

Problems with the Mind-Brain problem

David I. Dubrovsky

Department of Theory of Knowledge, Institute of Philosophy of the Russian Academy of Sciences, Moscow, Russia

Corresponding Author: David I. Dubrovsky, Department of Theory of Knowledge, Institute of Philosophy of the Russian Academy of Sciences, Moscow, Russia

Received date: November 15, 2019; **Accepted date:** December 27, 2019; **Published date:** January 03, 2020

Citation: David I. Dubrovsky. (2020) Problems with the Mind-Brain problem. J. Neuroscience and Neurological Surgery. 6(1); Doi:10.31579/2578-8868 /102

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Abstract

For decades, the mind-brain problem has been the object of intense debate in the realms of philosophy, psychology and neuroscience. This article relates to the polemic involving the leading representative of analytical philosophy, Thomas Nagel, who has formulated the main difficulties of the mind-brain problem in their most clear and complete manner and outlined the means of a possible solution. Nagel, however, believes that modern science and philosophy does not possess the necessary conceptual tools; they are not yet known to us and a quest for them is a thing for the future. Unlike Thomas Nagel, the author of this article believes that such conceptual tools are indeed known and sufficient to overcome the principle difficulties of the mind-brain problem. This is shown with reference to the information approach, which affords an explanation of the connection of mental states with brain processes, explanation of mental causality and free will, and which offers a basis for prospects of decoding the brain codes of subjective-reality phenomena.

Key words: mental and physical; mind; brain; consciousness; subjective reality; free will; information; kinds of codes; decoding brain neurodynamic code

Introduction

Half a century discussion on Mind-Brain Problem

The mind-brain problem has been the object of intense consideration in Western philosophy throughout the entire second half of the twentieth century and to this date. Indeed hundreds of monographs and anthologies, thousands of articles were dedicated to it. Since 1970 I have carefully followed the extensive discourse among practically all leading Western philosophers on the relation between the mental and the physical, consciousness and the brain. The vast majority of them have attempted to substantiate a materialist solution to the given problem, either in the form of physical reductionism (so-called “scientific materialism” with its theories identifying the mental with the physical) or assuming a functionalist position (substantiating the identification of mental phenomena with determined functionalist relationships within a complicated system). Some Western philosophers maintaining a different position. From them were Karl Popper and Eric Polten along with those who took a frankly dualistic position. I offered an analysis of this discussion in a series of articles published in the journals during the 1970s and in my book [1, pp.13-97]. It appears to me that no serious conceptual innovation has been offered in Western philosophical writings since, despite animated discourse on the subject and the undiminished significance of the problem (see: [2, 3, 4, 5, 6, 7, 8, 10]). I would like to draw attention from amount of this publications on one of late article of Thomas Nagel, an outstanding representative of analytical philosophy [9]. Thomas Nagel clearly and sharply outlines the main difficulties of the problem, indicating how they might be overcome. The project proposed by T. Nagel is of great interest. But the author, however, believes that there are no means to implement it on the current state of scientific knowledge. Indeed, we do not have a clear prospect of solving the main-brain problem at all. It is this feature of Nagel's article that will be the main subject of our discussion.

It should be noted that Nagel uses the term “mind” to include all the various realizable phenomena of subjective reality: from the experience of pain and the taste of a cigar to acts of abstract cognition, and that he

frequently interchanges terms such as mental, phenomenological, subjective, consciousness and even “first person point of view.” Although these terms are by no means synonymous, it is clear that he uses them to express the general and distinctive facets of all kinds of subjective reality.

Nagel definitely holds that “Consciousness should be recognized as a conceptually irreducible aspect of reality” [9;101-2] and appears equally averse to physical reductionism, that is, the “theory of the identity of the mental and the physical,” as to functionalist reductionism, maintaining that the mental cannot logically be induced from the functional, since a conceivably complex system might control all functional characteristics of a human; but being entirely devoid of “interior,” of subjective reality, such a person would amount to nothing more than a so-called “zombie.” This matter, however, requires special attention, so it will be discussed at a later point.

Having rejected reductionist solutions to the problem, Nagel states that a necessary, rather than contingent connection exists between the mental and the physical that is, the physiological. The principal task that a theoretician faces, therefore, is proving its presence, and the author minutely analyses the difficulties in finding this link and solving this problem.

These difficulties are familiar, and they have been repeatedly discussed in literature devoted to the mind and body, to consciousness and the brain. In a nutshell, they concern the following issues: 1) Spatial qualities of physical phenomena may not be ascribed to mental phenomena, although physical phenomena, including neurophysiological processes occurring in the brain, certainly possess them. How then is it possible to speak of a connection between them let alone a necessary one? This creates, in the words of Nagel, a situation in which the necessary link is “inconceivable,” “unimaginable.” Furthermore, the description of such transient events as the taste of a cigar and the description of certain brain processes which, one can only suppose, must necessarily be connected with this experience, are at such odds that understanding the

nature of this link is greatly hampered. According to Nagel, this is the location of an “explanatory gap” [9; 105]. A new means of understanding is indispensable in order to bridge the gap, and this must be capable of logically unifying such different forms of description. Such a thing, however, is not available, and the perspectives of its creation remain vague at best.

