



Open Discussion #1

BARCELONA
May 2024

NexComm 2024 & DigitalWorld 2024

Theme: Human Brain and Machines: Social Implications

COORDINATORS

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Qs

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Items

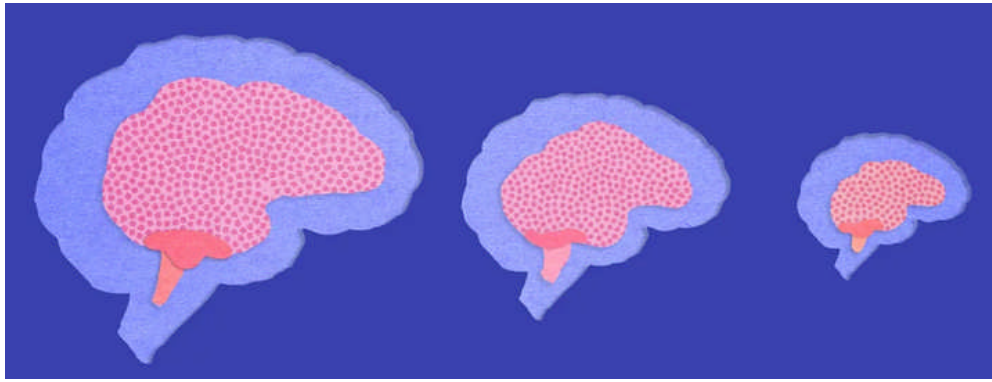
- a. The impact of exposing the brain to technical environment
- b. Retraining the brain usefulness for human beings
- c. Brain evolution and effects on other acquired skills
- d. Brain remanence and brain knowledge absorption
- e. Effect of brain expansion with immersive connections
- f. ...
- g. ...



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<https://www.bbc.com/future/article/20240517-the-human-brain-has-been-shrinking-and-no-one-quite-knows-why>



The brain weighs about 2% of our body mass but consumes over 20% of our resting metabolic energy.



- **Symbolic thinking / energy optimization**
- **Complex societies / knowledge sharing**

The brains of modern humans are around 13% smaller than those of Homo sapiens who lived 100,000 years ago.

Certainly, when compared with other animals of a similar size, our brains are **gigantic**. The human brain has **nearly quadrupled in size in the six million years since our species last shared a common ancestor with chimpanzees**. However, studies show this trend toward larger brains has reversed in Homo sapiens. In our species, average brain sizes have shrunk over the course of the last 100,000 years.

"This sort of **symbolic thinking** must have required a much more complex set of connections inside the brain than was present earlier. My suggestion is that having these *extra connections* allowed the brain to function in a much more *energy-efficient way*."

DeSilva suggests that the birth of **complex societies** and empires meant that knowledge and tasks could be spread out. **People no longer had to know everything**, and as individuals no longer had to think as much to survive, their brains reduced in size.

So how can we explain this **striking reduction**? Tattersall suggests that the shrinkage of our brain size began around 100,000 years ago, which corresponds to a period of time in which humans **switched from a more intuitive style of thinking** to the terms "**symbolic information processing**" – or thinking in a more abstract way to better understand your surroundings.

Yet, we are becoming smarter



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<https://www.bbc.com/future/article/20220503-why-human-brains-were-bigger-3000-years-ago>



At 13,600 people, it had a bigger sample than all previous studies on brain size and IQ combined, says the study's co-author Philipp Koellinger, a behavioral geneticist at the Vrije Universiteit Amsterdam, in the Netherlands.

The study found that having a bigger brain was, on average, associated with doing slightly better on IQ tests but, crucially, the relationship was non-deterministic. That means that there were some people who did very well on the tests despite having relatively small brains and vice versa.

- **Externalizing information / writing**
- **Adaptation to unpredictability / extra effort**



The brain remains "phenomenally complex", says Cox, and it is difficult to know exactly what difference the structural make-up of a particular brain will have on a person's intelligence.

