Goal, free-will and qualia in biological evolution

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Abstract. The author is developing the idea that genes were not enough in evolution to create goals, because the first goals should have arisen quickly. This is another clue that consciousness exists also at unicellular organisms. Besides, qualia are more primitive form of a goal. Consciousness is composed of qualia and free-will, and both need new physics. Free-will is based also on quantum consciousness. Although it seems that it is disproved by Tegmark, it is very obvious, thus it cannot be disproved until it will not be clarified what a physical base of consciousness is. Quantum consciousness is based also on panpsychism, which has already some support in mainstream science. Explanations of goal, free-will, qualia, and consciousness are also things of explanation of time. It is shown how time is connected with matter and how with consciousness. At the end it is criticized, how official science too much ignores goals and ideas of authors that do not belong to it.

1. Introduction

The author defends panpsychism, quantum consciousness and some changes of quantum mechanics. These elements appear as useful for explanation of goal, concretely of the goal of survival.

In the section 2 the author argues that genes were not enough to obtain the goal of survival in evolution, but qualia were also necessary. Then he gives arguments that free-will exists, he connects this also with the quantum consciousness and argues for this. Therefore he argues also for atomization of ego. He suggests also some experiments. In section 3 he shows still some models of consciousness that are different as the author's model. In section 4 he shows the direction of time as dependent of psychological time arrow, of entropic time arrow, of existence of matter, and of dimensionless coupling constant of elementary particles. The feeling of space is also delusive. But we need theory of quantum gravity that will tell more about what time is. But nature of time will finally be known only when the nature of consciousness will be known. In section 5 there is analysis of Rovelli's paper in this *2016-17 FQXi contest*, [1]. It is fine, that he simplified the problem enough. Rovelli then indicates that he defends a goal that is independent of consciousness, in short, he understand consciousness as an emergent phenomenon. But the author tries to show the distinction between Rovelli's and author's view. In section 6 a preclusive standpoint of official science to amateurs and laypersons is shown. The author claims that such preclusive standpoint causes that less goals exist in science, similarly as in communism (planned economics) there are less goals according to capitalism (free market).

2. Goal and free-will

Let us imagine, that we colonize Mars with robots that have good motor skills and good artificial intelligence (AI). (AI includes also neural networks.) Thus the only things that they still need, are goals. Let us compare this with people or animals which arose on Earth and colonized it. According to Dawkins, the goals are things of genes, [2]. Thus, transferred to the problem of the robots on Mars, they should replicate and mutate themselves that they will obtain the goal of survival. Thus, it would be enough that they would create the goal of survival in their neural networks and as a consequence they would actually survive.

But Dawkins forgot one thing: probably all biological creatures are guided by consciousness, which is composed of qualia and free-will. (For now, let us forget plants, although there are theories of their consciousness.) Qualia guide our decisions, and free-will realizes them. The goal means only a higher level of decisions. Thus, some primitive goals can arise very quickly, but with the help of genetics they only become more fine-tuned.

If the consciousness (especially qualia) had not existed at the start of the evolution, the goal would have been formed in many generations, but beings would have been

extincted before, because goals should appear quickly, in one generation already. This is similarly as people, which live without any pain and as a consequence they die soon. Pain guides us through life.

It can be a possible option that we can wait for the robots that maybe they will acquire the goals of survival, maybe they will survive when they wait until survival goal will accidentally appear in their heads. But something is missing, because consciousness does contribute to functioning of living beings.

Nowadays many philosophers, neurologists and physicists doubt that free-will exists at all. They rely on the Libet experiment, [3, 4, 5], which shows a neurological reaction before a person decided to push a button. But many common explanations exist here, for instance that this experiment proves free-won't, not free-will. Actually, we perceive existence of free-won't every day at our reactions, because many chores are performed almost subconsciously, and a more conscious reaction is needed for interruption than for continuation of the chore. Even materialistic philosopher Daniel Dennett is against denial of free-will. He claims that physics and biology cannot be treated on the same way, [6]. He claims for this denial of free-will that it is adverse, because so many people postpone fault for their bad decisions to other reasons, not to their decisions. Besides, we, as higher developed beings, are more responsible for Earth.

