

Science, Everyday Thinking and Truth

Agenda

- The Bomb, Trump and Social Media
- Scientific Thinking (Bernd Hänsch)
- Limits of Science
- Everyday Thinking

The Bomb

The Bomb: Cambridge Analytica

- Trump won the election because of targeted “dark posts” which manipulate people easily due to the fact that their thinking is well known (e.g. from Facebook)
- Suddenly, there seemed to be an explanation for the “unthinkable”. Looks like the people in Silicon Valley were especially surprised about Trump.
- I got several mails from friends about it within a few hours. All with an academic background...

Dark Posts: these posts are assigned to your Facebook page like any other post, but they are not visible on the page timeline, unless you actually publish them. And so the only way people will see it, is if you use Facebook ads to promote them. See A. Baltagavis

Digital Culprits

- Fake News
- Fake Majorities
- Filter Bubbles
- Echo Chambers
- Big Data
- Ocean score (Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism)



Sarah Shourd, The Box by:
https://www.vice.com/en_us/article/solitary-prison-play-sarah-shourd-iran-hiker

Communication in social networks allows new ways to cluster around the same ideas. Fake news are simply undisputed news and social networks allow a more isolated communication (as do traditional media, clubs, political parties, circles of friends with the same interests and so on). Traditional media like TV used to create more of a public sphere due to limited alternatives. See:

“Fake” Majorities

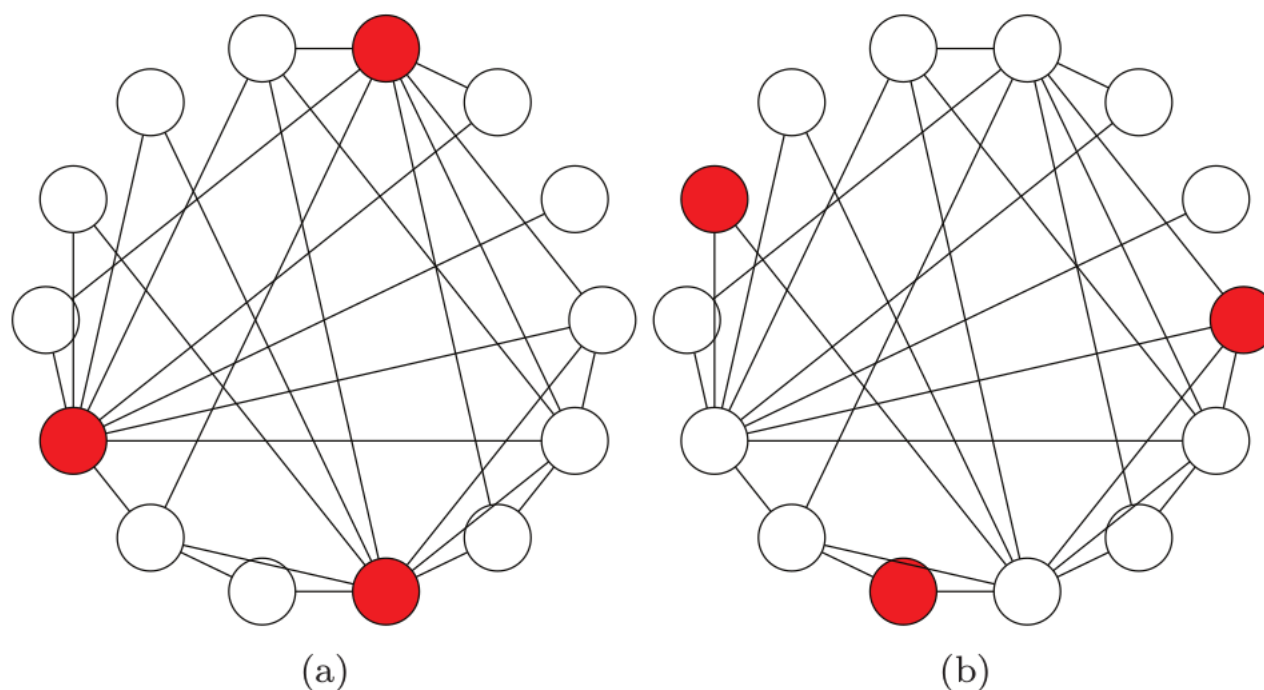


FIG. 1. An illustration of the “majority illusion” paradox. The two networks are identical, except for which three nodes are colored. These are the “active” nodes and the rest are “inactive.” In the network on the left, all “inactive” nodes observe that at least half of their neighbors are “active,” while in the network on the right, no “inactive” node makes this observation.

