

A Radically New View of Man

The core element is the neurosystemically based autonomy of the human being in his thinking and acting

by

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Abstract

According to palaeogenetic analyses, the earliest Homo sapiens groups began to separate from one another in Africa around 150,000 years ago, and did so for decades. Due to a lack of selection, none of their brains have changed *structurally* in the same way since then. From this we can deduce something monstrous:

The subsequent breathtaking development of culture and civilization of mankind, its incessant higher development of cognitive levels, indeed its constant acceleration, was accomplished by means of a cerebrum that has *always remained the same*; phenotypes of individually high aptitude do not change this. In addition, paradoxically: The human brain *does not differ substantially* from the chimpanzee brain in terms of architectonics and neurophysiology; only the proportion of the *non-specific* association cortex has increased in humans by up to an immense 80%.

This is an absolute novelty in the biological evolution of higher mammals: Without any further organ and brain adaptation through mutations, which would have had to be substantial, only Homo sapiens is capable of an incessant development of cognition in creative stages. The analysis of its *intracortical processes* of cognitive optimization suggests the following hypothesis:

Primarily the *complex* process of an exponentially increasing number of neuronal patterns - not a specially interconnected network - must generate a leap in quality, namely from the order states of procedural self-regulation to a *contrary system of neuronal autonomy*. It is only through this additional neural system - experienced as the control dominance of 'being conscious' - that the *thinking potential* for *unlimited* creative development is opened up.

A *leap in autonomy* compared to the animal consequently constitutes the hitherto misunderstood *nature* of the human being.

Key terms: Cognitive autonomy, Human brain evolution, Structural constancy, Cognitive revolution, Creative cognition, Consciousness emergence

1 Introduction

The paradox of incessant creative leaps despite a constant human brain

The extreme brain growth of *Homo erectus* up to 200,000 years ago *ended* with archaic *Homo sapiens* (Neubauer, Hublin, Gunz, 2018).¹ However, evolutionary anthropology cannot currently provide a decisive criterion that would essentially distinguish *Homo erectus* from archaic *Homo sapiens* - not just anatomically (Vidal et al., 2022). The genetic code hides behind base sequences that are not understood in their complex effects, which is essentially - i.e. cerebrally - what makes a person human.

When more or less exactly *Homo erectus* became "wise" is, however, much less important than finding out *how* this "wisdom" and thus the essence of man is gained - and what characterizes them. We must assume that being 'wise' cannot consist in a precisely determined level of cognitive performance. For man is not only capable of learning more and more quantitatively, but is also capable of recognizing successively higher qualitative levels: for example, the spherical shape of the earth, then the evolution of species, then the equivalence of mass and energy, then the fundamental indeterminacy of the elementary quantum of action, and so on. However, in order to discover something qualitatively new that cannot be derived, calculated, or predicted from the old, the human brain must make a cognitive leap for which no specific neurophysiological structures can exist; only the non-specific association cortex has doubled to up to 80% of the cerebrum. We call this ability of the human brain to generate cognitive leaps creativity. Its development to ever higher, more complex levels is unknown in any animal species and is impossible for even the most sophisticated computer.

At least it helps to clarify *when* the new quality "*Homo sapiens*" must be spoken of: Around 150,000 years ago, the first *genetically complete* humans already separated from each other in Africa *for decades of thousands of years*.

„Black Africans showed the greatest genetic variability in their mtDNA sequences - with a mutation rate assumed to be constant, they had therefore had the longest time to evolve. In other words, the origin of *Homo sapiens* in Africa could also be confirmed using genetic methods. Later studies have confirmed this result, even if the time of the first split in the family tree was corrected to 150,000 years ago.“
(Spencer Wells, 2003)

¹ Alleged earliest *Homo sapiens* from Jebel Irhoud a good 300,000 years old, brain volume approx. 1400 ccm; brain growth subsequently increased to 1450 ccm, but reduced to an average of 1350 ccm over a further 100,000 years.

Archaic *Homo sapiens* from Omo (Ethiopia), approx. 215,000 years old, brain volume over 1400 cc.

Homo sapiens idaltu, 160 000 years old, brain volume 1450 ccm.

This is an average value from the genetic analyses to determine the mitochondrial Eve, the Y-chromosomal Adam, as well as the separation of the first human populations from each other (at the earliest 175,000 to at the latest 125,000 years ago), including the ancestors of the Aborigines still within Africa (130 to 100,000 years ago).

„Unlike mitochondrial DNA, the DNA sequences of the Y chromosome differ only slightly from person to person. If one wanted to generate a family tree only by comparing sequences, as with the mitochondrial Eve, very long sequences would be required." "In 2013, another study was finally published in Science, according to which the mitochondrial Eve lived between 99,000 and 148,000 years ago and the "Adam of the Y chromosome" between 120,000 and 156,000 years ago."“(Callaway, 2011)

In addition, there is evolutionary genetic evidence that Homo sapiens left the evolutionary laboratory of Africa for Eurasia around 70,000 years ago (Rito, Vieira, Silva et al., 2019); it reached the Levant around 200,000 years ago. (Stix, 2009)²

At least since the ongoing separation of the earliest human groups around 150,000 years ago, Homo sapiens has remained essentially unchanged as Homo sapiens to this day. - At least indirectly, the substantial constancy of the brains of all people can be empirically proven: Sometimes it was only over 100,000 years later that *dispersed populations met again* (see the Aboriginal ancestors in 1770 to James Cook or the San people in southern Africa to colonialist Europeans, etc.) (Behar et al., 2008), who *were able to understand and exchange ideas with each other* despite extremely divergent cultural development. For this reason, any leaps in the quality of their brains in the meantime, which would be genetically determined, can be ruled out. Otherwise, differently structured brains would have resulted in different human races.

