discovered this fund, which resulted from gross re-valuation of contracts by top government officials of the last administration. The companies that executed the contracts have been duly paid and the contracts commissioned leaving the sum of US\$30.5 Million floating in the escrow account of the Central Bank of Nigeria ready for payment.

TOO GOOD TO BE TRUE

Extended example

- Starts at 3min into the clip I've linked below, and the second starts at 5:25
<http://www.youtube.com/watch?v=-4xAucZod6w>
- Melting steel: http://www.popularmechanics.com/technology/military_law/i227842.html?page=4
- Big plane, small hole: http://www.popularmechanics.com/technology/military_law/i227842.html?page=6
- White jet: http://www.popularmechanics.com/technology/military_law/i227842.html?page=7

Inappropriate bias

- Gilovich: Our beliefs should influence our assessments in proportion to how plausible the beliefs are
- But theories have a kind of 'inertia'
 - Ulcers are likely the result of bacteria (*helicobacter pylori*)
 - Strongly conflicted the longstanding theory that ulcers were the result of increase stomach acid activity
 - Difficult for scientists to get a new idea accepted (about 15 years)

Ambiguous information

- Colour black in professional sports: the referee's bias shows up in penalties assessed, and in our expectations of the team.
- The mere fact that somebody hits somebody else during a hockey game is ambiguous as to whether they were being excessively aggressive, or just playing the game.
- Happens in perception (e.g. rolling circles, next slide)
- Like the previous C /-\ T versus T /-\ E.

Ambiguous data

- Two interpretations are equally appropriate, but our sensory system prefers one over the other (2nd case).



Unambiguous information

- We seldom take unambiguous information to be what it isn't (i.e. we don't take the 'H' in CHT to be an 'A')
- Instead, we:
 1. subject inconsistent information to more criticism;
 2. seek out additional information only when initial data is inconsistent with our background beliefs; and
 3. assign meaning to new information based on our current beliefs.
- E.g., capital punishment, gambling errors

An example



Science

- Science is a human endeavour: scientists are as prone to these kinds of error tendencies as anyone else.
- E.g. recommendations for publication of a paper can depend on whether it agrees with the view of the reviewer or not (subtly)
- E.g. Broca looked for extra factors to account for differences in brain size between Germans and French, but looked for no such factors to account for differences between men and women.

Science (cont.)

- BUT scientists
 - Insist on replication
 - Publicly present all results
 - Rely on a set of established procedures and other tools designed to eliminate such bias
 - Quantitatively specify result meaning (*in advance*)
- None of these methods eliminate bias from every trial but they all go to limiting its effect in the long run (e.g. [homeopathy metastudy](#) finds no overall effect).
- Bias often depends on the kind of event, for instance...

Two-sided events

- Events that registered as events regardless of how they turn out (a win or loss, correct or incorrect, successful or unsuccessful, and so on).
- Folk wisdom (i.e., we just remember what we want) is not relevant for two-sided events because either result is emotionally significant (e.g., the slapshot that just went wide)

One-sided events

- Events that stand out only when they turn out one particular way.
- E.g. only notice when somebody cuts us off in traffic
- Logically speaking, a non-occurrence is as important as an occurrence, but psychologically this is not true.
- So expect only the psychologically interesting result to be remembered
- There are a number of factors that determine the type of event... for instance

Confirmation

- One-sided events are often confirmation events.
- That is, events in which our prediction is confirmed
- Confirmation events are much more memorable than non-confirmation events.
- E.g. subjects read a diary that was trying to determine the prophetic nature of dreams
 - better remembered dreams paired with the events that confirmed them

Temporal focus

- Focussed: The outcome of the event occurs at a pre-specified time (e.g. a win or loss occurs at the end of the game): two-sided
- No focus: when a relevant event may occur is left open (e.g., fulfillment of a prophecy may occur at any time; e.g. Nostradamus): one-sided
- E.g. diary experiment where events were
 - 1) either confirmed or disconfirmed immediately (no difference in recall); or
 - 2) confirmed or disconfirmed at any point in the text of the diary (3x better rate for confirmed)

Nostradamus

- **The year 1999 seven months
From the sky will come the great King of Terror.
To resuscitate the great king of the Mongols. Before and after
Mars reigns by good luck.**
- Nobody, not even the most fanatical of Nostradamus' disciples, had a clue what this passage might have meant before July 1999. However, after John F. Kennedy Jr., his wife Carolyn Bessette and her sister Lauren Bessette, were killed in a plane crash on July 18, 1999, the retroprophets came out of the woodwork. Here is just one example:
- **Could the crash of John F. Kennedy Jr.'s airplane in July of 1999 fulfill the line "from the sky will come "the great King of Terror"? Could the human fear of death and bodily injury be the intended definition of "the great King of Terror"? It might be possible!**

Asymmetries

- Different kinds of asymmetries result in one-sided events
 - Hedonic
 - Pattern
 - Definitional
 - Base-rate

Hedonic asymmetries

- Different instrumental consequences of possible outcomes can make events one-sided
- E.g. not being able to go through a door is more salient than being able to go through
- Most of Murphy's laws are probably a result of this kind of asymmetry:
 1. If anything can go wrong, it will.
 2. If anything just cannot go wrong, it will anyway.
 3. Left to themselves, things tend to go from bad to worse. ... etc.

Pattern asymmetries

- Symmetries (i.e. 'positive cases') that generally make an event one-sided
 - E.g. clock times of 3:33 or 12:00; many hits in a row
 - Matches create 'units of interest' that become the focus of attention
 - This forms the basis for belief in things like numerology
 - And 'hot hand'



Definitional asymmetries

- Events that by their very nature tend to be confirmed only
 - E.g. I can always tell when someone is wearing a hairpiece
 - E.g. people have to hit rock bottom before they recover

Base-rate departures

- The unexpected is often very memorable
 - E.g., people going into remission after visiting a faith healer
- Goffman termed such departures in a social setting 'negatively eventful actions'. This is when we don't notice social norms until they are violated
 - E.g. 'personal space', head-shaking customs, etc.

Summary

- All such factors leading to one-sided events serve to distort the 'evidential record'
- Such distortions lead to mistaken beliefs
- As critical thinkers, we may not be able to avoid such problems altogether, but we can at least try to take them into account.

Question

- Q: Give an example of an inappropriate bias.