From: Kristina Lerman et.al.

Solutions?

- Facebook cooperates with Correctiv Redaktionsgruppe in Berlin
- Automatic (ML) detection of fake news (:-)
- Social Networks require new everyday techniques to handle news
- More scientific thinking is necessary

Controversy Detection in Social Media

- Split social graph in partitions
- Random walk graph
- Use it to detect bubbles and chambers in your information input

From: Quantifying Controversy in Social Media, Kiran Garimella et.al.,
<https://pdfs.semanticscholar.org/9276/eb3ee70b83118bb45e89d91b172c4ed57bf9.pdf>

The Gap

- Trump's supporters are stupid, un-educated, emotional, irrational..
- They act against their own interests
- They call media "Lügenpresse" and get their (fake) news from social media
- They deny facts
- They are post-truth

do we see another – social – gap here? Intellectuals berating regular people?
How big is the gap between Silicon Valley and the rest of the US/world? Is there a superiority of intellectuals?

Scientific Thinking

Impuls zur Frage
„was ist Wissenschaft“
anhand einer These von
Paul Hoyningen-Huene

Was ist Wissenschaft?
Was wissen wir?
Was können wir wissen?
Was ist Wahrheit?

Bernd Hänsch

Vita

Studium der Ingenieurwissenschaft an der FHTE
Nachrichtentechnik

Praktische Tätigkeiten bei:
Studer Revox AG, SDR, SWR und für die ARD

Lehrauftrag an der DHBW
für Kommunikations- und Netzwerktechnik

Akademiestudium Uni Hagen
Philosophie und Soziologie

Wider-den-Methodenzwang
Paul-Feyerabend

theoretische-Philosophie
Wissen-und-andere-Definitionen-der-Erkenntnis
Alltagswissen

der-eine-Paul-hilft-dem-anderen
Hoyningen-Huene
Die-Struktur-wissenschaftlicher-Revolution
Was-können-wir-wissen
Was-ist-Wissenschaft
Erkenntnistheorie
Thomas-S.Kuhn

Was ist Wissenschaft?

Wissenschaft. Deutsches Jahrbuch Philosophie 2.2011. Hamburg: Meiner. S. 557-565:

https://www.philos.uni-hannover.de/fileadmin/institut_fuer_philosophie/Personen/Hoyningen/Aufsaeetze/175_Was_ist_Wissenschaft.2011.pdf

Information Philosophie. Die Zeitschrift, die über Philosophie informiert:

Essay: [#](http://www.information-philosophie.de/?a=1&t=7158&n=2&y=1&c=1)

Siehe auch iTunesU oder YouTube,

unter Universität Hannover, Vorlesung: „Was ist Wissenschaft“

Oder ausführlich in:

Systematicity – The Nature of Science, Paul Hoyningen-Huene,
Oxford-University Press, 2013

Rezession: Zeitschrift für philosophische Literatur:

<http://www.zfphl.de/index.php/zfphl/article/view/46/148>

Was ist Wissenschaft?

These Paul Hoyningen-Huene:

Wissenschaftliches Wissen unterscheidet sich von anderen Wissensarten, besonders dem Alltagswissen, primär durch seinen höheren Grad an Systematizität.

Was ist Wissenschaft?

These Paul Hoyningen-Huene:

Systematizität hinsichtlich 9 Dimensionen

- Beschreibungen
- Erklärungen
- Vorhersagen
- Verteidigung von Wissensansprüchen
- Kritischer Diskurs
- Epistemische Vernetztheit
- Ideal der Vollständigkeit
- Vermehrung von Wissen
- Strukturierung und Darstellung von Wissen.