Populations in other organs can still evolve – regional adaptations to high altitudes, lactose tolerance, malaria or HIV resistance, etc. Such adaptations are understood as examples of genetic-cultural co-evolution. However, they remain strictly limited to regional environmental conditions and do not affect the core cognitive potential of the species Homo sapiens. Thus, co-evolution in humans is effective at most as a residual mutation-selection process, without any explanatory power for the uniquely unlimited creative development that has been taking place since brain growth stopped around 200,000 years ago. This is precisely where the gap in current co-evolution models becomes apparent: They miss the real novelty, namely the process-related – not physiological – emergence of an additional, autonomous neural system from an architecturally unchanged brain.

² All of these and similar research findings are subject to the proviso that evolutionary anthropology has not yet presented a precise, cognitive scientific criterion that explains what makes humans essentially human. Anatomical phenomena, but also a misunderstood genome, are certainly not enough.

However, the fact that the brain is obviously no longer evolving is illuminated by the following fact: only the human brain is capable of making arbitrary cognitive leaps that remain beyond the reach of even the most powerful computers; it therefore already accomplishes what genetic adaptation previously accomplished in organ evolution – only far more efficiently and quickly. How could further genetic evolution over many generations compete with this? – And yet, traditional science sees nothing paradoxical in the constancy of the human brain when it simultaneously leaps from one level of cognition to the next higher one.

Current evolutionary biology and cognitive science believe they can explain this unique creative development through the use of symbols, language, cognitive niche formation and cultural dynamics. (Tattersall, 2015; Stringer, 2011; Tomasello, 1999; Deacon, 1997; Dehaene, 2020; Lieberman, 2013; Henrich, 2015; Prince, & Boyd, 2005; Laland, 2017). However, she never mentions how significantly differently an unchanged brain must process information compared to that of an animal in order to produce the entire disparate thinking of all human development to date, with countless errors.

But without a corresponding understanding of the human brain, all cultural techniques for self-explanation, no matter how ‘dynamic’, remain a single, great tautology. Correct: Humans use a complex world of symbols to predict artificial worlds; but how does a human brain analogous to the animal brain manage this? Correct: Humans use a complex world of symbols to predict artificial worlds; but how does the human brain, which is analogous to the animal brain, achieve this? Correct: Humans form cognitive niches - such as specialized craft techniques or specialized branches of science; however, they do not genetically adapt their organs for this purpose, but they themselves specifically modify the niche, namely all natural substances and energies, in their own way - in sharp contrast to biological evolution. Because humans are turning the entire planet into their niche, the hypothesis that they adapt culturally to niches no longer explains anything at all.

No animal brain is able to increase its cognitive levels as unimaginably like the human brain (from harvesting a plant to replicating photosynthesis, which is even more efficient). Even less so a computer: it is impossible for a computer model that has become "wise" to create all future innovative algorithms and software developments itself. - Inconceivably, only the human brain is capable of doing precisely this, although it does not differ from the monkey brain in any specific way, either architecturally or neurophysiologically. (Herculano-Houzel, 2016a, 2016b; Rilling, 2006).

With the end of brain growth, therefore, an extraordinary brain must have emerged. This radical qualitative leap in the human brain makes it possible -

without substantial change - to generate immeasurable cognitive performance solely by means of complex neural processes;:

thus, the most diverse cultural manifestation of early man over 200,000 years up to the Neolithic Revolution:

as well as all the cultural forms of primitive peoples that still exist today;

as well as the entire development of civilization from the first advanced civilizations to the current globalization in all its mental facets - individually and socially.

In other words: even the most abstruse and subtle, vague and specific conglomeration of thoughts, of which the entire body of human literature provides only a faint reflection, is produced by a brain that has remained architecturally and neurophysiologically unchanged for over 200,000 years.

(The indispensable, communal practice of all the cognitive phenomena listed here is to be left aside.)

All cognitive performances that have ever taken place - no matter how disparate - were in fact created with a structurally unchanged brain (Tattersall, 2002; Foley, & Lahr, 1992; Deacon, 1997; Roth, 2001; Schiefenhövel, 2002; Stringer, 2012; Tomasello, 1999). This requires a process that allows for arbitrary leaps in cognition. The enlarged association cortex allows every human being - regardless of the epoch - to continue intracortical processing of what has been practically experienced: but only on the basis of a fixed sensory apparatus; nevertheless, all past and future knowledge can be reproduced. - Consequently, it can *no* longer be a matter of a *purely gradually* optimized animal brain, because that never gets beyond a characteristic level of cognition - there must have been a systemic shift in the human brain.

In short, the human brain cannot have changed substantially by genetic means for at least 150,000 years. All people - however much they may differ phenotypically - must be characterized by the same brain *in principle*; all people of all ethnicities prove to be equal in their limitless creative development of any higher level of cognition. This unlimited cognitive potential can only be achieved by a system leap in a brain that has remained architecturally the same, expressed in a characteristic process.

We therefore hold firm:

A The human genome has not been able to change substantially since human populations in Africa were separated from each other on average around 150,000 years ago; after all, there was no longer any selection among all human populations (Pääbo, 2015).

B This applies in particular TO the brain, which is common to all humans because it is essentially unchangeable (what is still to be explained).