Besides, we have primeval feeling that we have free-will, although some people try to prove that these feelings are illusions.

The author claims that transition to biology is not enough if only non-quantum physics is respected, because any non-quantum physical model of a brain does not explain why qualia and free-will exist. The essence of non-quantum physics is movement and biology is only more complex, but anything similar to consciousness does not emerge. But, Dennett as a materialistic philosopher is, like many of physicists, against quantum consciousness and panpsychism. But without this, it is not possible to see how to explain free-will.

The wavefunction collapse is physically very similar to free-will decision, [7, Sec. 4]. Both mean unpredictability in physics. In physics it is hard to find something so similar to free-will as wavefunction collapse is. But the distinction is that wavefunction collapse is totally random, whereas a free-will decision is dependent also on experiences and mood, therefore on qualia. This distinction can be reconciled so that panpsychism is introduced, thus that consciousness is everywhere, more precisely, that free-will is everywhere where the collapse of wave function is. At this it can be assumed that free-will at small units behaves absolutely randomly, but free-will at larger connected units is dependent on old information. But, larger connected units are biological organisms. Accidentally, this agrees with Dennett's thinking.

A free-will decision event in a brain has not yet been detected. If it is assumed that free-will decision is a quantum event, this will be a problem. But because this has not yet been experimentally tested, this idea of panpsychism is not yet disproved.

The disbelief of Tegmark against quantum consciousness (QC) is known, [8]. There also also other similar opinions, for instance [1]. Indeed, Tegmark concretely

analyzed all this, whereas the author does not offer so specific model. But, examples of quantum biology are coming to existence, as sensing of magnetic fields by birds, [9], photosynthesis, [10, 11], quantum smell, [12], etc. Whatever the possibility of QC is small, such option is almost the only reasonable, so it should remain as a possible explanation until clear physical explanation of consciousness will appear.

But we can continue also because still larger disagreements between calculation and actual value exist in physics, for instance $\sim 10^{-120}$ in [13], whereas this model is still not disproved.‡

Otherwise, Tegmark analyses the brain as a quantum computer, but this is not completely the same as free-will collapse of a wave function. In essence, the author's model is not complete, so it has not yet given what decoherence time of free-will decision is. On some way, qualia should read data from a brain and free-will decides from these qualia. The author does not know what time intervals of these experiences of qualia are. The estimation would be 0.1 seconds, but according to Tegmark, [8], this does not work. At this, it is not sure that our intuitive estimation is correct. But, some estimations from quantum biology exist. One gives 80 μs for decoherence time of the avian compass, [16].

In essence all matter is quantum, only decoherence times are important, at least, this is clear for quantum computers.

The author's model of consciousness is also based on atomization of ego, [7, Sec. 2]. The fact that I am aware that I am one personality, is a thing of memory. If I had had some memory holes at some times, this would have been like to have two or more personalities. For instance, if someone woke up out of coma, and then he returned to coma again, he was conscious although he does not remember this. On some way, this is a multiple personality. Thus, because consciousness is located in the human brain, it is almost sure that it can also be located in the less intelligent creatures, probably also in the unicellular organisms, with the condition that the memory exists at them. It is possible that some memory exists also in non-biological physics.

This atomization of ego is also some relativization of it.

The model, which is similar to this model of ego is the model of Tononi, [17], but it does not focus on memory, but on entropy, and it does not explain the random nature of free-will. The author's model attributes consciousness to the smallest units, but probably Tononi's model starts with consciousness, when units are large enough. These two models should be more mathematized. Incompleteness of the author model is that decoherence times are not known. At this, Tononi also advocates panpsychism, thus panpsychism is allowed also in the mainstream science.

‡ By the way, the author has a speculative model, [14], where the elementary particles can be black holes. (It is not yet strictly derived.) Namely by [13], vacuum energy is proportional to m_{pl}^4, where m_{pl} is the Planck mass. If we assume that the smallest black hole is neutrino, the lightest known elementary particle, this proportionality factor is reduced for the factor 2.3×10^{-112} if the most possible mass of the neutrino is estimated as 1.5 eV, [15]. So, the new disagreement is 4.3×10^{-9}, what is much closer to 1 than before.