Wider-den-Methodenzwang

Paul-Feyerabend

Alltagswissen

theoretische-Philosophie

Wissen-und-andere-Definitionen-der-Erkenntnis

der-eine-Paul-hilft-dem-anderen

Hoyningen-Huene

Die-Struktur-wissenschaftlicher-Revolution

Was-können-wir-wissen

Was-ist-Wissenschaft

Erkenntnistheorie

Thomas-S.Kuhn

Limits of Science

- What is and what ought to be?
(D.Hume/S.Carroll)
- “Pure Data” (Big Data/Machine Learning)
- No consensus

“What is and what ought to be”

“In every system of morality, which I have hitherto met with, I have always remarked, That the author proceeds for some time in the ordinary way of reasoning, and Establishes the being of a God, or makes observations concerning human affairs; when Of a sudden, I am surprized to find, that instead of the usual copulations of propositions “is” and “is not”, I meet with no proposition that is not connected with an “ought”, or an “ought not”. This change is imperceptible; but is, however, of the last consequence. For as this “ought” or “ought not”, expresses some new relation of affirmation, ‘tis Necessary that it should be observed and explained; and at the same time a reason Should be given.”

David Hume, A Treatise of Human Nature, cited after S. Carroll

“What is and what ought to be”

1. Socrates is a living creature
2. All living creatures obey the laws of physics
3. Therefore, Socrates obeys the laws of physics

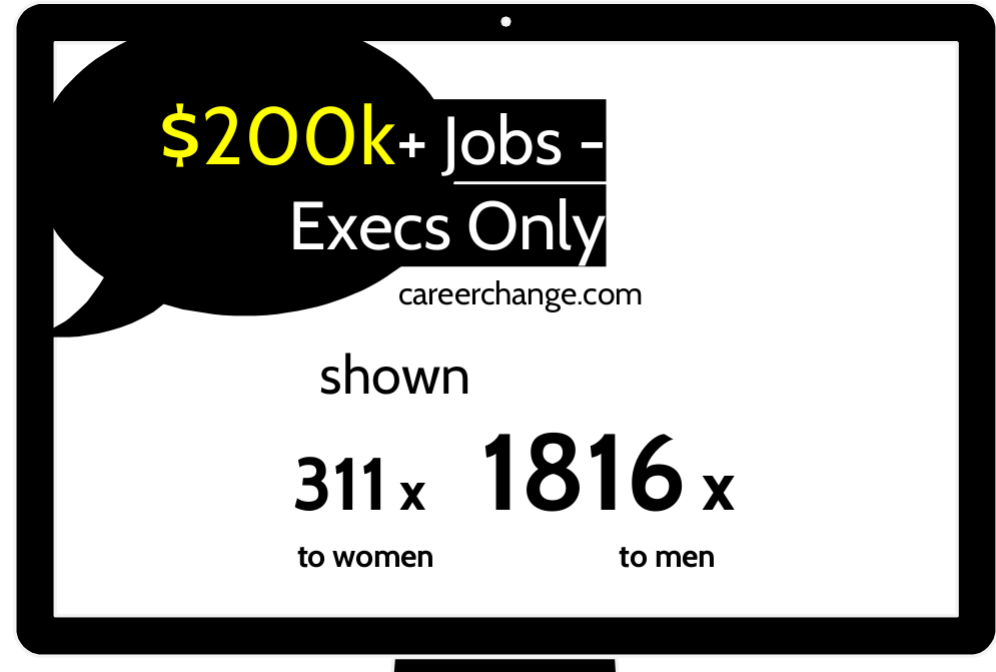
1. I would like the last slice of pizza
2. If I don't move quickly, somebody else will eat the last slice
3. Therefore, I ought to move quickly

From: Sean Carroll, the big picture, pg. 394ff.

“Pure Data”?