C Corticalization in *Homo erectus* over two million years has increased the size of the neocortex and the non-specific association cortex from 50 to an enormous 80 % of the cerebrum (Passingham & Wise, 2012; Kaas, Jon 2013).

D All of humanity's cultural and civilizational development has therefore always been accomplished with the same structural brain. The human brain, which is capable of creative self-development, contradicts every animal brain structure in this respect, because it has always been evolutionarily adapted.

Conclusion: In contrast to every animal brain, the human brain, with its structurally identical brain, is apparently capable of coping with higher levels of cognition indefinitely.

Second conclusion: Thus, no substantial further development of the neurophysiological structures can be responsible for this, but this unique cognitive potential must be due to an exquisite *process* of the human brain.

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Let me summarize: The phenomenological starting point was the question of the level of intelligence of the “wise” person, which had not yet been satisfactorily answered. The aim was to show that:

Humans are not characterized by a fixed level of intelligence, i.e. a cognitive performance that is genetically predetermined - such as the infamous intelligence quotient of around 100 points; this merely captures the variable, individual talent to master historically achieved cognitive levels faster and more precisely. The opposite is true: the unique intelligence that separates man from every animal consists in the mere *neurosystemic potential* of his *autonomy-capable* brain - which is explained in thesis three - to be able to develop his cognitive abilities to ever higher levels - provided that suitable historical framework conditions are in place. - (I will leave aside here how historically specific framework conditions *trigger* human cognitive potential differently: Just think of the problem of the extremely long era of hunter-gatherers up to the emergence of agriculture around 12,000 years ago and its slow progress in technology - compared to the scientific and technological revolutions of the last 200 years).

2 Method

Comparison of brain evolution and cognition levels in Homo erectus - with static brain and rapid creativity development in Homo sapiens

To get to the bottom of the extraordinary nature of this leap towards an inexhaustible cognitive potential, it makes sense to first take a closer look at corticalization in the precursor Homo erectus. The result should be compared with the cognitive abilities of the future constant brain of Homo sapiens:

Corticalization began to accelerate in the genus Homo when the upright gait was largely ,completed‘ in the australopithecines and continued for almost two million years - especially in Homo erectus: from about 2.1 million years ago (in Homo habilis) to about 200,000 years ago, during which time the cerebrum volume roughly doubled³ - Apparently, this was a selective advantage for Homo erectus over the other species of the genus Homo (Hublin, Neubauer, Gunz 2015; Wikipedia contributors, 2025).⁴

(I will not go into the popular question of what caused the rapid growth of the cerebrum - while often a single, specific cause is mistakenly assumed - because the answer would have to be difficult and would contribute nothing to the matter at hand.)

Despite this enormous brain growth in Homo erectus over nearly two million years, only four technological, i.e., cognitive stages can be identified:

First, from chopper to hand axe (2.1 to 1.7 million years ago); (Mussi, Margherita et al., 2023)

secondly, from the natural fear of fire to the passive use of fire (in the same period);

thirdly, from the passive use of fire to the artificial ignition of fire (1.7 million to 790,000 years ago, i.e. a seemingly endless period of almost a million years);

fourthly, from simply throwing stones and wooden sticks to artificially making javelins (2.1 million to about 500,000 years ago) (Mussi et al., 2023; Wilkins et al. 2012, Berna, Goldberg, Horwitz, Brink, Holt, Bamford, Chazan 2012).⁵

Strikingly, the shape of the hand axe remained almost the same over one and a half million years and no other stone tool was added. Since the human brain does *not differ significantly* from the ape brain anatomically and architecturally, but also neurophysiologically (Herculano-Houzel, 2009, 2012, 2016) - only in the differentiation of the special structures - there remains a single, *considerable* difference (Brandt, 2019):

The human cerebrum - inherited from Homo erectus - has an *unspecific* association cortex that is about *twice as large* as the ape brain; in humans it takes up to – mind you - *80 %* of the total volume compared to up to *50 %* in apes (Vaid,

³ Homo erectus from Lake Turkana: 1.7 million years old, brain volume approx. 850 cc.

⁴ For the transition: "Broken Hill Skull" from Kabwe, Zambia. The skull was initially named Homo rhodesiensis (as a type specimen) and later assigned to Homo erectus. Since the 1990s, some researchers have identified it as an African variant of Homo heidelbergensis, and occasionally it is also referred to as "archaic Homo sapiens". "A uranium-thorium dating published in 2020 finally narrowed the age down to 299,000 ± 25,000 years." "The brain volume is 1280 cm³ and thus at the lower limit of the volume of anatomically modern humans ..."

⁵ Earliest chopper culture 2.1 million years ago
Earliest passive use of fire 1.7 million years ago
Earliest active use of fire 1.7 million years ago

Huttner, 2020; Cell contributors, 2012). If we confront the accelerated growth of the brain of *Homo erectus* with the modest development of cognition in almost 2 million years, we can derive two most general findings:

Firstly, the cognitive advances of *Homo erectus* must have been implicit consequences of the *genetically determined growth* of the cerebrum. This is because the *leaps in cognition* occurred at too great an interval - a few hundred thousand years in each case - to be due to the conscious accumulation of small steps of experience. More efficient tools had not yet been developed through social learning - such as the differentiated special tools of the Middle Stone Age, scrapers, scrapers, burins, etc. -, although the flakes were always available as basic material. (This refutes the Lamarckian theory of anthropogenesis of Professors Tomasello (2020), Suddendorf (2014) and Laland (2014) - refutes an alleged “biological mechanism for cultural transmission”, refutes the thesis of recognition through “practice, practice, practice” in *Homo erectus* - and incidentally explains the astonishing durability of the hand axe).

