

THE LIMITS OF KNOWLEDGE & THE POWER OF BULLSHIT

“Sapiens: A Brief History of Humankind” – Yuval Noah Harari

Seminar: How to Lie with Statistics

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A Quick Overview...

- In the last two weeks, we have learnt the ***‘How to lie’s ...***
 - Peter Hügel: How to lie with statistics (Huff)
 - Florian Fallenbüchel: How to lie with charts (Jones)
 - Marvin Ruder: The Visual Display of Quantitative Information (Tufte)
- This week, we are learning about the ***‘How to detect & avoid lies’***
 - Julius Drück: The Demon-Haunted World (Sagan)
- Now a different perspective on the ***‘What’s and ‘Why’s...***
 - What is Intersubjective Reality? Why do we lie?



Who has never lied?

~~Who has never lied?~~

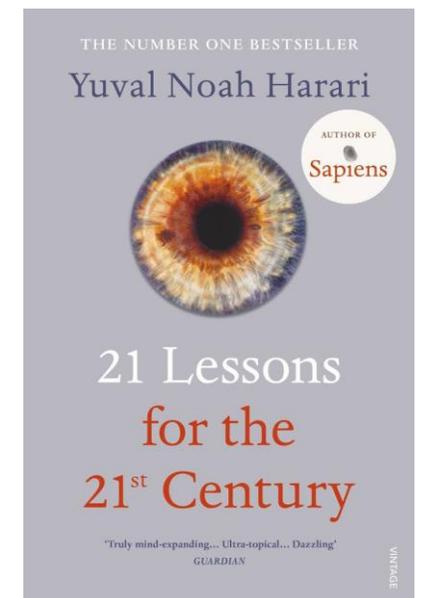
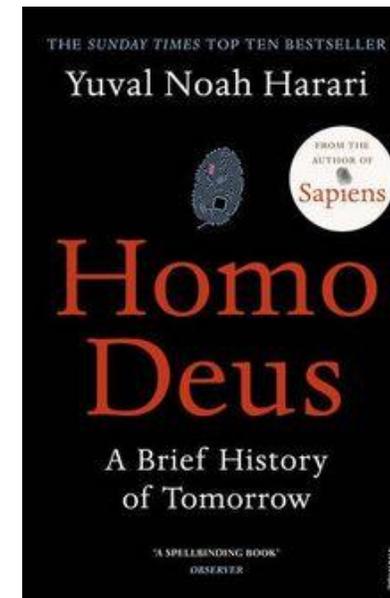
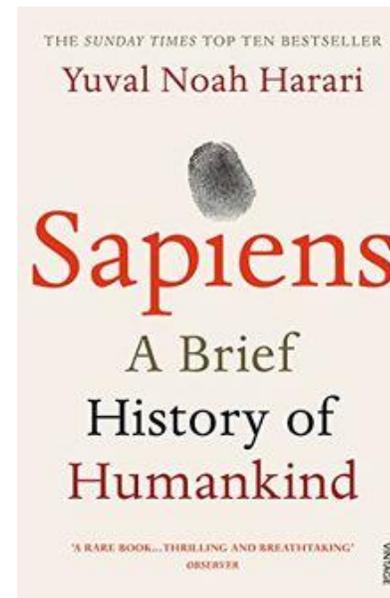
To lie is human.



Yuval Noah Harari



- Historian, Philosopher & Author
- Three bestsellers:
 - Sapiens: A Brief history of humankind (2011)
 - Homo Deus: A Brief History of Tomorrow (2015)
 - 21 Lessons for the 21st Century (2018)