2) Inasmuch as mental phenomena are not in their essence physical, it is impossible to accord them either spatial qualities or mass and energy. These two questions thus arise: how can the physical/physiological exert influence on the mental, causing it to change? Conversely, how can the mental cause change in the physical/physiological or corporeal? Interaction of this kind is empirically evident, for example in the case of my wish or intention to pick up an object resulting in the movement of my arm and hand. Nagel writes: “We have good grounds for believing that the mental supervenes on the physical i.e., there is no mental difference without a physical difference. But pure, unexplained supervenience is not a solution, but a sign that there is something fundamental we don’t know. We cannot regard pure supervenience as the end of the story because that would require the physical to necessitate the mental without there being any answer to the question how it does so. But there must be a ‘how,’ and our task is to understand it.” [9; 106 – 7]. Such are the fundamental difficulties, if abstracted from what we shall term associated background difficulties, which are in their own right also of considerable theoretical interest. These include, for example, the methodological difficulties bearing upon differentiation and the description of subjective phenomena; the correlation of their description in the third person and in the first person, as in I experience pain; and such issues as the conceptual connections and differences between the physical and the physiological, and the psychological and subjective reality. Due to the limitations of space, this exposition of Nagel’s account of the actual state of affairs must be limited to grappling with the aforementioned highly complex theoretical difficulties involved in suggesting how to solve the mind-body (brain-consciousness) problem and then to my relevant critical considerations and long-held conception, that is capable of realizing Nagel’s project.

Tomas Nagel on the main difficulties of the Mind-Brain Problem and its draft solution. Criticism of physicalism and reductionism.

Nagel’s attitude to the mind-body problem is deeply pessimistic and still prevalent among Western philosophers after half a century’s struggle with it. In his opinion, “no one has a plausible answer to the mind-body problem,” and research has come to an impasse. Between consciousness and brain processes there is a link that “remains resistant to understanding” [9;101]. Reductionist attempts to solve the problem are unsound, but serious anti-reductionist attempts have not been attempted. “We do not at present possess the conceptual equipment to understand how subjective and physical features could both be essential aspects of a single entity or process” [9;105].

At the same time, Nagel expresses certainty that a solution to this irksome mind-body problem is attainable and calls for a redoubling of effort in the attempt to find a new and alternative concept that explains and solves the problem. It is true that the proposed project is of a highly general nature and does not breach the long tradition of considering this problem within the boundaries of traditional analytical philosophy. Not surprisingly, Nagel’s severely critical relationship to reductionism, does not preclude excursions into territory dependent on physicalist paradigms (more on this later). Nonetheless, Nagel’s goals the broad theoretical requirements they posit, and the conceptual results that they require, are, to my mind, stringent and laudable.

He writes: “My reading of the situation is that our inability to come up with an intelligible conception of the relation between mind and body is a sign of the inadequacy of our present concepts, and that some development is needed” [9;102]. This bears, above all, on our concept “mind,” which requires extension so that it is one of the conditions capable of affording an “expansionist” approach. “Our problem is that

there is no room for a necessary connection with physiology in the space of possible development defined by the concept of mind. But that does not rule out the possibility of a successor concept of mind which will both preserve the essential features of the original and be open to the discovery of such connections” [9;106]. “Without such an expanded concept of the mental there is no prospect of overcoming the explanatory gap” [9;106]. He considers that beyond its manifest aspects — including the reflection of behavioural or functional acts the concept of “mind’s” latent content should be able to express the required necessary connection between the mental and physiological processes.

Such an expansion of the concept’s content is to be understood by analogy with such expanded concepts as typify the results of scientific thinking. In the case of the concept “water,” manifest characteristics are to be supplemented with such latent qualities as chemical composition. This train of thought suggested itself to the author in similar form in his previous works including one that appeared forty years ago, when he was still trying to preserve the general basis of physicalism and defended a version of so-called “Theoretical Materialism,” according to which the identification of phenomena in consciousness with brain processes is only possible in the sense of “theoretical reductivism,” that is, by means of reducing the object, via some observable standard, to a quantified theoretical entity, such as can be described by scientific theory. For example, water is identified with H₂O, the temperature of gas not signifying anything except the kinetic energy of a given quantity of molecules.

The article under consideration by Nagel emphasizes that the expansion of the concept of “mind” is only conceivable with its manifest content. “If we can do this without denying the phenomenology or reducing it to something else, we will be on the first step toward an expansionist but still non-dualist response to the mind-body problem.” He, however, concludes that “this is so far pure fantasy” [9;106].