Homo erectus was therefore still subject to a *mutation-selection process* (of its brain above all) and was still an animal. He *did not* achieve his cognitive progress *independently*, but owed it to an *evolutionary* brain optimization. How did this come about? Genome analysis of the brain has so far revealed that several mutations have been found, all of which merely contributed to prolonging *neuron growth* in the embryonic phase, thus favoring the increase in the number of neurons; namely very densely packed and uniform neurons of the association cortex, which are not specialized for any primary sensory functions. So far, there is hardly any evidence of *specific* neurophysiological *changes* (Florio, Albert, Taverna, Brandl, Lewitus, Haffner, Sykes, Wong, Peters, Guhr, Klemroth, Prüfer, Kelso, Naumann, Nüsslein, Dahl, Lachmann, Pääbo, Huttner, 2015; Fei, Mora-Bermúdez, Fu., Anastassiadis, Francis 2015; Namba, Dóczi, Pinson, Xing, Kalebic, Wilsch-Bräuninger, Long, Vaid, Lauer, Bogdanova, Borgonovo, Shevchenko, Keller, Drechsel, Kurzchalia, Wimberger, Chinopoulos 2019; Cell Stem Cell contributors, 2022).

A brief methodological digression: Although there are studies that point to minor, genetically determined changes in human brain physiology, they do not concern the basic neural system of the human brain. In this respect, one thing is certain: When it comes to very specific cognitive functions, we mainly know about the multisensory cortex and the cerebellum, among other things. However, abstract and symbolic cognitive functions that are only known in humans are based on the complex neural processes of the non-specific association cortex. In addition, typical human cognitive abilities depend on sustained imagination, the ability to anticipate, and the ability to make plans and projects. Over all, the human brain is characterized by complexity due to the interaction of many neural patterns, which

are probabilistic in nature. - Comparing typical cognitive phenomena in humans with their structurally unchanged cerebrum forces us to conclude: Consequently, the typically human ability to form stable and lasting abstract and symbolic ideas must also be based on self-regulating, self-organizing neural patterns that evolve in an orderly manner; even in higher animals, higher cognitive abilities are therefore not deterministically preprogrammed.

Before attempting to differentiate and explore very specific cognitive abilities, one must clarify the question of how, in principle, the stable and permanent states of order of higher abstraction and symbol formation can arise from the non-linear interaction processes of billions of neurons. Because once again: there are no specific neurophysiological structures for different languages or scripts or logic systems etc; and there cannot be any, because they are obviously capable of development at will. Ultimately, this complex system of interactions must also give rise to the diametrically opposed neural system of imagination: opposed because it is linear, unambiguous, and predictable. Because of these elementary but concrete basic conditions, the following hypothesis cannot be dismissed as pure speculation, even though no empirical research at the micrometer level is available yet. – So much for the method of this analysis.

Secondly, the following suspicion arises: The leap in quality that is noticeable with the end of cerebral growth in archaic Homo sapiens may have something to do with this *exponential* increase in the *number of neurons* in the enormously enlarged association cortex and its *non-specific* character; it may stem primarily from these interpolation processes of increased, uniform neurons that swell exponentially. The higher levels of cognition do not result from additional, specific structures, but are evolved *intracortically* and above all *processually* by means of the densely packed association cortex (Passingham & Wise 2012; Kaas 2013; Hill et al. 2010; Schoenemann 2006). This already applies to higher mammalian species.

This would fit in with the four widely separated technological stages in Homo erectus. Why? Each individual stage required more components, especially of the outside world, to be related in a forward-looking way. The more components make up a complex system, the higher the cognitive evolutionary process and the greater the number of neurons available for pattern selection. - Of course, this suspicion can only be substantiated once the way in which the neuronal system of the brain processes in *general* and the association cortex *in particular* is understood – namely *complex*.

It must therefore be *made clear* once and for all: The functioning of the human brain is often compared to that of a computer. Behind this lies the even more fundamental illusion that nature functions *according* to the eternal laws of mathematics and logic. Exact concepts of mathematics and logic are highly effective, but

purely *abstract-ideal*, i.e. reductionist tools of conscious thought in order to cope with *objective* chance and *objective* chaos - which ultimately trigger system leaps. For ideal absolutes of quantity (of numbers) and quality (of unambiguous self-identity) *cannot* exist in nature *in principle* (see the objective indeterminacy of quanta and the chaotic character of complex macrosystems).

Absolute concepts merely result as a cognitively highly advantageous ordering phenomenon from the processual evolution of permanently stable pattern attractors by means of human association areas. Despite their ideal form, absolute quantities succeed in capturing a real contradictory world by means of boundary properties - which do not permit any logical contradiction - in an arbitrarily precise approximation. Causal logic and formal logic, which are only due to the nature of conscious thought, therefore only capture with absolute precision permanently stable states of order - i.e. *special cases* of reality: because fluctuating, processual interactions in the brain are permanently dominated by neuronal attractors that provide stable states of order - and thus correspond to those of the macroworld. However, relatively permanent order structures of matter are quite rare, even in the brain; rare even among the only 5% of matter in the cosmos that is dominated by rest mass. - The fundamentally wrong comparison between the computer and the brain arises from a fatal retransference from the computer to the brain, because the system-specific process of the human cerebrum - *namely, interactive, bifurcational, and therefore unpredictably complex* - has been ignored: It alone enables creativity that is alien to the computer, i.e. the production of quality levels of cognition that are in principle unpredictable and unforeseeable.

