

## ЧЕЛОВЕЧЕСКИЙ ИНТЕЛЛЕКТ И ЯЗЫКИ

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*Язык – один из компонентов человеческих способностей, доступный для изучения. Среди множества вопросов о языке самыми важными являются: во-первых, почему язык вообще существует, и только у людей; во – вторых, почему языков так много? Это главные вопросы о происхождении и разнообразии, которые интересовали Дарвина и других мыслителей – эволюционистов, и которые составляют основу современной биологии (Почему в мире наблюдается именно такой ряд жизненных форм, а не какой-нибудь иной?)*

*С этой точки зрения, в науку о языке отлично вписывается современная биологическая наука, несмотря на кажущуюся её абстрактность.*

*Около 200 000 лет назад ни один из этих озвученных вопросов не пришел бы на ум, потому что языков еще не существовало. А около 60 000 лет назад ответы на них были бы такими же, как и сейчас. Единообразие способностей к языку, присущее нашему виду, убеждает нас в том, что этот анатомический признак современного человека должен был уже существовать к моменту, когда наши предки ушли из Африки и расселились по миру.*

*Ключевые слова: эволюция, человеческий интеллект, мозг, искусственный интеллект, гены*

## HUMAN INTELLIGENCE AND LANGUAGES

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*Keywords: evolution, human intelligence, brain, artificial intelligence, genes*

The human intelligence evolution is closely tied to the evolution of human brain and the origin of language. The human evolution timeline spans approximately 7 million years, from the separation of the genus Pan until the appearance of behavioural modernity 50,000 years ago.

Here is the first definition of intelligence<sup>1</sup>: the root (or the direct antecedents of the word "intelligence") lies in the Latin *intelligentia* meaning "the action or faculty of understanding", itself derived from the Latin *intellegere* (Ex.: Ro. (*înțelegere*) – meaning "to understand").

It follows lots of definitions of the term «**human intelligence**» like: 1. mental

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<sup>1</sup> 1. Intelligence – 1) the ability to acquire and apply knowledge and skills "an eminent man of great intelligence; 2) the collection of information of military or political value "the chief of military intelligence"

quality that consists of the abilities to learn from experiences adapt to new situations, 2. understand, and handle abstract concepts, 3. and use knowledge, to manipulate one's environment, 4. mental capacity to acquire knowledge, reason, and solve problems effectively, 5. it is most often associated with scientific, and mathematical thinking, 6. the ability to direct patterns, reason deductively, and think logically, 7. intelligence gives us the power to solve problems, and to make good decisions. Among the authors providing research in the field of "**Theory of Multiple Intelligence**" is Howard Gardner's (1983) who comprised seven types of intelligence:

1. Linguistic Intelligence (is on the first place)
2. Logical – Mathematical Intelligence
3. Spatial Intelligence
4. Musical Intelligence
5. Bodily-Kinesthetic Intelligence
6. Interpersonal Intelligence
7. Intrapersonal Intelligence

As far as we are interested in preserving, and development the appropriate intelligence of modern language level we shall: 1. Analyze the texts that contain /use a lot of negatives, 2. Classify them, 3. Find the ways to avoid them in communication.

Large-body mammals that are 130 lbs typically have a brain of circa 12 cubic inches, while the brain of early humans were 36 cubic inches. At present, the average brain size is 73-85 cubic inches. The brain of Neanderthals, were bigger than ours. The brain grows and impacts the big evolution of human intelligence. Our follow humans with big brains offer an obvious advantage over other animals, but at certain timeline that wasn't necessarily because big brains takes a lot of energy to fuel. Approximately, our brains make up only 2-3% of our body weight, but use 25% of our energy, (while the brains of our ape siblings only use 8% of their energy). Scientists still don't know why early humans evolved such large brains, as there was little use in that period of history, but we suppose that they contributed to the **evolution of human intelligence**. In the middle of the food chain, humans had to catch small animals to use their energy to power their brain instead of using energy to power muscles.

The loss/drain of energy caused 2 main problems. Humans needed a lot of time/calories to feed their hungry brains, their muscles, atrophied, because their bodies had to divert. (Ex.: Ro. divert (*a se abate de la, a devia de la*) – from muscles to feed the brain. This seems it provoked the **Cognitive Change/Revolution**. It was probably a chance **gene mutation** that selected a certain way the brain was wired (*a bobina, a se desfasura*) and lead (Ex.: Ro. (led- *a fi călăuză/ghid, a duce*) – to a quantum leap (Ex.: Ro. *săritură, salt*) – in cleverness and foresight, a versatility in solving novel problems.