It is indeed hard to imagine how such an expansion might be carried out. The desired inclusion of neurological equivalents into the very concept of “mind” is inconceivable. Were this possible, then the problem would have been solved, or, rather, would never have existed. Although this part of Nagel’s project is not sufficiently founded, interesting consideration is given to the correlation of descriptions of the phenomenological and the physiological [9;110–111].

Considering the problem’s difficulties and theoretical possibilities, Nagel further modified his project and leaned toward not expanding the “successor concept” of “mind” but regarding it as some other kind of concept, of an essentially different nature, capable of unifying the phenomenological and the physiological.

In this, he formulated the most significant part of his project, a part with which I concur entirely. He writes: “The right point of view would be one which, contrary to present conceptual possibilities, included both subjectivity and spatio-temporal structure from the outset, all its descriptions implying both these things at once, so that it would describe inner states and their functional relations to behaviour and one another from the phenomenological inside and the physiological outside simultaneously—not in parallel...The difficulty is that such a viewpoint cannot be constructed by the mere conjunction of the mental and the physical. It has to be something genuinely new, otherwise it will not possess the necessary unity. Truly necessary connection could be revealed only by a new theoretical construction, realist in intention, contextually defined as part of a theory that explained both the familiarly observable phenomenological and the physiological characteristics of these inner events” [9;111–12]. (The emphasis is mine.). Nagel’s final pronouncement reads: “The conjecture is essentially this: that even though no transparent and direct explanatory connection is possible between the physiological and the phenomenological, but only an empirically established extensional correlation, we may hope and ought to try as part a scientific theory of mind to form a third conception that does directly entail both the mental and the physical, and through which their actual necessary connection with one another can therefore become transparent to us. Such a conception will have to be created; we won’t just find it lying around. All the great reductive

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successes in the history of science have depended on theoretical concepts, not natural ones concepts whose whole justification is that they permit us to replace brute correlations with reductive explanations. At present such a solution to the mind-body problem is literally unimaginable, but it may not be impossible” [9;112]. (The emphasis is mine.).

Although I support the fundamental aims proposed in Nagel’s project, I reject his assertion that there are no “conceptual possibilities,” that such a solution is at present “inconceivable,” and that it is necessary to create a “third conception.” I am convinced that we have long held the necessary conceptual possibilities and indices, and that we already possess the coveted “third conception.” In order to realize this, it is necessary to take into account the changes in the paradigm structure of scientific knowledge during the last fifty years. It is necessary to at last rid oneself of physicalist spectacles and to overcome the hypnotic effect of physicalist paradigms that narrows the horizon of theoretical possibilities applicable to the mind-body problem.

Let us recall the rigid form of the paradigm as the general philosophical and methodological attitude concomitant with logical positivism. Carl Hempel states that “in principle all branches of science have the same nature; they are branches of one solitary science, namely physics” [11; 382]. For this reason, all really scientific explanation should be grounded in physical explanation. This goes for all explanations of consciousness and of the mental

The mind-body problem, which logical positivists had long counted among the number of pseudo-problems, was rehabilitated by post-positivists, but the majority of the latter continued to occupy the position of radical physicalists. Any quality and ability of a human, including his consciousness, as David Armstrong stated, can “be reduced to nothing but physical qualities.”[2; 37].

The paradigm of physicalism in natural science was the product of the industrial era. Since approximately the middle of last century, in conjunction with the development of biology, cybernetics, information theory, systemic and structural research, the rapid development of mass communication technology, marking the onset of the changeover to the post-industrial information society, the physicalist paradigm has begun to reveal its inadequacy. Functionalism delivered it a serious blow: its earlier representatives H. Putnam, J. Fodor, and D. Lewis asserting that functional qualities are not reducible to the physical. Drawing on mathematical results from Alan Turing’s famous “Turing machine,” they showed that physical explanations are not universal, inasmuch as the functional organization of a system logically differs from its chemico-physical description [12; 281]. It became apparent that the idea of unifying all scientific knowledge on the common ground of physics became increasingly untenable. Physics was incapable of explaining a new class of objects self-organizing systems, such as biological, socio-biological, economic and other systems.

Conformity in the functioning of self-organizing systems cannot, of course, confound conformity to physics, but research on this represents a particular type of cognitive task depending on conceptual means that in their essence function irrespective of the explanatory means and methods at the disposal of physics. Here we are dealing with information processes and code control. Insofar as information and code control are unambiguously not connected with the determined physical qualities of the self-organizing system, a purely functional description will suffice for its ends. In my own work, this forms the fundamental principle, to wit, the principle of informational invariance relative to the physical qualities of its bearer: one and the same piece of information may be embodied and transferred by various kinds of bearer, the physical qualities of which might be at variance with one another. This engenders the basis of a particular type of causality informational causality: function, in this case, is not determined by pure physical factors in particular, such as quantities of mass or energy, but by the given information under the conditions of the code links which form the given self-organizing system. All this bears witness to the untenable nature of the physicalist paradigm, to the necessity of observing measures appropriate to the theoretical carcass of physical knowledge and using analysis of information processes, especially with regard to the mind-brain problem.