The structure of a neuron and its many thousand-fold, above all probabilistic, i.e. *ambiguous* connections with many other neurons makes it clear (Bastos, Usrey, Adams, Mangun, Fries & Friston 2012): The processes of all neurons - and their patterns to represent quality characteristics - are *non-linear*; they represent the *unpredictable* processes of a complex system. The states of order of neuronal patterns, which manifest themselves as cognitive performances, must therefore first *be found* in a *self-regulating, self-organizing* and, in the case of higher performances, above all *processually evolving way* - and are therefore unpredictable. - Mathematically, these cognitive performances that have become stable can be understood as attractors⁶ of neuronal patterns (Douglas & Martin 2004).

Cognitive performance - especially of the huge association cortex - can therefore by no means be calculated formally and logically as in a computer according to predetermined algorithms and circuit diagrams on the basis of clear information and exact connections. To represent the airy, fluctuating, even erratic meanings of fragmentary thinking, formal-logical links would be far too rigid, too

⁶ In a dynamic system, attractor refers to a certain number of variable states, a structure towards which this system moves asymptotically over time.

unambiguous (Rabinovich, Huerta & Laurent 2008). Rather, their cognitive performance is optimized by *strengthening or weakening* more suitable versus less effective neuronal patterns (Timme, Wolf, und Geisel 2002); *most* higher levels of cognition are *alternately evolved in an intracorporeal trial-and-error process* and therefore remain *unconscious*. - (For my part, this is a general conclusion based on the specific properties of neurons and their ambiguous connections: They process *non-linearly*, branch their patterns, go through *chaos phases*, culminate in attractor-like *states of order*).

It is true: The brain stem, the thalamus, the basal ganglia and an early cortex are already *pretracked* and *fed back* for *simple* cognitive functions - such as undifferentiated sensory perceptions, reflexes and instinctual reactions. However, with the differentiation of the neocortex for highly specialized, sensory perceptions, *very differentiated components* of perception must be *synchronized* and *integrated* again in order to simultaneously develop all perceptions to a higher cognitive level by means of memory in a learning and *anticipatory* manner - even through creative *chaos phases* (Zumdieck, Timme, Geisel, Wolf 2004; Spitzer 1996). This cannot happen through the *primary* cortex or the connectome, but only *intracortically* (i.e. non-specifically) and *coordinating* by means of the(*secondary, tertiary, etc.*) association cortex and its interaction processes, which select advantageous pattern attractors.⁷

It should be noted that these processes of evolving pattern attractors are *not* selection processes of neuron positioning in the embryonic phase; *nor* are they processes of selection of more active versus less active neurons in long-lasting learning processes, so-called neuronal plasticity (Changeux / Connes 1992). These two cases of neuronal selection are far too cumbersome to explain the speed at which processually non-linear evolutionary stages of unconscious thought are accomplished. All higher forms of cognition involve the *processual* selection of fleeting synaptic patterns, which can also change through bifurcations into the unpredictable stable state of order of a creative pattern attractor (Kelso 1995). - (Since we are not yet able to follow more comprehensive processes of pattern evolution at the micrometer level, this is also a - in my opinion - highly plausible hypothesis based on the known individual facts (MICrONS project 2021; Larkum 2013)).

The larger the non-specific association cortex, the more interacting factors in solving a task can be evolved purely intracortically in such complex processes. Solutions that are found in biological evolution organ-specific and over a long period of time through trial and error are found cognitively in the shortest possible time by means of an enlarged association cortex in the smallest possible space through *selection* and thus the *evolution* of *synaptic patterns* - i.e. through their

⁷ Several self-regulating patterns of neurons evolve towards an attractor, which I call the pattern attractor.

preferential strengthening or weakening. Because these are highly complex neural processes that evolve optimized variants as stable states of order under many fluctuating patterns, the higher cognitive performances also fluctuate and vary and are by no means clearly predictable (see variable solutions for cognitive tasks, uncertainties, radical new approaches, etc.).

What is still missing as a general result: The outstanding cognitive performance of humans is not directly based on peculiar brain structures that are unique to humans - if one does not want to take the enormous enlargement of the association cortex for this. Rather: The exceptional nature of human cognitive potential stems from the neurosynaptic processes themselves - namely from their exquisite system character, which is constituted independently by these mass processes themselves.

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To summarize: Architecturally, structurally and neurophysiologically, the human brain does not differ significantly from the brain of apes - except for a comparatively larger than average *non-specific* association cortex. Increasingly higher cognitive performance must be found with it *intracortically* in the trial-error procedure of varying neural patterns; this is by no means *solely* due to the empiricism required at the same time. Nevertheless, the same human brain is capable of not only creating but also generally comprehending one unpredictable cognitive leap after another in the development of culture and civilization without any further substantial change - even at an accelerated rate, as has been the case since the Renaissance.