Foresight seems also to be an essential aspect of intelligence, making a guess that discovers some new underlying order like: 1. finding the solution to a problem or the logic of an argument, creating a pleasing harmony or a willy reply, or guessing what is likely to happen in the immediate future. Such simple neural mechanisms

constitute probably the foundations of humans' abilities to handle logical and metaphorical thinking.

- **Human Intelligence and Language**

Scientists wanted to know where our capability for complex language came from. First of all, they related to more than just brain size. They wanted to know what additional important things our brains can do, and when and why they evolved this manner. They identified very few physical clues, such as: as far as our ancestors left artifacts, these don't indicate what speech they were capable of making.

- **The Development of the mouth, throat, and tongue**

Due to the investigations in the field of linguistics, we know much about the development of the 5,000-plus languages in existing today. A modern human being can describe their grammar and pronunciation and see how their spoken and written forms have changed over time. Most Europeans understand the origins of the Indo-European group (who migrated from their last cradle (I-India, I-Iran, I-Iraq approximately 40,000 years ago) of languages, which are: Romance Languages (Italian, Romanian, Sardinian, French, Portuguese, Spanish, Catalan, Occitan, Rhaetian and other small spread languages followed by Germanic Languages (Icelandic, Norwegian, Swedish, Frisian, Yiddish, Flemish, Afrikaans, Germanic, Gothic, Faeroese, Frisian, Yiddish, Dutch), Slavic languages (Eastern group, Western Group, Southern Group), Indian Languages (starting with Hindi summing approximately 222 languages), Celtic Languages (spoken on the Continent and on islands), Anatolian, Greek, Albanian and other less spoken languages. Europeans can trace back the above-mentioned languages to tribes in Eastern Europe in about 3,000 BC.

Besides the rich map that deals with the history of languages, there are still areas we know little about. Linguists are beginning to look to the field of evolutionary biology to find out how the human species developed to be able to use language. Surely, there are lots of half-theories that can propose answers and there are far more questions that could be asked.

Humans can express more complex thoughts, convey subtle emotions, and communicate about abstract concepts in different timelines, past, present, and future. All this can be provided if we follow a set of structural rules, known as grammar. Besides humans, our nearest and most relatives like chimpanzees and dolphins share this capability because they are able to recognize when these rules are broken.

The capability for complex language came from the difference between our and animal brains. It doesn't relate only to just brain size. The researchers paid great attention to what other things our brains can do and at what timeline they evolved that manner. The ancestors left very few physical clues. It concerns the development of the mouth, throat, and tongue. The investigations demonstrate that about 100,000 years ago, humans had evolved the ability to create complex sounds. The experts in evolutionary biology can only guess, and presuppose whether or not humans used a greater number of basic sounds. At a certain time, humans' brains became able: 1) to make our mouths produce both vowels and consonant sounds, and 2) developed the

capacity to invent words, 3) to name things around us i.e. – together/create ingredients for complex language.

### **Words – sentences- “protolanguage”**

The change that would follow were probably, 4) to put those words into sentences, similar to the “protolanguage” children use when they first learn to speak. Maybe the next step 5) adding grammar to signal Present, Past, and Future as well as 6) plural and relative clauses required the next step to a further development in the human brains or a parallel response to our increasingly civilized way of living in family – in the society.

The first evidence of early human civilization is considered through cave paintings between 100,000 and 50,000. There are no evidence about the connection between the discovery of cave paintings and language, yet humans did not suddenly become more complex and more intelligent, nor the size of brains became bigger. No one knows whether the more complex brains began producing language.

### **Genetics of brain – mutation- language**

There are still more questions in looking at the influence of genetics on brain and language development. Maybe the genes mutated and gave us language ability. Experts have found a gene mutation that occurred between 200,000 and 100,000 years ago, that there was a connection with speaking and the way our brain control our mouth and face. Let’s think that one day DNA researchers would found how much influence genes have on language. Monkeys have similar genes but, they didn’t undergo this mutation.

### **If complex of language depends on specie**

Obviously, humans have the most complex of all. Researchers consider that the complex of language at dolphins and monkeys is beneath human. But they have a second language communication like ways to signal to each other: 1. through sounds and gestures; 2. through repetition; 3. through hands-down experiences; 4. through understanding that specific sounds and gestures can help to identify edible and in inedible; 5. ways which are not being taught but more through observation.