We have entered the information age, of unprecedented rapid change and development in computer technology with concomitant types and means of scientific knowledge. The tasks of researching information processes, self-organizing systems and deciphering code links and functional relationships have moved to the foreground. Solutions to deciphering the genetic code and genome of man and other fundamental matters have been found. These enrich not only empirical, but also theoretical means of specific types of scientific research. Significant results have been achieved in the study of information processes in the brain and in the decoding of the neurodynamic codes of mental phenomena.

It is rather surprising that these inspiring results, these means and theoretical possibilities, seemingly touching upon the surface of these very matters, remain “unremarked upon”, in work concerning the mind-body/brain-consciousness problem.

The awkward fact remains that the questions whose solution Nagel considers at present “inconceivable” actually have simple and clear answers.

Information approach to the Mind-Brain Problem

Indeed, Nagel’s statements should read as follows: We do “at present possess the conceptual equipment to understand how subjective and physical features could both be essential aspects of a single entity or process” [9; 105]. We have had a “third conception that does directly entail both the mental and the physical for a long time already, and through which their actual necessary connection with one another can therefore become transparent to us” [9;112]. This third conception is that of information. Here I define information as that which is generally accepted in the scientific community and that it meets my and Nagel’s shared aims.

1. **Information is necessarily embodied in its physical bearer;** it does not exist outside certain physical objects and processes.
2. **One and the same piece of information (for the given type of self-organizing system) can be embodied (and transferred) by bearers of physically different natures.** I call this the principle of informational invariance (henceforth — PI) relative to the physical (chemical, substrate, spatial and temporal) quantities of its bearer.
3. **Information may obey a regulatory factor that is a cause of given change within a self-organizing system inasmuch as this serves the concept of the self-organizing system and is indispensable in delineating its scope.** This is relevant to biological, biosocial, technical and social systems, among others.

From these three irrefutable initial premises three important deductions can be made:

- 1) One and the same piece of information can be encoded and transcoded in various forms; 2) Information only exists in its given encoded form, as represented by its bearer; and 3) Control is derived from code links which display given forms of correspondence between the qualities of the information bearer in their concrete spatiotemporal determination and their “meaning” for self-organizing systems, that is to say, information proper, in cases where control is determined not by the physical qualities of the bearer itself, but indeed by information.

Let us examine these deductions more precisely. Information no more exists outside of its bearer than it does outside and beyond its given encoded form, or, in short, outside its code. Deciphering code or “decoding,” represents the translation of an “incomprehensible” into a “comprehensible” conceptual coding. This signifies that there are two types of codes. The first, immediately “comprehensible” to the system (subsystem) it addresses, does not require a special decoding operation. I call this a “natural” code. The second kind, for which decoding is required, I call an “extraneous” code.

Decoding, therefore, amounts to nothing else than a translation, and it is particularly important to underline this point: it is the conversion of “extraneous” code into “natural” code. If the information is “comprehensible” to the system, namely, that it is represented in the form

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of a “natural” code, then this signifies that it obeys or is able to obey system factors coherent with its integral functionality and control factors: maintenance and development of self-organization as well as the realization of its aims.

In a complex self-organizing system (the elements and subsystems of which are themselves self-organizing systems, such as an organism and its cells,) control is formed on the basis of a chain of code links coming into existence via phylogenesis or ontogenesis the codes themselves being of the “natural” order.

With these three initial premises and their short elucidation, the next step involves the recognition of the legitimate definition of the “mental” within the quality of information. It is important to define more closely mental, mind, subjective, phenomenological, consciousness, and other terminology applied by Nagel, because, as noted earlier, they are by no means equivalent. All of them, however, denote to a greater or lesser extent the unique qualities of psychic phenomena that are the essence of the individual’s subjective experience. The concept of the psychic proves broader, incorporating the realm of the unconscious and such analytical features of personality as temperament, character and so forth. For this reason, it seems better to use the term “subjective reality” (or phenomenon of subjective reality) to signify present, recognizable experience, which, however, might equally be substituted for the term “phenomenon of consciousness”.

It is natural to maintain that every phenomenon of subjective reality or every phenomenon of consciousness is information, since it is intentional and reflects some sort of “content,” its knowledge having significance and being capable of serving one aim or another. Information is necessarily included in the material bearer. In the given case this bearer is a particular neurological process. (According to contemporary scientific opinion, this process would be called particular brain neurodynamic systems.)

This, in principle, answers the question of the necessary connection between the “mental” and the “physical”: consciousness and brain processes.

