Philosophy of Mind and Metaphysics for Interstellar Message Composition

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Filozofija uma i metafizika
za kompoziciju međuzvjezdane poruke

U ovom tekstu razmatramo neke implikacije koje mogu proistjecati iz filozofije uma i metafizike a koje se mogu ticati konstruiranja međuzvjezdane poruke kojom bi se nastojala postići komunikacija s izvanzemaljskom inteligentnom vrstom, ukoliko ona postoji. Problem može predstavljati različita struktura osjetila i uma izvanzemaljske vrste. Naime, pripadnici ljudske vrste, katkada, rabeći različite simboličke sustave, teško se sporazumijevaju međusobno. Još je teže, zbog mnogih razloga, a za mnoge stvari i nemoguće, sporazumijevanje s ostalim zemaljskim životinjskim vrstama. Naravno, ukollko bi izvanzemaljska vrsta bila inteligentna, onda je razumno pretpostaviti, iako to ne mora biti tako, da bi ona prošla neku vrstu evolucijskog razvoja pa se na osnovi toga može spekulirati o obliku i sadržaju poruke. No, isto tako, interesi nas kao vrste i neke izvanzemaljske vrste mogli bi biti suprotni pa je sa strateškog stajališta moguće postaviti pitanje da li uopće probati uspostaviti kontakt. U kratkom zadnjem dijelu, s obzirom na fizikalne karakteristike svemira, izražavamo određeni skepticizam prema postojanju izvanzemaljskog života.

Interstellar message composition is an interdisciplinary area of research gathering together various disciplines such as astronomy, biology, exobiology, psychology, philosophy, linguistics, information theory, computer science, engineering. The main question is how to compose a message which would potentially be decipherable by the possible intelligent extraterrestrial species and which would convey some information about our species – *homo sapiens sapiens.* The main leader of the project is the SETI Institute.[1] We would like to examine a few philosophical aspects of this research, so this article consists of two, somewhat different, parts. In part one we press some questions concerning the interstellar message

[1] Acronym for Search for the Extraterrestrial Intelligence, headquarters situated in Mountain View, California.

composition and possible communication with intelligent extraterrestrial species[2] and in part two we look briefly on the question how the universe is structured and what implications that could have for the possible existence of (intelligent) extraterrestrial species.

Part One

A number of questions and problems surround the problem of extraterrestrial life and especially the possibility of intelligent extraterrestrial life. Still more intriguing is how to make a message for a possible communication, if there exists some intelligent extraterrestrial species. It seems to us that the hardest problem is perhaps how to compose the message for which someone would be able to *break a code* but not only *what* we shall send. Of course, the very content is also extremely important but not as important as the importance of the code is. Without knownig a code there is no reading of the message. Remember how difficult is to break a code in military, especially war communication. Today when ciphering is having done with the aid of the computers, it is virtually impossible, mathematically speaking, to break the code and read a message. There is even no enough time to try all possibilities for some code, because of the combinatorial explosion. This effect would require more time then the entire age of our universe. Still, due to experienced people and good hints, sometimes we witness successful deciphering. Here we only have to mention an old example from World War II: deciphering of the German machine Enigma. But, the objection could be, these examples take their origin just in reverse of the idea of what we wolud like to do towards intelligent extraterrestrial beings: in military, we want and try *to hide* what we want to communicate and, it seems, that in composing interstellar message, we want to make *transparent* some basic facts about us to possible intelligent extraterrestrial species. Sure, but it nicely illustrates some problems with which we are immediately faced. Let us examine, briefly, a few of them.