Book Summary

1. Cognitive Revolution

- c. 70,000 years ago
- Emergence of language

2. Agricultural Revolution

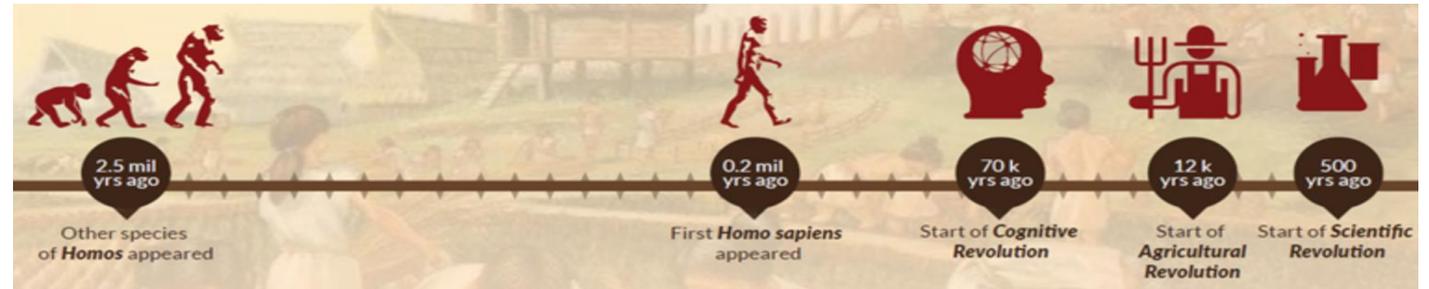
- c. 12,000 years ago
- Domestication & settlements

3. Unification of Humankind

- c. 5,000 years ago: kingdoms, script, money
- c. 2,500 years ago: empires, religions

4. Scientific Revolution

- 500 years ago
- Ignorance, power and capitalism



How did our species succeed in the battle of dominance?

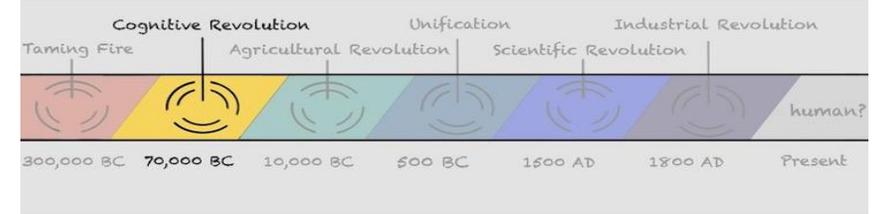


Why did our foraging ancestors come together to create cities and kingdoms?



How did we come to believe in gods, nations and human rights?

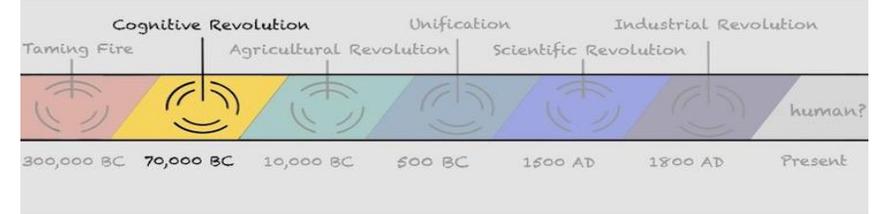
Cognitive Revolution



- Prehistorical humans are insignificant animals
 - Somewhere in the middle of the food chain
 - Homo sapiens: just one of a number of different human species
- Cognitive abilities are the game changers
 - E.g. Language, imagination, abstract thinking, reasoning, planning, problem-solving, story-telling, etc.
 - Human brains: 2-3% of body mass, 20-25% of energy consumption
 - Taming of fire and cooking food – larger brains
- Difference at the collective level
 - The only animal that can cooperate both **flexibly** and in **large numbers**