The key to the apparently unfathomable cognitive potential of humans must therefore lie in the *primarily* purely quantitative increase in the association cortex and in its complex - not complicated - process character. The characteristics of the structure of fast - densely packed, dendrite-laden, synapse-abundant - neurons and their processing as well as the unspecific character of the association cortex and its intracortical processes are obvious:

A cerebrum processes in a complex way - not primarily in a complicated and formal-logical way. All fashionable comparisons with electronic computers are on the wrong track, because the brain and computer process in fundamentally *diametrically opposed* ways: The brain self-organizes from below to find higher, cognitive order by trial and error under varying, neuronal patterns - the computer calculates larger, logical order from disordered fixed data, centrally controlled from above. The brain evolves unpredictably creative things through states of chaos - the computer calculates only hidden patterns from disorder, i.e., patterns that already exist. *Unlimited, original self-development* is denied to any electronic computer, no matter how powerful; it is always bound to qualitatively limited maximum performance or to the creative results that human communities have

achieved up to that point, only to be attributed to artificial intelligence by the simple-minded.

The developmental potential of the creative human brain can only be explained by its chaotically branching neural processes, which must evolve higher cognition each time in an original and primarily processual way.

3 Result

Hypothesis on the emergence of neuronal autonomy in *Homo sapiens* from the non-linear interaction system of the enlarged, non-specific association cortex

Having arrived at this point, the *decisive* question arises: According to our general knowledge of nature, can a specific system expand infinitely without *qualitatively* changing the system? Can the intracortically processing and unspecific association cortex - and thus the interactions and the complexity of its neuronal patterns - increase infinitely without changing the system of order generation from below? Highly complex self-organization processes of neural patterns result in pattern attractors, and therefore remain unconscious, so that we *know nothing about* these cognitive processes. Can such pattern attractors increase arbitrarily with the swelling number of order-forming processes or is there a critical tipping point (Parisi 2022)?

On this question, the science of complex systems has recognized: Condensed hydrogen clouds set in motion the fusion process in stars, the results of which are unpredictable; the boundless increase in cyanobacteria in the world's oceans created an oxygen atmosphere with incalculable consequences, the prerequisite for dynamic life on land; the unnoticed increase in the self-domestication of animals and plants alongside longer-lasting communities of wild prey led to unpredictable agriculture; increasing division of labor in rural village communities brought about a previously unimaginable market, commodity production and state formation through increasing product exchange; overproduction, especially of consumer goods, depletes the earth's resources in incomprehensible ways, even endangering humanity; and most recently: Unchecked CO²-production is likely to cause the global climate to tip - unthinkable for previous generations.

We must assume the *same* for the *exponentially increased* pattern formation in the human brain: Increasingly higher cognitive performance is based on stable and fixed states of order - guaranteed by neuronal pattern attractors - which must inevitably *evolve*: The greater the capacity of the enormously grown association cortex, the higher cognitive performance is possible, the more stable pattern attractors have to be evolved.

This swelling process also has a *tipping point* (Maass, Natschläger & Markram 2002); namely when the *permanent* quantity of stable, permanent pattern attractors has become so large that it *covers* or *shields* the process of self-regulation of neuronal patterns, which has so far remained unconscious because it is constantly interacting. - In this way, an additional neural system - a small, primary part of all perception - arises in Homo sapiens alongside the non-linear one of the unconscious. This neural system captures all relatively unambiguous patterns of order, because they are permanently stable and can therefore be formed logically, and because they can only form linear connections; unambiguous cognitive elements are now controlled autonomously - by a partial ego from above - i.e., solely in the imagination, because their unambiguity means they can no longer interact. This dominant neural system of a few, stable pattern attractors has a highlighting effect like a very coarse sieve in the face of an otherwise immeasurably complex external world. This is the only reason why we experience even simple perception as peculiarly *conscious* - so that we *also know about it*.⁸ - (How exactly the number of stable and permanent states of order, which grows exponentially with the association cortex, establishes an additional autonomous neural system remains an open question as long as the corresponding neural processes cannot be followed in the necessary resolution).

This autonomous capacity for imagination, itself interacting with the unconsciously evolving neural patterns, suddenly makes a mutation-independent, autonomous development of cognition possible - despite a brain that always remains the same (far beyond its plasticity): For the first time, it controls and corrects the latent creative cognitive evolution from below from above by means of an autonomous partial ego. Unpredictable, cognitive leaps of creativity are thus rooted in the micro-evolution of complex neural processes - not in the linear, causal-logical thinking of the conscious mind. However, the autonomy of consciousness only makes this creativity fully effective by being able to critically examine it from above and direct it precisely. (This *completely open potential* of systemic interaction of the autonomy of thought is perceived by some as absolute freedom of will, because the systemically conditioned *degree* of freedom has radically expanded compared to the animal. Nevertheless, in practice it is subject to enormous restrictions and relativizations. Not in such a way that freedom and non-freedom are strictly distributed in percentage terms - 5 to 95%, for example - but in the sense that even what is thought autonomously is inherently of specifically conditioned origin. Freedom and unfreedom of will thus always form a real contradictory unity, only the center of gravity shifts).

⁸ An in-depth discussion of the approximately 34 theories of consciousness of recent decades has been dispensed with because they have all remained purely speculative; they have not been derived from the complex microprocesses of a greatly enlarged, unspecific association cortex and its stable pattern formations, as would be appropriate. - Experts therefore rightly spoke of the still unsolved riddle of consciousness.

It is true that in *conscious* thinking *slow*, because autonomous, processes of imagination are possible, which allow *radically* abstracted causal logic, pure reason and the like. The autonomously acquired, ideally absolutized reason of a partial ego is thus able for the first time to identify specific creative achievements of complex pattern evolution and therefore to transform them constructively. As mentioned above, this is merely an open cognitive potential - not a specific cognitive function -, whose realization has historically depended on varying favorable conditions (such as climate, geology, cultural exchange etc.; the late Neolithic Revolution is a prime example). It is these external and internal framework conditions that - for historical reasons - always limit a neurosystemically *absolute* freedom of thought to a tiny degree of freedom. - However, this tiny amount is enough to enable unlimited creative development by cooperatively testing advantages.