Thus, the problem of goal is transferred to the problem of decision. The author claims that the distinction between both of them is only in complexity, whereas this distinction can be described mathematically, for instance with neural networks, or AI.

The idea to measure free-will decision is a challenge and every step toward this is also a challenge. The steps are, for instance, the locations of the brain areas for consciousness, [18], clarification, what qualia are, Radin's measurement of impact of consciousness on double slit experiment, [19, 20] §, seeing of photons, [21, 22]. Chemical source of qualia can tell a lot. For instance, peptides, [23], are connected with pain. Systematization of qualia, and search for the smallest units can also tell a lot. For instance, animal *mantis shrimp* sees 16 basic colors, but people see only three basic colors, [24]. The question is what these 16 qualia are. What we can see if we install these 16 colors to ourselves? As further, many birds and insects see in the ultraviolet part of the spectra. What is a quale for the ultraviolet light? Simulation of qualia in the world of unicellular organisms is also a challenge. It is possible to make a model of their reactions and it can be compared with reality. The challenge is also investigation and explanation of quantum biology.

Beside of similarity of free-will decision and collapse of the wave function, other analogies are between physics and consciousness. One example is summing of forces as analogy for the fight of motives in the brain. It means fight of motives where one motive prevails. Thus, motives behave like forces.

The principle of qualia gives decisions and goals, thus consciousness cooperates in physics. This output physics of free-will is known above all as movement. Similarly, the output of every computer is movement. The author predicts that physics of free-will is still unknown, unpredictable with nowadays classical physics and also with the nowadays quantum physics. But input physics, qualia, is still more unknown, as Capra had already written, [25]. This is also named the hard problem of consciousness, [26, 27]. Thus, mathematically, free-will can be described easier than qualia.

But physically it should be defined what free-will is, and in the second stage, what the qualia are.

It is also necessary to say that a free-will decision is not all, because external conditions are also important.

3. Some other possible models

All knowledge of physics until now cannot explain free-will. Some people expect that neural networks, or AI, [28], will give the final answer, but, what is given by neural networks is classical physics and not simulation of free-will. The question at presentation [28] was how he will know that his software will be conscious. This is a known dilemma at research of consciousness, it is named Turing test. In [7, Sec. 4], it is proposed such Turing test that only quantum physics gives something similar to free-will. Besides, it is proposed also such Turing test that qualia should be clarified, [7, Page 8]. Some type

§ This is not yet clearly studied by the author, so he has not yet a clear opinion.

of this test is written also at the beginning of this paper, where it is added to Dawkins that for the creation of goal we need also consciousness, not only genes.

This question about neural networks is similar to the question whether the computer is aware when it calculates 2+2=4. But why it should be aware, because this calculation is only a physical process, where some movements cause that this is calculated.

It is interesting to simulate what the goals of beings of Newtonian physics would be, thus without qualia, without free-will, only with the ordinary wavefunction collapse. Thus, these beings are Dawkins robots on Mars. The goal would arise in a long time period, but qualia would not exist. This would be similarly, as people which are born without pain, as one essential quale. Such people die soon, because pain is an important guide at decisions.

Let us generalize that even external observers do not exist, anywhere in the universe. Thus, sense is lost if something is happening without consciousness which feels this. This is senseless matter without consciousness.

The next possible option of model for consciousness is that qualia exist, but free-will does not exist. Thus that we are guided only by qualia. Such model does not demand the change of wave function collapse, it seems that maybe even it is not necessary that QC exists, but the author thinks that it is necessary even in such model. But, even such model would be enough to explain how the goal arose in evolution. The author claims that free-will exists because we feel it. Besides, it would be weird that qualia exist without free-will, because we would be as patients that can only observe, but without possibility to do anything. But we are not only such automatons, only observing our reactions.