“ ... ant brains might seem hopelessly different to ours. **They are roughly one tenth of a cubic millimeter in volume – or a third the size of a grain of salt – and contain just 250,000 neurons. A human brain, by comparison, has around 86 billion.**”

We reached a threshold of population size, a threshold in which individuals were sharing information and **externalizing information** in the brains of others?

The emergence of **writing** – roughly, ~ 2,000 years before the reduction in human brain size set in – also had an effect of externalizing information

One study found that birds that colonized oceanic islands, and therefore had to **adapt** to **unpredictable new territory**, possessed larger brains than their mainland counterparts.

In other words, it is not the volume, but intelligence goes collective



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- **How errors would be corrected in Brain-Computer interface?**

- Alternated mental status
- Stressful situations
- Errors correction from imperfect AI accuracy
- “Shut down button”



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- **Knowledge** **Perception (+)** **Side effects (-)**
- Technology VR/Immersion G5/Electromagnetic vs. Environmental turbulence
- **Digital** health - patient records digital hassle
 Immersive driving digital pollution
- **AI** health no needs
 vehicle no pains
 mining no practice, no failures
- **A** + brain enlightenment, by being exposed to unusual environment (brain expansion)
- **A** - brain latency, brain confusion, decreasing agility on various functions
- **Use cases:** (i) from planning ahead a trip on a paper to Immersive Google Map.
 (ii) Knowing N, S,... (cardinal points); Knowledge vs. Compass
- **Q:** Altering human emotions and judgements
 Loosing acquired skills





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- **Gradual negotiation with the technologies around us - Tom Chatfield**
- **Environmental Remanence (Real vs Virtual)**
 - Brain and games
 - Immersion environments
 - VR-based recovery
 - VR-training
- **Co-evolving with Technologies**
 - Uninformed (Ignorance) and Informed (Hesitation)
 - Human minds are literally extended into aspects of the environment surrounding them
 - Metaverse is training the AI-based tools with virtual models
- **The power of Digital**
 - Practicing, learning, trusting
 - Mental upgrade and digital acceptance (through Digital Literacy and Practicing)





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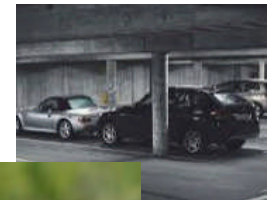
How AI is testing the boundaries of human intelligence [deep layers]

<https://www.bbc.com/future/article/20240501-how-ai-is-testing-the-boundaries-of-human-intelligence>

The term neural network incorporates a wide range of systems, yet centrally, according to IBM, these "neural networks – also known as artificial neural networks (ANNs) or simulated neural networks (SNNs) – are a subset of machine learning and are at the heart of deep learning algorithms". Crucially, the term itself and their form and structure are "**inspired by the human brain, mimicking the way that biological neurons signal to one another**".



Air Force Secretary Frank Kendall sits in the front cockpit of an X-62A VISTA aircraft at Edwards Air Force Base, Calif., on Thursday, May 2, 2024. The flight on the Artificial Intelligence-controlled modified F-16, is serving as a public statement of confidence in the future role of AI in air combat. The military is planning to use the technology to operate an unmanned fleet of 1,000 aircraft. Arms control experts and humanitarian groups are concerned that AI might one day be able to take lives autonomously and are seeking greater restrictions on its use (AP Photo/Damian Dovarganes)



Why humans will never understand AI [nor our brain, either]

<https://www.bbc.com/future/article/20230405-why-ai-is-becoming-impossible-for-humans-to-understand>

Unknowability

There is a good chance that the greater the impact that artificial intelligence comes to have in our lives the less we will understand how or why. Today there is a strong push for AI that is **explainable**. **We want to know how it works and how it arrives at decisions and outcomes**. The European Union is so concerned by the potentially "*unacceptable risks*" and even "*dangerous applications*" that it is currently advancing a new AI Act intended to set a global standard for "**the development of secure, trustworthy and ethical artificial intelligence**".

Solo Tandem

Fighter Jet: AI-controlled F-16



No pilots are needed in the Air Force's new fighter jets