To elucidate the particularities of this necessary connection, for the sake of brevity henceforth the term A will designate phenomena of subjective reality, and the term X the cerebral neurodynamic bearers of such information. The connection between A and X proves to be not causal but functional and represents itself a complicated code link. The latter term expresses the given relation of “representation” of the information in the concrete bearer (within its organization and physical entity) for the self-organizing system X is a specific code of A, outside of which A does not exist. A and X are simultaneous phenomena that evince the functional rather than causal nature of the necessary connection between themselves. This shows that the necessary connection between them is, so to speak, mono-causal, consequences of one and the same cause.

Therefore, a being that would be entirely void of consciousness, although in its functions identical to the sum of human organic brain and body functions. The weakness of this argument lies in its unwarranted reduction of the concept of function to physiological and behavioural acts: for reasons unknown he excludes “mental functions.” This makes the logical possibility of the “zombie” seem plausible. However, even if the concept of function is reduced so as to be of such narrow application, reasonable doubt remains as to the logical possibility of the “zombie,” since it is absolutely unclear if a description of physiological functions is sufficient and proper to identify humans and such hypothetical beings. If there is identical equivalence, in itself hard to imagine, then there are strong logical grounds to suspect that such a creature would also be possessed of consciousness.

Keeping in mind that Nagel includes consciousness (“the mental”) in the category of function, in regard to his thesis of functionalism, such a state of affairs is possible if we conceive of “a conscious subject with an inner life just like ours that behaves and looks just like a human being but has electronic circuitry instead of brains” [9;108]. It paraphrases, and to an extent emotionalizes, the famous thesis of isofunctionalism of systems: the possibility of reproducing one and the same function on different physical and chemical substrata. In the case in point, this follows from the principle of invariance of information (PI) in relation to the physical

qualities of its bearer. Such a conceptual directive not only stimulates an increase in perspectives of technological advancement, such as the development in information technology, but it also significantly heralds the creation of prosthetic elements and organs in medical practice. Furthermore, it promises development in nonbiological forms of human evolution and changes in the very fabric of civilization. It makes thinkable the existence of other intelligent beings with completely different substratal foundations and organization.

It must be noted that the concept of functionalism, qua alternative to radical physicalism, proves to be a broad one, encompassing as it does the spheres of inanimate nature, technology, biological and biosocial systems, and human society in its poly-dynamic structures. In the realm of the mind-brain problem and in terms of its basic tenets, it proves to be entirely compatible with the information approach. It permits a deeper elucidation of the essence of the functional connection, and of specific code links, and thereby clarifies the nature 1) of subjective reality qua specific type of informational process; and 2) of the particular “representing” a specific type of the information itself for a highly developed self-organizing system and its relations to other types of information processes and different means of “representing” information.

A, as a given “content,” i.e. information, as represented by the cerebral code X, may, without change of “content,” be transcoded into different kinds of codes, for example, by means of complex graphic signs or sequences of sounds, and so on. Such codes are capable of independent existence outside of individuals and independent of them. However, the quality of subjective reality is excluded here. This quality is only necessarily connected with specific types of brain code. It is also connected with motor activity, the expression of the eyes, and other behavioral expressive code in addition to vocal codes. But only the neurodynamic cerebral code of the X kind is of fundamental importance to it.

Under the proposed theoretical position, the sacramental question of the spatial characteristics and the localization of phenomena of subjective reality has a definite meaning. Like information, phenomena of subjective reality are located in code, that is, in a given neurodynamic system that possesses concrete spatiotemporal qualities. Equally, one and the same piece of information may be embodied in different codes and consequently have varied spatial accommodations. It can also be transported from one space to another or replicated and simultaneously occupy separate spaces. Information as “content” is not affected by this state of affairs.

The last point is also of relevance to phenomena of subjective reality. The same one may be affirmed about the meaning or content of the outlined words. Is it permissible to ascribe length and width, and so on to “meaning” or “sense”? Here there are two conceptual systems without a clear logical connection between them. One of the two is subject to classical physical nature; the other to human knowledge. To connect them requires an intermediate categorical link, which is precisely the concept of information.

Meanwhile, the location of information becomes absolutely essential when diagnosing a code entity, that is, an information bearer, whose essence is not in its physical, substratal structural qualities but in its functional meaning, in its representational *raison d’être*. This is equally true when decoding or understanding the information trapped in a code object. If we wish to “appropriate” and make this information “accessible” to our brains, then we must find at least one concrete space in which it resides a concrete, code entity outside us or a concrete person whose brain codes embody the information that interests us.

Received higher initial theoretical premises offer substantiated answers to other key questions associated with attempts to solve the mind-brain problem.

Two particularly difficult questions

1) How can we explain that the objectively extant neurodynamical codes in the human brain afford the experience of subjective reality? How, for example, is it possible that I should experience the image of the tree when it does not objectively exist within my brain?