Even when an enemy signal is intercepted and loaded down for examination and analysis, considering the abovementioned remarks, there is a very little chance that it would be deciphered. But the situation is that those experts who intercepted the signal *know* that here is some

[2] See for example Vakoch (2011), Vakoch and Harrison (2011), Janović (2013), Cohen and Stewart (2002).

message and they can even correctly suppose a narrow field of possible contents that is contained in the intercepted signal. Already in the very act of intercepting, it is implicit that they, who intercepted the signal, know that there is *an intention of communication* in the signal intercepted, although the sender of the signal, of course, tries to make the signal, also intentionally, to be hard to decipher. Take also examples of Linear A or Etruscan language which are still undeciphered, but these systems were just for transparent communication and in them there were no any intentions for anything to hide; these were means of communication of our fellows – beings exactly like us. If somebody thinks that the examples of military ciphering is not quite good because there is *an intention to hide the content*, well, there is a loose analogue of that, namely that we do not have the slightest idea of the structure of the conceptual scheme in which the intelligent extraterrestrials would try to find out the code and read the message. So it would be almost sheer luck to get the message in the form which would be easily readable for alien intelligent species; it is more likely, whatever we do, that we are in a position to send something which would be as hard to decipher as military communication is ciphered on Earth but, of course unintentionally.

Here we come to the second problem: what could be the structure of the senses and the mind of a possible extraterrestrial intelligent species? It could be of crucial importance to try to speculate about this a bit. We saw that the first thing should be that extraterrestrials recognize that *there is an intentional message at all* when it is sent to them. It would depend on the conceptual scheme they have and that very scheme is a product, or better to say, the constructive and constitutive part of the mind, together with the senses which transform and transduce raw signals from the environment and which are then analysed and assembled according to perceptual abilities into structured data about the world around.[3] So, because we primarily gather information from external world and enviroment around us through our senses and form perceptions, we can pressuppose that extraterrestrials would develop senses and perceptual abilities to do it as well. It would be relatively easier situation if they have similar senses, but maybe they have very alien senses. Take an example from animal world. We could not imagine how experience of echolocation looks like and this is an ability which dolphins and bats

[3] For some details about the notion of »conceptual scheme« see Davidson (1984) and for perception Sekuler and Blake (1994, 3rd ed.).

have and use. But it is very hard to communicate in the right way for what we cannot imagine so we are in a position that we do not know how the content should be represented to be conveyed with the meaning we intend. But we and many other species, on the other hand, have the same senses. It is due to the fact that most information we need from environment are transferred in one particular area, so we develop abilities which exploit that fact. One of the examples, on Earth, is that what we call visible light (400–700nm roughly) and many species evolved senses like eyes to detect specifically this interval of radiation.[4] Why is that only this small portion of the spectrum of radio waves is captured by the eyes? General answer is already given, namely, that most useful information are thus conveyed to individuals. In some detail, it means that evolution produced sense that capture wavelenghts of radio waves which penetrate the atmosphere and which energy is such that it does not destroy possible organic tissue which does the job of capturing them – photoreceptors – and that the accurate image can be made at the very short focal distance.[5] This story gives a hint that, perhaps, *we should look what conditions prevail in regions (of the planets) to where we would like to send a message and try to find out in which ways the most of information of that environment are transferred.* If we succeed in this, then we could speculate more specifically about the possible senses and minds of possible intelligent extraterrestrial species. We are aware that it would be hard to do this because of technical means. Sometimes astronomers are not even sure whether they discover a planet around some star or not, still less we can search for conditions which surround the planet or are present in its atmosphere. But, in future we could have more powerful means which will enable us to do this and to think more concretely about conditions which prevail on a discovered planet outside Solar system.

In the example of our own species, *homo sapiens sapiens*, it seems that we are naturally equipped to think and regard that others have the same or at least almost the same senses and mind. It is rational to have such a stance towards other members because it enables effective communication and, consequently, cooperation between ourselves. Though we regard that others have the same or very similar mind structure to our own, that does not mean that we automatically understand a great deal

[4] Of course that there *are* variations. Some species *can* detect other portions of the spectrum which humans or most other species cannot.