It is worth to mention still the option that free-will is completely in accordance with quantum mechanics. Thus that the solutions of quantum mechanical problems are dependent of randomness and of boundary conditions. For instance, boundary conditions at double slit experiment are either that we know through which slit the photons travel or we do not know. As comparison, boundary conditions at free-will can be qualia, informations and physics in the brain, but what is genuinely free-will is as the pure random part of quantum event. This model also cannot be quickly rejected without consideration. Maybe it is true. Something similar is defended by Gründler, [29] ‖. One criterion for the choice of the correct model will be simplicity, or the Ockham razor.

Otherwise, ideas of Platonism, [30], are also used for explanation of consciousness, but intuitively it seems that they are wrong. It is a doubt that a mathematical function behaves like a physical object, or as a quale. Besides, we do not know a theory of quantum gravity, thus we do not know complete mathematics in physics if consciousness is excluded.

Quantum gravity may will explain what is essential physical model, and if other models are allowed, and how many of them are allowed. If it would be deciphered

‖ Gründler claims that this model cannot be tested. The author disagrees with him about this. It seems that Gründler defends dualism.

that other models are allowed, and their number is large, Platonism would be allowed, otherwise not.

4. Nature of time

Properties of time as we perceive it are connected with consciousness. We know the psychological time arrow, which shows us that we move only in one direction of time. But, if we go to microscopic physics, time is symmetric in one direction and in the another one, thus, if we look the equations of quantum mechanics or of general theory of relativity, they are time symmetric. But macroscopically we should add still entropy and it is growing in the same direction as of the psychological time arrow. It is important that the entropy is a thing of information and information is this essential thing in physics, more than matter.

Time can be dissected still on another way. By special theory of relativity it is evident that time runs inside the elementary particles that can be at rest, but it cannot run inside of photons, [31, Sec. 4]. If the rest particles had not been existed, time would have not been existed.

This can be seen also from the viewpoint of the dimensionless constants μ_i. At this $\mu_i^2 = m_i^2 G/(\hbar c)$, m_i are masses of various elementary particles, G is gravitational constant, $\hbar$ is Planck constant, and c is the speed of light. μ_is mean coupling between mass and spacetime. Namely, if absolutely no matter had existed in the universe, dimensionless constants μ_is would have not existed, and it would have not been defined what the scale of this matter and spacetime is, [31, Sec. 5]. Because of this, the clock would have not existed. If μ_is had not existed, mathematics and information would have not totally described physics. Therefore dimensionless constants μ_i are the essence of physics.

Some experts of theoretical physics claim differently, [2], [3], but they do not know these arguments. They have in their mind only partially empty spacetime, where time can be simulated with test particles, what can also mean virtual clocks. But, in absolutely empty spacetime these test particles are not defined.

If people had been composed of 1000 times lighter particles, one second would have seemed much longer than it is. At this, the dimensionless nature of μ_is is important. These quantities define how fast time is running. Thus time speed which we feel is not arbitrary.

As further, the examples can be found that feeling of time is connected with physics and so also with consciousness. A cold lizard feels time to run faster run of time than a warm one. As the next example, the metabolism of younger people is faster than metabolism of older people, therefore, the most probably, younger people feel slower run of time than older ones. Probably also the fly feels slower run of time than the elephant, because the fly has smaller inertia of processes.

Thus, the common sense tells us that matter without consciousness has no meaning. One essential thing in physics is also information. Information also needs consciousness,

which senses it.

The two main problems of elementary physics nowadays are quantum gravity and consciousness. Consciousness is not appreciated enough as a physical problem, but new physics that can be found from consciousness is much cheaper than new physics that can be found from quantum gravity.¶ Because, we reduced physics to the equations of motion, but it seems obviously that free-will differently affects the equations of motion as physics that is known to us.

But, quantum gravity is also important about consciousness, because quantum gravity will tell something new about the nature of time. For instance, now it is not known how to merge absolute time of quantum mechanics and relative time of general relativity. The problems of creating quantum gravity are mostly connected with the nature of time, [32]. Besides, quantum gravity means also the essential nature of physics, and physics can help to give foundation of consciousness.