Cognitive Revolution

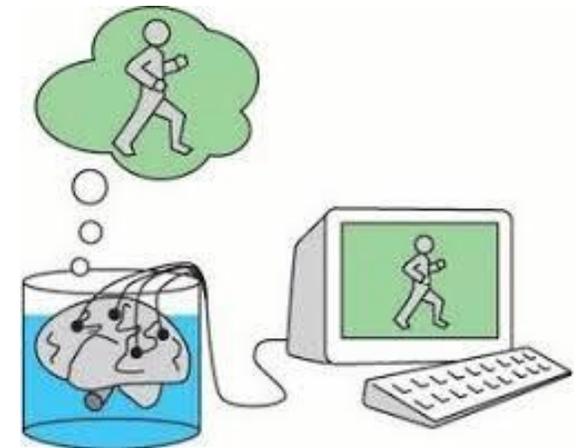
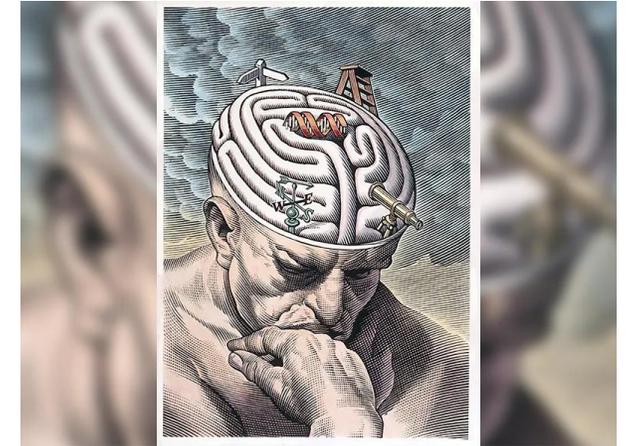


- The only animal that can cooperate both **flexibly** and in **large numbers**
 - Social insects:
 - large numbers but inflexible, genetically encoded
 - Social mammals:
 - can cooperate flexibly but only in small numbers, intimate knowledge of one another required
 - Theory of Dunbar's number (150)
- **Imagination** enables us to create and believe in fictions and stories at the collective level – **Intersubjective Reality**



Three Layers of Reality

- **Objective:**
 - Things exist independent of our beliefs and feelings
 - E.g., trees, mountains, lions, gravity, radioactivity, etc.
- **Subjective:**
 - Dependent on the personal beliefs and feelings of an individual
 - E.g., fear, pain, desire, imaginary friend, etc.
- **Intersubjective:**
 - Entities exist within the communication network linking the subjective consciousness of many individuals
 - Collective imagination, providing a web of meanings
 - E.g., money, law, gods, etc.
- *(More philosophical definitions of reality not discussed)*



Intersubjective Reality - Money

- What is money?

- A universal medium of **exchange**, **storage** of wealth
- Shells, cigarettes, gold, bank notes, Bitcoins
- Not a material reality, over 90% just electronic data



- How does money work?

- With universal **convertibility**, money builds universal **trust** between strangers
- Facilitating effective cooperation in trade and industry
- Money has **value** only in our common imagination

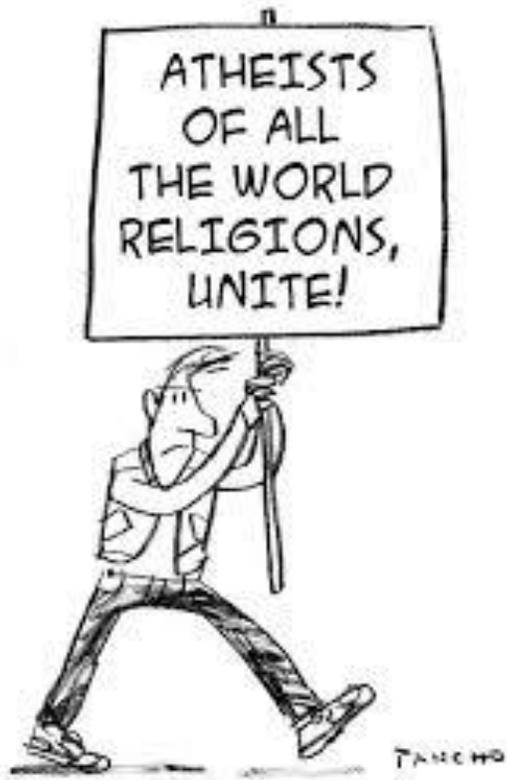


Intersubjective Reality - Companies



- In what sense can we say that a particular corporation exist?
 - Products? Buildings? Executives? Employees? Shareholders?
 - “Legal Fictions”
 - Lawyers vs. sorcerers/shamans
- These fictional entities are some of the most powerful forces in our world today