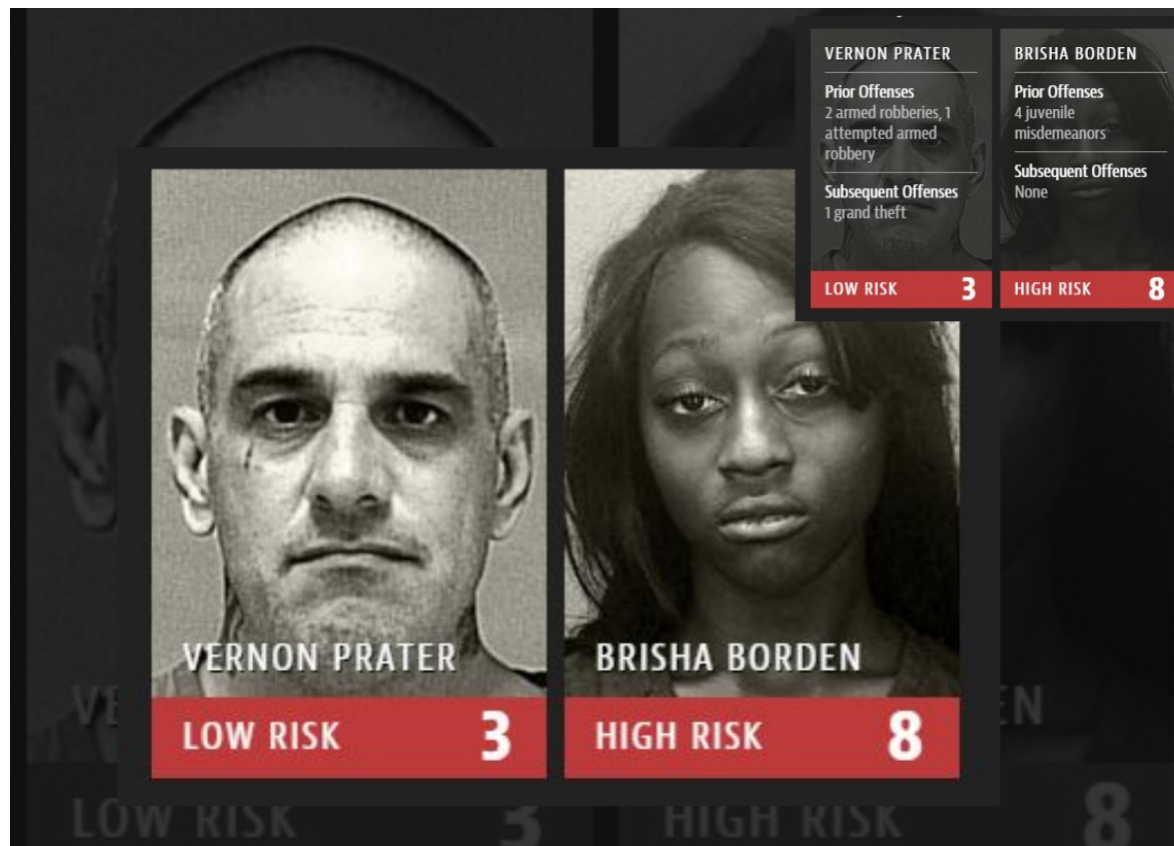
Tagged automatically with
“ape, animal” (twitter ML)



Why do women see high-paying job
ads far less than men?

From: N.Bopp)

“Pure Data” ?