Although quantum gravity theory has not yet existed, dimensionless constants μ_is already exist and they give some information about quantum gravity. Their existence already tells us that quantum mechanics and gravity are necessary building blocks of physics; and that physics is only mathematics, that means, it is information, [31, Sec. 5]. The dimensionless constants mean also simplification of physics, because the essence of physics is information, all other (materialistic) physics should be as simple as possible, maybe even zero or close to zero. The author also supposes that also formulation of quantum gravity should be very simple, it can be written on a T-shirt.

The dimensionless constants are also coupling constants between spacetime and matter.

It should also be clarified how it is with qualia for feeling of space, [7, Sec. 6, Page 18]. For instance, let us imagine that a conscious computer in USA (U) thinks how to move a robot in Europe (E) and in Japan (J). Where the consciousness is located? The answer is probably U. Really, when a human being feels pain in a toe, he feels it in a toe and not in a brain. But, we have such mechanism in brains that we think so; in true, the pain is in a brain. But, if we obtain a photon from J, we are also in J in some way. And, if locations E and J are close together in a computer, by intuition they are really close together, because space is relative also according to the informational aspect, maybe. Namely, space is also what we can build in virtual reality, and this space is some sort of reality, because it is connected to consciousness. Quantum gravity should tell something about such relative aspect of space.

As we concluded that spacetime without matter does not exist, it can also be concluded, that spacetime without consciousness also does not exist. Especially, if we assume panpsychism, then consciousness is so a basic concept as spacetime and matter are. Even, if we do not assume panpsychism, this should be allowed, because it is not disproved. Especially time and consciousness are very close. Therefore it should be solved what spacetime and matter are. This will be said by quantum gravity. Then

¶ Research results of consciousness have also more practical applications than of quantum gravity.

consciousness will be explained more easily, especially its elements qualia and free-will.

We can also imagine that we squeeze a lump of soil. If it does not resist at all, it does not exist. This can give us feeling that energy is the same as matter. But, this can be generalized, that, if a lump does not give any feeling of resistance, it does not exist. Thus it can be generalized that matter is the same as consciousness. This thought experiment is short and explains the essence.

5. Analysis of Rovelli's paper

Analysis of paper [1] is added here, because it was read by the author afterwards.

Rovelli, [1], more clearly describes attitude of mainstream science than Dawkins. The paper gives correct grounding for consideration, because the problems are properly simplified. Magnets in the section 2 describe properly how physics reduces the number of possibilities. The author's analysis of dimensionless constants μ_i gives similar conclusion.

The author proposes that a unicellular organism has also some primitive sort of consciousness, whereas Rovelli does not include cooperation of consciousness. However, humans have consciousness and we operate similarly as Rovelli's bacterium, only more complex. The second question where Rovelli does not give a clue, is how this organism obtained the goal of survival (the goal to obtain food) in very short time at the beginning of evolution. Of course he does not include qualia.

His opinion about consciousness is not panpsychism, [4].

It is a dilemma whether consciousness is emergent, because also different levels in physics are treated separately. This dilemma can be deciphered in the paper, [5]. Rovelli does not give opinion about this, in contrast with Dennett who claims that biology is different than physics. Rovelli lets this open.

But, Rovelli looks a different aspect as the author. The author asks where the goal of survival comes from, whereas Rovelli ask what is distinction between physical process and information. The author answers to this that physical processes are also information, the distinction is only in the context, or in "information for what".

Rovelli also uses notion "meaningful information", whereas the author claims that the essence of this information is in qualia and in the connection with qualia.

6. System of science and goals

We people have deceptive feeling that logic is enough and that emotions are almost not necessary. But the goal is one example, which is almost not given by logic or by mathematics. One special example is the system of science. It is assumed that it is logical, non-emotional, unbiased, but it is not such. Lobbies are created inside of science, which prefer some papers and researches, and reject the others. Outsiders, thus amateurs and laypersons have still less opportunities. There is a lot of prejudices against them. These are examples of bias. For instance, endorsement system at *arXiv* is such that it does not allow publications of people outside of universities.

Although official science is rigorous at publications, it is permissive at already published papers. When a rebuttal against a wrong paper appears, [33], they even admit that the rebuttal is correct, but they claim that the wrong paper has not been cited enough times. But, if the system of science had worked as it is necessary, it would have accepted all rebuttals which show on a clear mistake.