This is demonstrated by the extremely leisurely beginning, but continuously increasing *development of cognition* in humanity, which still has no limit today - see most recently Crisp/Cas9, Higgs particle detection, ChatGPT, etc. - while the cerebrum remains essentially unchanged: 300,000 years ago sluggishly differentiating Middle Stone Age stone culture (scratches, scrapers, burins etc. in Jebel Irhoud, Morocco) (Max Planck Institute contributors, 2017); then 120,000 years ago the first grave goods (in Qafzeh, Israel) (Bar-Yosef/Vandermeersch 1991); 92,000 years ago pierced shells and harpoon hooks (in Katanda, Congo) (Canadian Museum of Nature contributors, 2012); 79,000 years ago the first ornamental engravings (six crosses within a diamond on ochre, in South Africa) (Henshilwood, d'Errico, van Niekerk, Dayet, Queffelec, Pollarolo, 2018); around 51,000 years ago, the earliest rock-cut mines (on Sulawesi) (Nature contributors, 2024); around 47,000 years ago, earliest rock paintings (in Australia (Academia contributors, 2012)); 44,000 years ago, first musical instruments (in Western Europe) (Higham, Basell, Jacobic, Wood, Ramsey, Conard 2012); 35,000 years ago, figurines (in Central Europe) (Hahn 1986); around 25,000 years ago bows and arrows (Lombard, Phillipson 2015); around 18,000 years ago the spear-thrower (Enrico Brühl, Jiri Svoboda 2003); 12,000 years ago monumental cult sites (in Turkey, Göbekli Tepe) (Schmidt, 2006); almost simultaneously the emergence of agriculture (Benz 2008) and only 5 500 years ago early advanced civilizations etc. (Neanderthals and Denisova-species, on the other hand, *did not develop nearly* as creatively in the at least 250,000 years of their existence and were therefore biologically selected). (Spectrum.de contributors, 2024)

The fact that the end of cerebral growth in *Homo erectus* approx. 200,000 years ago, another astonishing fact tells us indirectly that a cognitive leap in quality must have occurred: The brain prelude of 1450 cc reached by the following archaic *Homo sapiens* decreased to the anatomically modern *Homo sapiens* in the following 100,000 years to a human-typical 1350 cc (on average); in this

biologically short period of time, however, the development of cognitive performance, which is characteristic of humans alone, already began in stages: specialization of the Middle Stone Age artefacts, burial of Qafzeh, diamond-cross ornament of the Blombo cave. - From this paradoxical phenomenon we must conclude that an apparently inefficient, surplus volume of the association cortex was reduced again in *evolutionary terms*, while the Neanderthal died out with a larger brain. The cessation of cerebrum growth 200,000 years ago in the developing human appears to be evidence of a previous system leap, i.e., a specific *critical size* and thus a *critical number* of efficient neurons in the association cortex.

*

Let me summarize: The ability of humans to develop an increasingly rich language, mathematics and writing in their history, as well as four elementary forms of thinking (generalizing, abstracting, analyzing, comparing and their opposites), is by no means based *directly* on *genetic* mutations to the *specificity* of brain structures; the latter have remained *substantially* unchanged since the emergence of man. Rather, the extreme enlargement of the cerebrum - in particular of the stable pattern evolving association cortex - has led to an exquisite, non-animal *process* that has overridden further, substantial evolution of the genome through selection. In addition to the *fundamentally complex* neural system - which humans share with animals - a higher neural system was added that operates *in the opposite direction* to the animal neural system: linear controlling instead of non-linear self-regulating. This higher neural system puts a *small part of* the human *ego* into a state of *neuronal autonomy*. We call this systemic state of *dominant control ability* “conscious”, which means that we have *relatively* free, merely imaginary - that is, from above - equally autonomous cognitive elements at our disposal, because we *can* know about them - precisely in the state of neuronal autonomy (which the etymology of the term 'consciousness' indicates as “having knowledge *about* something”).

Man's partial autonomy of thought not only makes possible a permanent, *mutation-independent* development of his cognitive abilities by allowing purely intuitive, more or less imaginative ideas to be subjected to targeted, even logical control. Above all, autonomy of thought also allows it to make *creative leaps in cognition* - which are denied to all mathematics, all logic and therefore also all artificial intelligence *without humans* (which is implicitly confirmed by Kurt Gödel's theorems of incompleteness). However, by accomplishing *its own* further development, because the brain of every human being is able to evolve creativity on purpose, humanity makes the *final leap* out of evolution *in order* to follow its own creative path.

4 Discussion

The need for three major paradigm shifts in evolutionary anthropology and brain research

According to these research results, I see the absolute necessity for *three major paradigm* shifts in evolutionary anthropology and brain research:

First new paradigm: The unreflected traditional dogma of a genetically determined, specific level of human intelligence does not stand up to the facts. - Since humans came into being at least 200,000 years ago - when the growth of their cerebrum came to an end - their cognitive performance has increased to ever higher levels. For this reason, since the emergence of civilization, all people have had to go through ever longer and ever more advanced stages of training - indeed, lifelong further training is becoming increasingly indispensable. This by no means only comprises new and increased individual facts, but the means and methods of recognition and understanding are becoming increasingly sophisticated in terms of quality. Accordingly, the level of cognition is increasing - from genetics to proteomics, from atomic to elementary particle physics, from computer science to AI research, and so on. And more and more people are benefiting from higher, cognitive education. Apparently, all people tend to be able to master similarly high levels of cognition - naturally according to their specific talents (which are allele-related, not due to substantial mutations).