As language develops over time no one knows whether animals improve their language or add to their vocabulary. Humans use language to better their lives by inventing, while animals – for survive.

### **Language – organize linguistic structure – communication**

Dolphins and monkeys have complex language like humans do, but not in the same manner they might have an organized linguistic structure to communicate. Animals talk it’s own way. Dolphins regards clever animal in the world. Humans have talk about the Past, Future, and Present. Animals have a wide language. Apes and dolphins are quite smart. Maybe they just need a little time to evolve to our level. “A little time” according to the evolution sometimes means millions of years and they are on their way now. Other animals have their own ways of communication – dances, smells, sounds, or movements. A different way of communication has the bees with their dance speech and the ants with their very complicated and structured method to

share information. Here is the newest researches about tree's communication. The biologists were surprised to know that they "talk" to each other too. One more remark, to make is with regard to plants. It is important to differentiate between "chemical / biological" signal and linguistic signal. They serve the same purpose, which is the interaction between creatures, but the latter is massively more complex in its structures and nature. You would oversimplify if you tried to equalize these two.

### **Average brain size**

Absolutely, everything that is alive today has evolved with the average brain size of 73-85 cubic inches. The former ancestors evolved many traits (characteristic features) that helped them to survive in the respective environments. Many other traits one can easily see among our modern population today. The most important, and consequential traits are working on two legs (around 6 million years ago), and having a large brain. During the evolution, the shape of the bones, and ankle of humans, and other primates also changed. Where will the evolution take us in the future?

The traits are passed from parents to their children through genes. (As a powerful piece of social technology language conveys your thoughts as coded puffs of air or dozens of drawn symbols, to be decoded by someone else. It can also move information about the Past, Present, and Future; it can formalize ideas trigger action, persuade, kajole Ex.: Ro. a linguși), and deceive. Now there are 7,102 such codes around the world. All human society has language, and no language is **better** than any other. Experts say that *Homo Sapiens* has always had language inherited from our common ancestor some 500,000 years ago or more, especially when the gene FOXP<sub>2</sub> essential for speech was discovered.) The same genes may have different versions – called alleles. The evolution happens when the proportion of these alleles (i.e. genes) in the population changes over multiple generations. Alleles help certain individuals survive in their own environment. That means that evolution is not the fastest, the strongest, or the smartest. Everything depends on the environment.

### **The Evolution of brains**

Some scientists consider that our ancestors had to move (to walk) a lot due to shrinking of forests, due to changing of climate. Humans have the largest brains on the planet, although the elephants' brains are bigger, but their body mass are even bigger than ours.

#### **● Big Brain- big innovation**

Without big brains, we wouldn't be able to:

- create machines;
- create vaccines;
- send rockets to Moon;
- protect from dangerous diseases;
- write books;
- share information to every corner of the Earth;
- tell stories to children.

We would be passing our genes to the next generation. The human brain got

bigger over a long course of the evolution until about 200,000 to 300,000 years ago when *modern humans* – Homo Sapiens, showed up. Since then our human brains started to get a bit smaller, probably our bodies became smaller. *A slightly smaller brain* probably will not use as much energy. Many people consuming a largely vegetarian diet had undergone a mutation that helps them more efficiently process fats, thus preserving healthy brains. That doesn't mean that all men want to become like a SuperMan.

● **What happens in the world of Artificial Intelligence (AI)?**

Today Artificial Intelligence (AI) can translate any text from one language into another as qualitative as a professional interpreter. Many people had found out that a translation company developed a **metric, Time to Edit (TTE)**, to calculate the time it takes for human representative compared to the AI approach. This is a way that may help quantify the speed toward singularity. It is extraordinary difficult to predict what is beyond this technology.

Although languages are the most difficult Artificial Intelligence challenges, **Trombetti** from Orlando said that machines are not so far from closing the gap approaching the human level translation quality.

But Artificial Intelligence (AI) is expected to disrupt the wealth management industries with one in 6 companies predicted to be bought or shut down in the next five years. Big industries should switch to Artificial Intelligence (AI) if they want to survive. One should ask more: can AI Artificial Intelligence settle problems connected with climate change (next topic to discuss).

**Conclusion:**

1. All human societies have language.
2. No language is “better” than any other.
3. Human sapiens has always had language inherited from our common ancestors.
4. The gene FOXP<sub>2</sub> was discovered as essential post-speech.
5. Languages are the most difficult Artificial Intelligence (AI) challenge.
6. Machines are not so far from closing the gap approaching the human level translation quality.

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