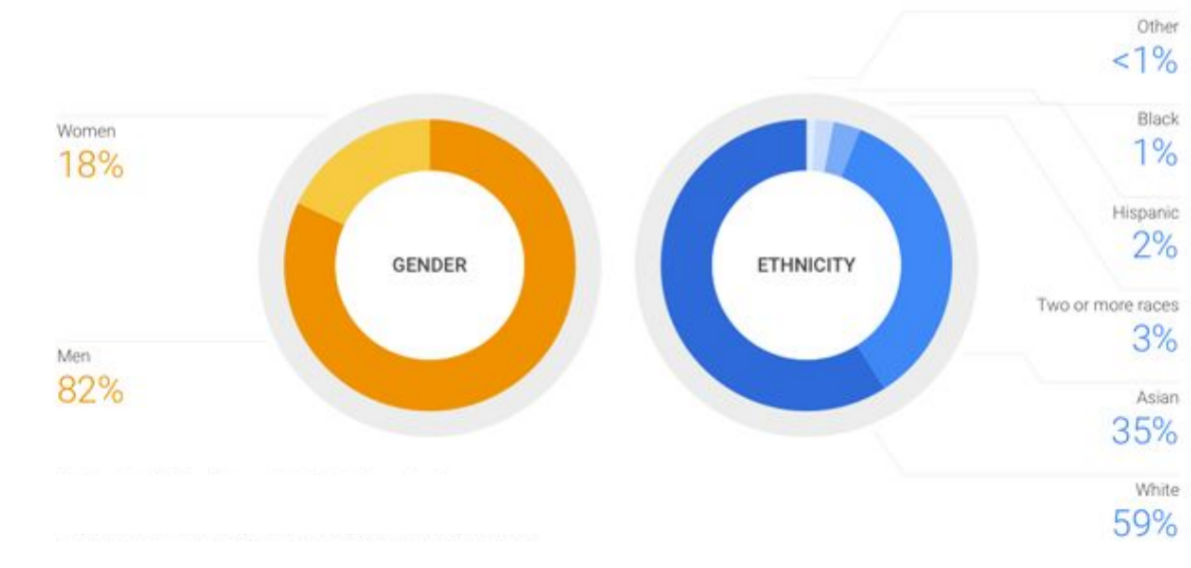


Software used at US courts predicts the probability of subsequent offenses (and thereby whether parole is useful). Blacks are assigned a 30% higher probability for future crimes. Is this a) scientifically sound? b) a self-fulfilling prophecy? Should companies expose socially discriminating algorithms? (from: N.Bopp)

More than a coincidence?

Mitarbeitervielfältigkeit

Google Hiring Diversity im Bereich 'Tech', Januar 2015



(from: N.Bopp)

Big Data and ML: Replicating Reality?



Microsoft AI software turns racist after “learning” from users

(from: N.Bopp)

Black Swans and Bogus Math

APPLICATION	Simple payoffs	Complex payoffs
DOMAIN		
Distribution 1 ("thin tailed")	Extremely robust to Black Swans	Quite robust to Black Swans
Distribution 2 ("heavy" and/or unknown tails, no or unknown characteristic scale)	Quite robust to Black Swans	LIMITS of Statistics – extreme fragility to Black Swans

The four quadrants. The South-East area (in orange) is where statistics and models fail us.

THE FOURTH QUADRANT: A MAP OF THE LIMITS OF STATISTICS

By Nassim Nicholas Taleb [9.14.08], edge.com

“Why Polygamy is bad for you”

“A new study shows that drinking a glass of wine is just as good as spending an hour at the gym” [Fox News, 02/15]. “A new study shows how sugar might fuel the growth of cancer” [Today, 01/16]. “A new study shows late night snacking could damage the part of your brain that creates and stores memories” [Fox News, 05/16].

From Binning et.al: “The research community started to develop tools, like Vizdom/IDEA [7], SeeDB [34] or DataPolygamy [5], that are likely to considerably increase the number of false discoveries from data analysis. one of the participants, even the more statistically savvy ones, did consider that the arbitrary exploration and attempts to find interesting facts actually increases their chance to find random occurrences of seemingly significant correlations.”

Violations of statistics:

- multiple hypothesis (given a certain p-value, more visualizations (hypothesis) WILL LEAD to more bogus correlations)
- $P(O|H) \neq P(H|O)$
- Simpson Paradox etc.

No Consensus

- Are nuclear power plants dangerous?
- Do we cause a change in climate?
- Do we understand what other people said?

Science is all about dispute, not consensus. There are large and important areas of research where we cannot achieve consensus. There are no “facts” without an interpretation based on a theory behind. Therefore, science does not know “truth”, only intermediate acceptance of hypothesis when they cannot be rejected (K. Popper)

Everyday Thinking

- Is it wrong? Weak? Deficient?
- In defense of Everyday Thinking

Durkheims Analyse des Alltagsdenkens

„Der Mensch kann nicht inmitten der Dinge leben, ohne sich über sie Gedanken zu machen, nach denen er sein Verhalten einrichtet.“ 115

- Das Alltagsdenken ist „**ideologisch**“, weil es mit immer schon vorgefertigten Vorstellungen und Ideen, d.h. vorurteilsbehaftet, an die Dinge herangeht. (115)