[5] See Cowey (1981).

what humans do, say and produce. Maybe we immediately understand some basic and important things on which our survival depends but still many things we have to learn explicitly to understand or otherwise rarely we would just come to know what they mean. This is especially so when we come to more sophisticated products of human culture. Take an example from art.[6] In the language of classical ballet, circle around the head made by the hand means »I am pretty«. Though sometimes we would come to understand something like that from the context, in many situations we would not be able to do so. In many such situations, we would not be able to grasp the meaning simply by looking what has been done and not even if we try to place it within broader context, but we must explicitly learn what some gestures, or whatever is in question, means. So even when we know, at least partially, the intentional structure of the mind or have some innate dispositions, which are on the right track, to treat the minds of our fellow members of the species in the way as having the same general structure as our own individual mind (which enables us to efficiently communicate), we come to situations in which we cannot recognize the meaning or content which is intended to be conveyed. So it seems that the remarks above show that the crucial thing is to try to guess some possible intentional structures of the extraterrestrial mind. It is so because the mind of extraterrestrials would be the principal »target« of message sending. We must, at least, produce a message which would be such, in the first step of analysis, that it could be relatively not so hard to understand that signal has something beyond pure physical characteristics of frequency, wavelenghts and periods of coming (namely some content about us, the senders of the message). After that, for the second step of analysing, it would be good that message would have such a structrure which makes it easier to come to understand the very content of the message and it would be so if signal is somehow »adapted« to the intentional structure of the mind.[7] We would not be able to compose the message in that way if we do not try to speculate a bit about possible intentionality of the extraterrestrial mind. We are aware that it would be just a speculation, but something is better than nothing.

[6] We borrow the following example from Carroll (1999). See also pp. 49–55 for interesting discussion.

[7] Interesting details from philosophy of mind about intentionality, mental states and other mind matters can be found in numerous books and articles. See for example Searle (1992), Braddon-Mitchell and Jackson (1996), Heil (1998), Jacquette (2009), Fodor (2008).

Perhaps it could be good that the content of a message be encoded in several various ways. We think that some redundancy in these matters can enhance the probability that potential extraterrestrial receivers can come to understand that there is some intentionally sent message and that, in deciphering it, perhaps they could more easily assemble what does it mean if they have several different pieces which converge to the same content.

To attract attention of potential extraterrestrials to us, perhaps we can use some unexpected signals. We can send some kind of signals which would be similar to natural processes, but totally unexpected from this part of the universe. For example, we can imitate radiation specific for black holes (or anything like that) because there are no black holes close to us. If extraterrestrials have advanced astronomy they can know that fact, so it could be very strange to them that suddenly they caught such a specific signal. They can conclude, after the search in which they will not find anything close to the black hole, that that signal is not from natural source, but that it is artificially produced and intentionally sent. That could be the first step in communication. On the other hand, we can imagine the following. There could be a certain extraterrestrial species which is more advanced scientifically and technologically then we are, so that they can perhaps manipulate objects even on a cosmological scale. They also want to find out if there are other intelligent beings in the universe and they have their own program of doing this. Because they know that on long distances, there is a dissipation and weakening of the signal, they want to use something strong. Since they have advanced technology, they can turn some star into the pulsar which has strong unexpected and regular outbursts of energy which should travel on a very very long distances and be captured as such. Since it is so exotic, different from almost all other objects in Universe, they think, the signal which comes from it must be interpreted as an artificial intervention in the universe. Perhaps they can even set the pulsar to send a message with some content instead using radio antennae. But, we have a good scientific theory and explanation of pulsars, what they are and how specific kind of stars become pulsars. We treat them as completely natural objects. We do not want to suggest that pulsars *are* artificially produced, but I would like to show, if they were so produced, because we are inclined to explain everything in natural terms, how hard would be to interpret any such kind of signals that they, in fact, contain some significant intentional

message. It is very hard to find a border where some physical object or process is just that – physical object or process – or it is also something else – namely, that it contains something beyond, some content which is encoded or represented by this object or process. Though explanation of pulsars is good and ingenious and it is almost 100% sure that all pulsars are just natural objects, *if there were* a case that at least one pulsar sends something beyond brute signal with physical properties and characteristics only, we would not regard it as such; we would not regard it as a means of sending a contentful message. We only illustrate difficulties, not really suggesting pulsars as communication of extraterrestrials.