Let us leave to one side such implausible answers to this question as

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certain scholars would have us believe that, at the time of perception, a chemical copy or other such duplication of the image is called into being within the brain. Incidentally, many serious writers consider it necessary to presume the presence within the brain of a special decoding device which translates code into image. However, their presumption engenders additional difficulties, such as cannot be negotiated without the infamous homunculus.

Their principal feature is that it is impossible to rid code information of images that represent information about external matters. But what is to be done if these are abstract ideas rather than certain features of perception? What if, for instance, the idea of the infinite presently occupying my thoughts is among them? How, is it necessary to decode the neurodynamic brain codes of this thought? Could it be that decoding amounts to nothing but transcoding into “natural” code? Information represented in “natural” code is immediately “comprehensible” to a self-organizing system that in this case in point, is the cerebral ego system, the “I.” (More detailed commentary about this will follow) Pulse-frequency code at the exit of the eye’s retina is immediately “comprehensible” to those brain structures to which it addresses itself. The meaning of the word, *derevo* (tree) is immediately comprehensible to a human that knows Russian. Analysis of the physical and structural qualities of this code is not required. Deciphering is required to deal with “extraneous” code, but this only amounts to transforming via transcoding into “natural” code. Once the means of this transformation has been found and assigned, the “extraneous” code becomes “natural” to the self-organizing system, a step which marks an act of control.

The code organization of an information bearer never “resembles” its “contents” as constituted by the information it embodies. What does the organization of constituent letter elements and all the graphic components of the word “tree” have in common with its “contents,” that is, information about an external tree object? Nothing in the slightest. One-to-one correspondence between information and its “structure,” the organization of its code, is of an absolutely different nature, having, as a rule, nothing in common with the relationship between copy and semblance.

All the above also has bearing on the correspondence between phenomena of subjective reality and its cerebral code bearer. It is senseless to search here for the aforementioned copies and semblances. However, we are inclined to accept such ideas, rooted as they are in centuries of physicalist-type thinking that entirely excludes alternative explanations. Such recidivism is found in the work of Nagel, who writes: “But we cannot see how a detailed account of what is going on in the brain could exhaustively explain the taste of a cigar — not even if we could see how it explained all the physical effects of such an experience. So long as this explanatory gap remains, the identification of the states remains problematic” [9;105], where Nagel describes as indispensable “some view or representation of the squishy brain, which in light of our understanding we will be able to see as tasting chocolate. While that is at the moment inconceivable, I think that it is what we would have to have to grasp what must be the truth about these matters” [9;102].

Actually there is no “explanatory gap” in the sense of revelations about semblances (those that one might “see”), but only explanations as to code links between given information such as the taste of cigars or chocolate or other sensations and its bearer, namely cerebral neurodynamic equivalents. “Identification” will not remain “problematic” if the necessary connection between them is established and it is taken that they cannot be divided into spatial or temporal sense. This identification, as Nagel himself concedes, does not mean reduction of one to the other. Here a both crucial and fascinating question arises: how is information represented, “given” to a self-organizing system, and how is the code bearer of this information represented to it?

“Natural” code is, in its own physical qualities and organization, so to speak, transparent to the self-organizing system: the elements which make up its qualities are not heterogeneous; they enter in the capacity of integers, immediately accessing the information embodied in it in the case of “external” “natural” code (as per familiar words of a native language.) They are also transparent inasmuch as code bearers and their organization are absolutely un-reflected at a conscious or at any psychic level when “internal” “natural” codes are involved.

It must be stressed that both “natural” and “extraneous” codes may be both external and internal to a given self-organizing system. This then stipulates individual tasks associated with their decoding and transcoding. I distinguish between two individual decoding tasks: the “direct,” that is, when there is a code object and an explanation of the information it contains is required as is the case for “extraneous” code; and “inverse,” when certain information is supplied, and it is necessary to establish bearer and code organization. The latter involves “natural” code, which as a rule proves to be more difficult than those involving their counterpart. Brain codes of the X type are internal “natural” code. Information A, embodied within it, is directly received by the individual in the form of phenomena of subjective reality: sensory images, thought, and so on. Furthermore, despite its presence, the structure of the cerebral neurodynamic code — and even its very presence — is a matter entirely concealed from each of us. We are given information as if in “pure” form: we do not feel these processes occurring in our brains and do not reflect upon them at a psychic level. When an individual reflects on something, he or she operates with information given to him in “pure” form. Such reception of “pure” information and the ability to manipulate it represent a cardinal fact of our psychic organization. But the incontestable fact that we experience the image or think without knowing what is occurring at the same time in our brains begs the question as to why our organism is constructed in this manner rather than in some other; moreover, the answer should provide a more profound answer to the first question about how information is given to the self-organizing system. 2) Why, in the phenomena of subjective reality does an individual receive information about reflected objects and the phenomenon of acts of reflexive consciousness but in the complete absence of any information relating to the bearer of brain codes?