Intersubjective Reality - Religions



- Power to unite (or divide) people
- A superhuman order & a system of human norms and values
- “When a thousand people believe some made-up story for one month, that’s fake news. When a billion people believe it for a thousand years, that’s a religion” – Harari

Journey of Evolutionary Success

- Currency of evolution: copies of DNA
 - 200,000 years for our population to reach 1 billion
 - Only 200 years to reach 7 billion
- From Agricultural Revolution to The Global Village
 - Commerce, Empires, Religions
 - Technology & Capitalism
- Human Population through time
 - https://www.youtube.com/watch?time_continue=118&v=PUwma3Q0_OE
 - Source: American Museum of Natural History (2016)



Limitations of the Human Brain

- Human brain is not a good storage device for information:
 - Limited capacity, information loss in transmission
 - Adapted to store and process only particular types of information:
 - Visual information for survival: botanical, zoological, topographical,...
 - Social information
 - Not very good with numbers and large amount of mathematical data
- Susceptible to cognitive biases
 - Availability heuristic, selection bias, anchoring effect, hindsight bias, survivorship bias, etc.
 - Daniel Kahneman: “Thinking, Fast & Slow”, System 1 and System 2
- To deal with the more complex aspects of reality and our own limitations
 - The language of numbers, Mathematics & Statistics, the Scientific Methods

Writing & Language of Numbers

- Writing as a method for storing information
 - Language remained as spoken since Cognitive Revolution
 - Writing – a system of graphic marks representing the units of a specific language
 - Sumerian, between the years 3500 BC and 3000 BC
 - First words of wisdom...
- Arabic numerals (0-9)
 - Invented by the Hindus between 100-400 AD; spread by the Arabs, widely adopted in Europe 12th Century
 - Basis of mathematical notation, world's dominant language
 - Mathematic literary, speak in numbers

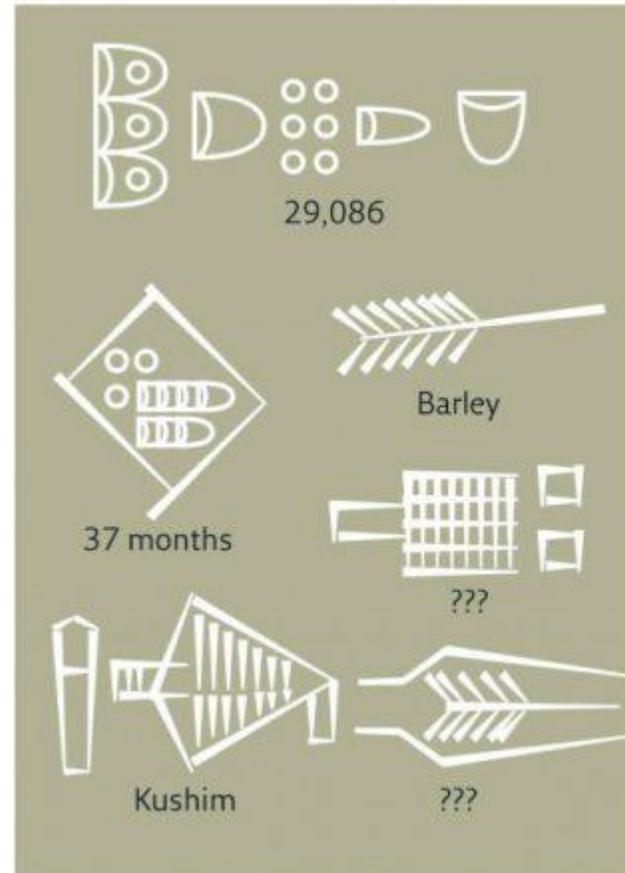


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First Words of Wisdom from Sumariens 5000 years ago...



A total of
29,086
measures of
barley were
received over
the course of
37 months.
Signed,
Kushim.