- Das Alltagsdenken verfährt **subsumtionslogisch**, weil ihm die Tatsachen als blosser Illustrationen oder bestätigende Belege für im Voraus gefasste Ideen und Theorien erscheinen. (115)

- Das Alltagsdenken ist **praxisbezogen**. Sein wichtigstes Geltungskriterium ist dasjenige der Praxistauglichkeit. Dieses schliesst systematische Selbsttäuschungen nicht aus. (116) Es sucht nach Heilmitteln, nicht nach Erklärungen (129). „Die Menschen haben die Entstehung der Sozialwissenschaften nicht abgewartet, um sich über Recht, Moral und Familie, Staat und Gesellschaft Gedanken zu machen. Sie brauchen das zum unmittelbaren Lebensvollzug.“ (117)

- Das Alltagsdenken ist **normativ und gefühlsbehaftet**: Es orientiert sich bisweilen stärker an dem, was sein soll, als an dem, was ist (116) und lässt sich dabei von Gefühlen leiten. (130)

- Das Alltagsdenken neigt zu einer **idealistischen und konstruktivistischen** Auffassung sozialer Erscheinungen: gesellschaftliche Institutionen erscheinen ihm als Erzeugnisse von Ideen. (118) Ausserdem erscheinen ihm diese als künstlich und willkürlich geschaffen. (118)

- Das Alltagsdenken neigt zu **individualistischen** Vorurteilen, d.h. zur Vorstellung, „wir hätten selbst geschaffen, was uns in Wahrheit von aussen auferlegt wurde“. (108) *Durkheims Erklärung hierfür*: „Selbstgefälligkeit maskiert den erlittenen Druck.“ (108)

Alltagsdenken nach Emile Durkheim

Nach: Soziologische Theorie 1: Durkheim – Soziologie als Wissenschaft©
Peter Schallberger

Linda – Plausibility over Probability

“Linda is thirty-one year 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 antinuclear demonstrations.”

Is Linda

- a teacher in elementary school?
- working in a bookstore and taking yoga classes?

....

- a bank teller
- a bank teller and active in the feminist movement?

From: Kahneman, Thinking Fast and Slow, pg. 156ff.

A more “Scientific” Society?

If more “science” in everyday thinking and living would help, shouldn’t universities be much better in

- organizing things
- the way people interact
- avoiding useless arguments
- treating people
- manage change?

This is obviously not the case. There seems to be a huge gap between the things we are working on in science and the way we think and behave in everyday live. Even experts and professionals in statistics seem to be unable to apply their own science in everyday live, much less use scientific results on those biases.

In Defense of Everyday Thinking

- The shape of the earth
- Gambles: Parallel worlds of one world
- Good ways to think

The Shape of the Earth

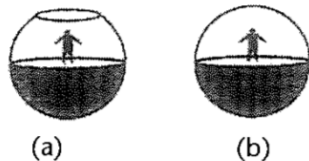
Sphere



Flattened Sphere



Hollow Sphere



Dual Earth



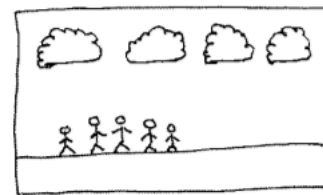
Disk Earth



Rectangular Earth



OR



A



3.



B

Adults' drawings of the earth (examples redrawn after Nobes and Panagiotaki 2007:

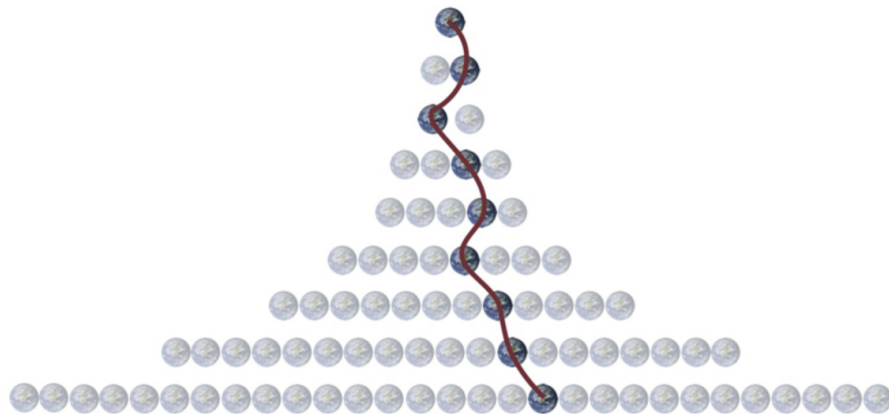
Earth?' (ibid.: 656). If the sky is the atmosphere, some reasoned, and if the atmosphere is an integral part of planet earth, then perhaps the sky should be inside the earth rather than outside of it. And by the same token, so should the people. Many respondents accordingly rejected the 'scientifically correct' view that people live all around on the outside of the earth. Outside, they argued, is space, and you cannot live in space. To live, there must be ground to walk on and air to breathe. Thus, people must live inside the earth (ibid.: 657). But perhaps the most perplexing question of all was the last: what is below the earth? The 'correct' scientific answer should have been either 'sky' or 'space'. Yet a little reflection shows the question to be absurd. 'Above' and 'below' can only be established in relation to a base or ground. So what is below the ground? Earth! As one respondent commented, in conclusion, 'these questions are not easy for adults to answer. For young people this would be difficult, confusing and probably quite upsetting for many!' (ibid.: 658).

What is a Human Being? What does it mean to be human?

- Species of nature, terrestrial animals, living organisms breathing the same air
- Rise above and beyond the confines of nature. Transcendence of reason (science) over nature.

“Are not scientists, and all who think like them, also human beings? How then, can they be both of nature and beyond nature at the same time?[..] Human is a word that points to the existential dilemma of a creature that can know of itself and the world of it is a part only through renunciation of its very being in the world.” (T.Ingold, pg. 113f.)

Risk: Parallel Worlds or one World?



3 x 3 Risk Matrix

L I K E L I H O O D	Likely	Medium Risk	High Risk	Extreme Risk
	Unlikely	Low Risk	Medium Risk	High Risk
	Highly Unlikely	Insignificant Risk	Low Risk	Medium Risk ?
		Slightly Harmful	Harmful	Extremely Harmful
		CONSEQUENCES		

"The first perspective -- considering all parallel worlds -- is the one adopted by mainstream economics," explained Gell-Mann. "The second perspective -- what happens in our world across time -- is the one we explore and that hasn't been fully appreciated in economics so far." (see: Bardi, Exploring Gambles..)

Proper Everyday Thinking???

- What we learned from our parents/teachers/coaches
- Do you understand, what others feel?
- All media is “Lügenpresse” by necessity
- Everybody is part of a minority, so beware of division!
- Don't trust your own (Christa Wolff, Kassandra)
- A model for the world?
- Can you explain money and interest?
- A bit on natural history and materialism?
- The earth is flat, too!
- There is no truth!

And what about all those people who don't give a shit?

Conclusion

- We (computer science people) are changing the world and creating social gaps
- We are changing other peoples world
- This is enabled by science, but is not “scientific”
- Social and cultural gaps in a society are very dangerous during phases of extreme change
- We need to be both “out of this world” and “situated within”

Literature

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- Eli Pariser, Filter Bubble
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- H. Grassegger, M. Krogerus, Ich habe nur gezeigt, dass es die Bombe gibt. Dez.2016
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- <http://highscalability.com/blog/2016/12/5/the-tech-that-turns-each-of-us-into-a-walled-garden.html>
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<https://www.quora.com/What-are-Facebook-dark-ads-How-do-you-place-and-use-them-and-do-it-correctly>
- Jason Socrates Bardi, Exploring Gambles Reveals Foundational Difficulty Behind Economic Theory (and a Solution!) Chaos Journal,
<https://publishing.aip.org/publishing/journal-highlights/exploring-gambles-reveals-foundational-difficulty-behind-economic>
- Carsten Binnig Lorenzo De Stefani Tim Kraska Eli Upfal Emanuel Zraggen Zheguang Zhao, Towards Sustainable Insights or why polygamy is bad for you