The short answer to this question is under PI. Just as one and the same piece of information can exist in various codes, the reflection of concrete qualities of an information bearer in most cases proves to be inessential material. In order to function efficiently, a self-organizing system needs information such as provides reliable information about external objects and situations, the most probable changes in means and methods of interaction with it, and about the current state of its own system functions and changes. Irrespective of the concrete qualities of a bearer, which may differ, the measure by which the character of behaving acts is determined by semantic and pragmatic informational parameters, is the degree to which the manner of reflection of a cerebral information bearer during the course of evolution and anthropogenesis did not develop. The means of information reception, however, was developed by this same coefficient: its range broadened, and the means of information manipulation and application for control and self-development improved.

In the process of anthropogenesis, when compared with the psyche of animals, consciousness arises as a quite new quality that naturally is linked with the origin and new code form of storage, with transformation and transmission of information, primarily in language. Indeed, this new quality can be defined in this context as the ability to manipulate such information with which it is possible to boundlessly reproduce information about information. This creates that “duality” of reflection through the prism of modality “I” and “not I” that characterizes consciousness, and with this duality the capacity for abstract thought, creativity, contemplation of self, self-determination and will. This type of information manipulation is the prerequisite of such boundless freedom of activity in the sphere of subjective reality including daydreams, meditation, hopes, fantasies and existential reflection which constitutes not only the basis of higher values and sense in thought, but also of the barren pondering of the internal world of the self and equally that of monstrosities, madness, chimera and suicide.

I shall risk the assertion that the orientation of development conditional to PI has led to such levels of a condition in human civilization that there is an extreme deficit in self-knowledge and reasoned self-transformation which threatens contemporary civilization’s very existence. This developmental orientation created and perpetuated from the very onset an ever-worsening state of what I call fundamental asymmetry in cognition and transformational functions. Indeed, it is evident in the following: despite the necessary dependence of cognition and

transformation of the external world on standards of self-cognition and self-transformation by man himself during the course of history long-since recognized by philosophers the vector of self-cognition and self-transformation has proven extremely limited and of negligible result. It is this that has led to the ecological crisis, among other global problems, and it is this that nourishes a chronic situation in which the human knows not what he does and turns his hand against himself, incapable of bridling himself and his energies. From century to century the irritating sentimentousness continues about the weakness of the will and how, if a man might keep himself in order he might keep the world in order.

However, to control oneself effectively, it is imperative that a new goal of code links be created within one's own organism and its nervous system, one that would not only provide for the worthy project of self-transformation, but also enough energy for its realization. At present, science cannot instruct us how. This kind of goal is partially reached only by gifted individuals operating intuitively. Nonetheless we do not lose hope. Important steps, such as the deciphering of the human genetic code, the genome, really have been made in this direction. With the deciphering of the brain codes of psychic phenomena and the study of code organizations of volition along with the methods of optimizing them the gradual discovery of practical solutions to the mind-body problem has begun. Irrespective of the possible and unforeseeable negative aspects of such scientific achievements, it is they that will be able to give the key to this problem.

It is admissible to presume the possibility of essentially transforming our subjective realities in its sense content and intentional aspects by means of cognition and transformation of its code organization. It is theoretically admissible to conceive of other types of subjective reality as opposed to those which are inherent in animals and those which characterise humans. One of those theoretically conceivable variants may consist of an extraterrestrial type of subjective reality capable of directly giving to a self-organizing system not only information about the objects represented in it, together with information about information as is characteristic of people, but also about information that is internal to the bearer of information (about the organization of code, the mechanisms of its functioning providing the subjective experience of the given information). It is plausible that such a type of subjective reality would be linked to a type of social self-regulation different from that on Earth, for the capacity to immediately reflect upon the internal information bearer and influence it would amount to a qualitatively higher capacity for self-reflection and self-control in the individual, and thus a higher degree of self-perfection. This would entail

the transformation of evaluative and reasoning structures with qualitatively higher creative activity, producing existential values, to an extent which at present is inconceivable to us.

Questions bearing on activity in phenomena of subjective reality merit more detailed consideration.

Mental causation, voluntary action, free will

1) How are phenomena of subjective reality (A), to which it is impossible to ascribe physical qualities, capable of obeying the causation of corporal change? (This question has already been posed above, but it requires a more detailed discussion)

In the general outline of this question lies the answer: phenomena of subjective reality influence physical processes, governing them in the form of informational processes. We are concerned here with the aforementioned informational causation, or, more precisely, with an aspect of it we will call psychic causality. PI determines and distinguishes this form of causality from physical causality due to the fact that it is codal in nature. A chain of code transformations realizes psychic causation, and its result is determined with values and operative characteristics of information A embodied in brain code X. If A is the intention to complete some comparatively simple action, such as wishing to pick up the pencil and doing so, then the chain of code transformations is built, as a rule required, on the hierarchical system and can be seen as a properly developed in phylogenesis and ontogenesis, that is sequential and parallel turning-on of code programmes for the movement of hands and arms and of the concomitant physical changes along with code programmes that provide energy for all of this complex of changes

Naturally, that which we call acts of volition require a more exact description. Beyond the general features explaining "the mechanism" by which phenomena of subjective reality have an influence on corporal processes, I would, however, like to discuss briefly one allied question. 2) How is the "influence" of one phenomenon of subjective reality on another to be explained such as when one of them calls forth directed change in another or one thought attracts another?