Writing & Language of Numbers

- Writing as a method for storing information
 - Language remained as spoken since Cognitive Revolution
 - Writing – a system of graphic marks representing the units of a specific language
 - Sumerian, between the years 3500 BC and 3000 BC
 - First words of wisdom... was a tax document!
- Arabic Numerals
 - Invented by the Hindus between 100-400 AD; spread by the Arabs, widely adopted in Europe 12th Century
 - Basis of mathematical notation, world's dominant language



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From Maths Script to Binary Script

- Statistics

- First introduced by Gottfried Achenwall (1749), analysis of data about the state
- Mainly tabulations of human and material resources that might be taxed or put to military use
- The story about the Scottish Widows, Bernoulli's law of large numbers

- Numerical Literacy

- Speak in numbers, translate ideas in numbers

- From Mathematical Script to Binary Script

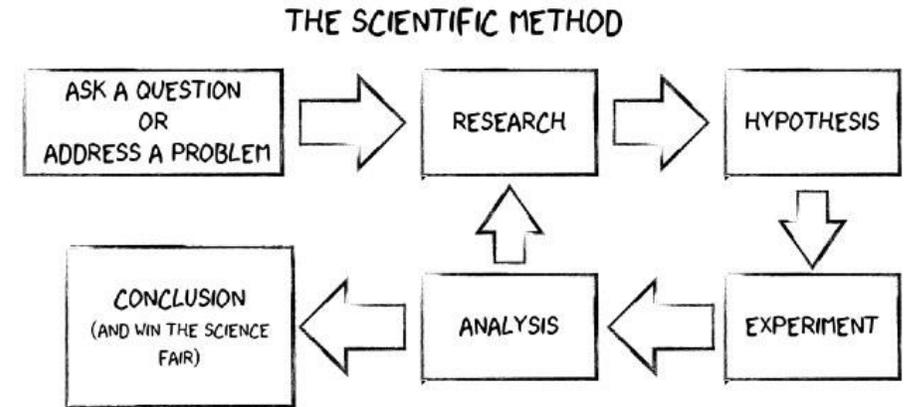
- Physics & Engineering
- Computer languages - a new writing system

Our computers have trouble understanding how Homo sapiens talks, feels and dreams. So we are teaching Homo sapiens to talk, feel and dream in the language of numbers, which can be understood by computers.

-- Yuval Noah Harari

Scientific Method

- Empirical method of acquiring knowledge
 - Centrality of observation and mathematics
- Willingness to admit ignorance
 - Assuming we don't know anything and we are not 100% correct
 - Accepting that thing that we think we know could be proven wrong as we gain more knowledge
- Acquisition of new powers through development of technology
 - The real test of 'knowledge' is not whether it is true, but utility, i.e. whether it empowers us
- Knowledge is power
 - Reality of science funding: The economic, religious, and political interests that impact the flow of money into research, have a huge impact on the output of science
 - The military arms race prompts many scientific discoveries



Why Do We Lie?

- To lie is human
 - Advantage in the competition for resources & mates
 - Akin to the evolution of deceptive strategies in the animal kingdom
 - A developmental milestone, theory of mind
 - Brain's executive function: planning, attention, and self-control
- We are terrible at detecting lies
 - Only 54% of accuracy!
 - Prone to believe lies even when unambiguously contradicted by evidence



The Danger of Lies

- Truth Default Theory & Liar's Advantage
 - Dan Ariely: “(Dis)Honest – The Truth about Lies” – cost & benefit analysis
 - Implicit trust in human communication important for social relationships
 - People want to believe what they hear, esp. affirmatively
- Intersubjective Reality in the Post-Truth Age
 - Fake news, half truth, bullshit, lies, ...



Conclusion

“As a species, *humans prefer power to truth*. We spend far more time and effort on trying to control the world than on trying to understand it — and even when we try to understand it, we usually do so in the hope that *understanding the world* will make it easier *to control it*.”

If you dream of a society in which *truth reigns supreme* and myths are ignored, you have little to expect from Homo sapiens. Better to try your luck with chimps.”

- Yuval Noah Harari, “21 Lessons for the 21st Century”