All these levels of education are mastered by a brain that is *always the same*; it therefore has the pure, *systemic potential* to apply *every known* cognitive leap - with the help of a community - given the appropriate training. This requires us to abandon the previous dogma that each specific, higher cognitive performance requires a correspondingly different neurophysiological structure. This vulgar materialistic idea has prevented us from recognizing and understanding the historically proven, unlimited, even accelerated development of human cognition, which every educated person is able to comprehend at all times.

Second new paradigm: Brain research in particular, but also evolutionary anthropology, must abandon the counterproductive dogma that the brain processes like a computer or a more complicated electronic device. Without exception, all macocosms, including the brain, ultimately consist of *complex*, i.e. *unpredictable* systems, because the initial conditions assumed in each case are *fundamentally ambiguous*. In special cases (such as planetary systems, mechanics, or even primitive brains), causal-logical models are sufficient for their approximate description. As soon as the ambiguity of the components involved - in the brain, this applies to synapses, neurons and their probabilistic patterns - results in a *complex and therefore non-linear, even chaotically processing system*, exact mathematical calculability and predictability are no longer possible in the long term. Copying

and storing thoughts - or more precisely: the unconscious thought process - of a brain thus proves to be unfeasible in principle.

High cognitive performance must therefore be *wrested from* a complex system of disorder - and this succeeds, as in biological evolution, through self-regulation, building on this through self-organization up to the *micro-evolution* of quality leaps through trial and error, i.e. *procedural selection of pattern variants*. These non-linear, erratic neural processes can only be accomplished by a specifically undefined association cortex, which *evolves pattern attractors intracortically, i.e. self-referentially* - and is not exorbitantly enlarged in humans for nothing.

Third new paradigm: Not only brain research and evolutionary anthropology - science in general must overcome the dogma that higher levels of development of matter, as in the evolution of species, would arise *purely* gradually through known and calculable steps. Dead and living systems of complexity cannot possibly grow infinitely without even small steps reaching a *quality limit* that can only be crossed by finding an unpredictable and incalculable original new system. The Homo erectus brain also underwent a corresponding 'trial and error' process until the uniformly growing association cortex raised the overall system to a higher level. In order for the human brain to make the evolutionary leap to a system of inexhaustible cognitive potential, its process had to reach this tipping point: It evolved procedurally from the primarily self-regulating neural system of the animal into a second one: that of dominant neural autonomy. This stands in contrast to the self-regulating basic system, namely as a central control system, in order to interact with it and form a competing, and therefore innovative, unit.

This autonomy system grew out of the order-forming processes of the old, self-organizing neural system, but placed itself over the old one in a dominant controlling role. The complex interaction of these two contrasting neural systems, which are perceived as unconscious (without knowledge) versus conscious (with knowledge), allows for the first time a directed, unlimited, and sometimes creative cognitive development. Higher cognition, let alone a leap in cognition, is gained through non-linear, branching, i.e. *evolving processes* of neuronal patterns that are fleeting and unpredictable in nature - whose reasonably stable results can be sensibly controlled, corrected, and planned through intellectual autonomy. The creativity of evolving neural patterns, which animals only use spontaneously because they are unconscious, can be consciously controlled by humans in the long term. *Higher* cognition is by no means a mechanical or logical result of a *pre-determined* neurophysiological structure, such as a reflex arc.

5 Conclusion

The *uniqueness of the human being* shows itself after all *firstly*, in its *neurosystemic potential* for unlimited *higher development* of cognition with *always the same* brain; *secondly*, this is made possible by an additional neural system of relative autonomy, which was established rapidly, in particular by means of an enormously *expanded* association cortex; which - *thirdly* - *checks* the spontaneous *creativity* of the self-regulated, near-chaos neural system of the base by means of a partial ego that has become autonomous and transforms it into ever higher tasks and goals with great foresight.

*

The quintessence of this analysis, which critically combines facts that have long been known, must be as follows: Humans therefore *do not possess a genetically determined level of cognition*, as is persistently claimed. Instead, he has a *neurosystemic potential* for an *unlimited higher development* of his cognitive abilities, whereby partial *autonomy of thought* is absolutely necessary - one could also say: *relative* freedom of thought - or previously misunderstood: consciousness. For it is only *through* intellectual autonomy that humans are able to recognize creativity in nature and in thought - which in principle cannot be achieved through logic alone - as such, but also to examine it logically.

Man is therefore no longer an animal; because his specialized organs no longer need to be *genetically* adapted - after all, *he himself adapts* all natural substances and energies to his needs and goals far more quickly and purposefully by means of his brain, which is *always the same*. This is why the human brain *can and does* no longer *need* to evolve - it already ensures *everything* that genetic evolution *previously* provided in an undirected way, *and much more*: but now through limitless, increasingly forward-looking increases in cognitive levels.

Humanity has long since *left* biological evolution behind and is *solely responsible* for its further civilizational development, *and therefore also fully responsible* for it. - Humans are the first species to be able to recognize and understand their own development and that of nature, from which they come, far in advance and to plan and direct it towards general goals. – There is no nature that can be preserved forever, just as man is only a transitory stage.

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