Verifications of ideas on forums are also a problem. A lot of arrogance appears, created also of people from universities, but arguments are missing, or they are wrong [+]. At the end, it is not necessary to believe, that such unrighteous system knows everything, or that their intuition is always correct.

One another example is also Dennett's claim that consciousness is an illusion, [34]. Such claim has became more important than it should be, and it is not supported by our intuition. The second example is Dawkins' claim that consciousness will be explained materialistically one day. This gives feeling that this will really happen, but this is only a prejudice. But those two people are in the system and they bias science toward their claims.

Beside of Dennet and Dawkins, a lot of people have ideas what consciousness is. Otherwise, this is a question which demands knowledge of physics, philosophy, neurology, biology, programming, mathematics, etc. At the same time this is more a question of thinking than of an experiment, because experiments that can tell something are rare. This is one complicated combination and one establishment cannot surely determine, who has an optimal combination of this knowledge. Maybe others better explain how matter produces or does not produce consciousness.

It is fine that people have goals. Communism differs from capitalism in number of goals which are is much smaller in communism. Goals in communism are more created by elite. Science should also be more opened. It is not well that goals are allowed only in universities, but not by amateurs and by laypersons. Therefore all of us should have possibilities to publish. Filters should be, but more righteous and so more sophisticated than today. People outside of university have smaller probability to write a correct paper, but this probability is not zero.[*] The computer age enables that correct ideas of amateurs can be known in science community, whereas other incorrect ideas would not enlarge entropy of informations.

7. Instead of conclusion

Consciousness arises emergently, from carbon atoms. No, no, this is sarcasm. This is similarly, as Feynmann said about quantum mechanics that there is no gears, but it should be as simple as possible [35]. Other theories of emergent consciousness are also like with carbon atoms or like with gears. Therefore the author defends panpsychism and quantum consciousness. A lot of things can be emergent, but not qualia. And the final claim of the author: qualia in consciousness and cause in physical processes are

[+] For instance one said that rebuttal [33] is wrong.

[*] More in [7, Sec. 7].

the same things.♯

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♯ The paper will be published at [40]

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Technical Notes

[1] *Experimental results are clear, however: there is absolutely no evidence for a quantum basis of consciousness. The evidence has various parts, those directly against the relevance of quantum effects, those indicating how it cuts across what is known about the basis of consciousness, and those that show how the whole enterprise is unnecessary in the first place. I briefly discuss the first and second aspects here; the rest of this book develops an argument for the third. The uncertainty brought about in chemical transmission across a synapse by quantum mechanical effects can be calculated to be less than one in a million of nonquantum effects; they are therefore negligible. A further range of suggestions as to how quantum mechanical effects may in fact be of relevance to consciousness was surveyed (Herbert 1993), but they have no specific relation to the creation of particular states of mind, especially consciousness.*[36, Page 118]

[2] Motl claims differently: "*the only "information" that the vacuum carries at each point is the so-called "metric tensor" - a set of numbers that allow one to calculate the distance between any two nearby points. This is enough for the vacuum to be able to bend - much like any material.* ***One doesn't need any atomic constituents to be able to talk about geometry of the space****, and to guarantee that the environment is able to get curved (and to distinguish a flat region of the vacuum from a curved one).*"[37]

[3] Another claim is also: "*In fact, however, the equations of general relativity are perfectly consistent with spacetimes that contain no matter at all. Flat (Minkowski) spacetime is a trivial example, but empty spacetime can also be curved, as demonstrated by Willem de Sitter in 1916.*"[38, 39]

[4] *The definition of 'meaningful' considered here does not directly refer to anything mental. To have something mental you need a mind and to have a mind you need a brain, and its rich capacity of elaborating and working with information.*[1]

[5] *They have a level of autonomy from elementary physics in two senses: they can be studied independently from elementary physics, and they can be realized in different manners from elementary constituents, so that their elementary constituents are in a sense irrelevant to our understanding of them. Because of this, it would obviously be useless and self defeating to try to replace all the study of nature with physics. But evidence is strong that nature is unitary and coherent, and its manifestations are – whether we understand them or not – behavior of an underlying physical world.*[1]