There is a reasonable supposition that if there is or there are intelligent species beside ours, then it is probable that these species have undergone a process of some kind of evolution.[8] Considering some general outlines of evolution of higher animals and ourselves, another reasonable supposition is that if these intelligent species consist of individual members who live in some or other kind of society then, taking into account the fact that they evolved, existence of some kind of cooperation could have arisen. So, that fact could be something that they could understand. Reasonable enough. But some things about this opinion we can reconsider.

If we think about various possibilities concerning structures of senses, minds and conceptual schemes (and we should) of extraterrestrials, then, needless to say, they can have these devices very alien compared to ours. That does not mean automatically that cooperation would not be possible with them, but it can complicate matters of cooperation a lot. Let us illustrate this possibility of complication from earth examples. We, human beings, do not cooperate, in evolutionary terms, with, for example, tigers or spiders. How to explain potential benefits of cooperating with human beings to them? We do not draw on differnces in intelligence here, but I emphasize the difference in sense and mind structure and organization between ourselves and tigers and spiders. Every species which is alive today, regardless of intelligence, is successful in evolutionary terms because it survived the environmental pressures. Tigers have different biological way of life than humans. They have different needs and instincts, roughly speaking, and these are »wired« in their minds. In a potential situation of disastrous dangers (meteorite

[8] For evolution of mind, social interactions and cooperation see for example, Lumsden and Wilson (1983), Levin (1984), Barkow et al. (1992).

hit the earth, or so; in case of tigers we do not even have to imagine situations because they are really endangered species in usual terms, so humans already try to preserve them taking some measures in Asia) it could be better for tigers to cooperate with humans to continue their survival. But, according to their needs and instincts, when in a hunger they will attack and eat us. For a short period it could certainly be better for them, but, in a potential situation of disastrous dangers, perhaps, saving human beings (as a reciprocation in cooperation) could be better for them in a longer run, because, in return, humans could provide food for them in order to prolong survival of tigers (for whatever reason – for example, for maintaining ecological equilibrium). This providing of food for tigers on the part of humans could be for a longer time then tigers themselves could provide, in a potential situation of disastrous dangers with which they cannot handle but humans potentially can. But we really do not know how to *explain* this to tigers because their »mind schemes« are so different, and we emphasize *difference* for the sake of analogy and example, and not difference in intelligence capacity. Of course, we can force some methods and measures in order to preserve tigers, but this is not cooperation. When humans take measures to ensure the survival of some endangerd animal species, they do not then expect reciprocation and cooperation with these species but we take steps by ourselves which are imposed and forced upon these species. It is so because we think that these measures and steps we take are good for species and we impose them without the (conscious) consent and cooperation from these species and we do not expect any reciprocation from members of the species in question. So even if cooperation would be possible with some high intelligent extraterrestrial species, if they have very different minds, it could be extremely difficult how to explain the means and contents of cooperation between us and them.

Another possible idea could be that some intelligent extraterrestrial species and we, have mutually exclusive interests so no cooperation would take place or even would not be possible. Of course, »mutually exclusive interests« may mean various different things. In the worst scenario under such a situation, it could be very bad or dangerous for us. For example we can imagine a possibilty that they are in a situation, for whatever reason, in which they lack some resoureces essential for their survival on their planet. After the communication with us they realize that we, on earth, have that resources. If they are technologically superior, they can

perhaps come and take these resources away (whatever it is, for example the oxygen or water or whatever). But taking these resources may mean *our* extinction, even perhaps *very fast* extinction. They can estimate that no any natural equlibrium concernig the life on the scale of our Galaxy would be changed if we are extinct; they can use only their rationality to do this to continue their survival. Extraterrestrials do not have to be evil or aggresive in order to wipe us out of existence, but just because of the reason just mentioned. This scenario is possible, but maybe very improbable. But though it is still possible, it gives a reason that on strategic grounds we can pose the question why should we send any information about ourselves in complete ignorance to whom we are sending.

Then, of course, it might be that there are beings, or even species, which had not undergone any process of evolving or any process which is in the slightest similar to processes of evolution on earth. In vast regions of the universe, very low temperatures reign, even on planets which are very distant from their suns. It is a bit fantastic, but we may imagine the following. It seems that the base of mental activity is the electrical activity of the brain. So, perhaps what is most essential in the realization of the mentality are those fine grained electrical currents. Perhaps, then, appropriate kind and complexity of the same or similar currents can be activated in other sorts of (very complex, I presume) things. Imagine some liquids or liquid-like clumps of matter on some planets where very low tempratures are normal. If these liquids are full of various kinds of ions and if something initiate electrical activity between them, then perhaps these clumps of matter can become conscious; moreover, low temperatures can realize conditions similar to conditions of superconductivity, so that these beings even process electrical currents (which, if they are of appropriate kind, are substratum of mental activity) with great speed and in such a way maybe achieve high intelligence without any evolution. They could be static – just pools of some ionic complex liquids. So perhaps no notion of cooperation would be known to them.

Part Two

In this short and somewhat different second part, which follows, we present something like a scepticism towards the existence of extraterrestrials.

It seems that our universe is »fine tuned«. It means that many physical constants, ratios, masses of particles and fundamental laws are very

precisely balanced, and have to be so, to enable our universe to evolve in such a way that, at some stage, the life comes to the scene.[9] From our own example, if this is not too preposterous, we know that not only life, but, eventually, even intelligent life, appeared. Fine tuning, being somewhat extraordinary fact, seems to require an explanation because it is very improbable that so many physical things are so neatly balanced and life requires that. Theists can use these facts legitimately to argue for the existence of creator of immense power which we ordinarily call God. We are inclined to take »fine tuning« as enforcing the traditional arguments from design for the existence of God, despite of some criticisms.

The chief rival expalnation is that, in fact, many universes burst out into existence, each with different constants, masses of particles, laws etc., which take their values randomly, so a few of them would be as our universe is. A variant on this says that there are infinitely repeating cycles of Big Bangs and Big Crunches and at every beginning, physical values are randomly taken, so eventually, by chance, one universe would have »just right« values to permit life. It is no surprise that we, or any other kind of observers, can observe only the universe which permits life and observers. This is an application of the so called anthropic principle in cosmology. One of the things in reasonings about the anthropic principle and the physics of the universe tells that characteristics of planets which would be suitable for life as ours, or similar to ours, have to have very precise constraints. If correct, it folllows that there could not be much planets except Earth in the entire universe that could support life of the similar type as on Earth. So it supports sceptical conclusion towards the existence of extraterrestrials, leading to think that we are only ones in the universe regardless whether we wish to argue that God created the universe or it just had come to existence.

We would like to end with just a few remarks instead of a conclusion. Now it may seem that we are too pessimitic but it is not in fact so. What we really wanted to do was to press some hard and perhaps fundamental questions on which answers depend for the solution how to make the best message. We think that awareness about hard problems can be stimulating to find a right answer. We also admit that we have

[9] For a discussion about the cosmology and the philosophical problems of cosmology see for example Carr and Rees (1979), Rosen (1985), Rozental (1988), Leslie (1989, 2000), Pećnjak (1989), McGrew, McGrew and Vestrup (2001), Guth (1998), Holder (2004), McGrath (2009).

not given any elaborate solution but that, at least, here we provided some interesting fields in which we can think and in which direction the possible solutions may go.

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