That one thought is capable of summoning or begetting another appears to be an omnipresent fact of our experience. A scientific description of this, however, is subject to greater difficulties due to the incomplete nature of differentiation/discretisation methods for the continuum of subjective reality, which actually take into account within its dynamics the multifaceted nature of its "content." For this reason, when speaking about individual phenomenon of subjective reality, and most particularly when the subject is the influence of one such phenomenon upon another, then it is necessary to stop at a point where a sign indicating the possibility of dividing it and differentiating it from another can be found. This is a very difficult task.

But let us assume that it is possible to make such a distinction we designate to one the name A1 and to another that of A2, such that if A1 summons A2, this is equivalent to the code transformation X1 to X2. This also has the status of informational (psychic) causality. The internal "mechanism" that engenders A2 from A1 is not in principle different to cases in which subjective phenomena induce determined physical change. The only difference is in the contours of code transformation, in that subsystem where the changes take place. In cases where one thought attracts another, the most likely paths of code transformation are of type X, the "paths of motion" acquired from cultural norms. These logical, moral and other norms determine schemes of actions at an internal level; these most likely "paths" of significant change in the sphere of subjective reality are particularly conspicuous in the example of logical norms that strictly confine such "paths of motion" to the discursive level of thought processes.

However, each and every separate phenomenon of subjective reality is subject to a given unique "I" and bears its stamp — each is a moment of integral subjective reality existing only in a concrete and unrepeatable personal form. This integrity, determining our "I," represented within the brain ego system which makes up a high level of brain self-organization and in whose sphere code structures of the X type function. In other words, the direction of transformation of a given type is conditional on the unique nature of this ego-system. (For more on ego-systems, more often termed the "self", see the works of A. Damasio [13], D.P. Matyushkin [14] and others). And that is why it appears in this regard among reflections that are not predetermined and depend on personal characteristics and such parameters as the individual will. Central to the mind-brain problem, therefore, is the traditional question of free will.

3) How can the phenomenon of the freedom of the will and its compatibility with determined brain processes be explained?

There is neither the possibility nor the necessity to immerse oneself in a detailed analysis of the phenomenon of the free will here. For our purposes it suffices to concede that in some cases people act subjectively or in external practice by strength of will and of their own volition: in some cases they make choices on their own initiative. These activities cannot be equally determined by external factors yet also by creative capacities that presuppose capabilities inalienable from personality responsible for action.

It is hardly possible to deny that at least in some cases, a man can direct the development of his thoughts, can operate by means of his will intentional vectors or some other phenomena of his own subjective reality, although in the composition of subjective reality there is a class of phenomena which is either absolutely beyond the control of volition or else yields to it only with the greatest difficulty. But the admission allows, albeit partially, some capacity of "I" to operate its own phenomena of subjective reality, which is information in its "pure" form. This signifies the following:

A) If I am capable of manipulating certain phenomena of my own subjective reality of my own free will, i.e. of transforming A1 into A2,

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and so on, as was previously seen, then this is the equivalent of being able to manipulate their codes X1, X2, and so on which represent in themselves certain cerebral neurodynamic systems. Consequently, and though it may appear strange at a first glance, I can by means of the will manipulate and control certain classes of my own cerebral neurodynamic systems. Moreover, this signifies that I am able not only to activate and deactivate certain sequences, but also to determine the orientation of code transformations within these or other boundaries, and finally, to create new code patterns of the X type, which are unprecedented varieties of my own neurodynamic system. It is impossible to deny that man creates original thoughts and unique artistic forms with his creative energies. These new formations have in the sphere of one's subjective reality their own necessary code embodiment in the cerebral neurodynamic system. But subjective reality, as an integral entity has the uninterrupted historical chain of new formation by means of the creator which thus or otherwise constitutes our "I."

B) Inasmuch as the ability to create new formations in the sphere of subjective reality corresponds to the ability to engender new formations at certain cerebral neurodynamic levels code organizations of the X type, then this allows for the continuous possibility of broadening the diapason of possibilities of self-organization, self-perfection and creativity.

Furthermore, this relates, of course, to both the steering of psychic and bodily processes and the psychosomatic contours of self-regulation. There is no doubt that when an individual of so-called strong will overcomes pain or slows down cardiac rhythm as in the case of a yogi that this person is forming such cerebral neurodynamic patterns. Such a chain of code transformations trailblazes a new effective path and "captures" vegetative and other involuntary levels of regulation as are usually closed to transformational conscious control.

C) The capacity to form one's own cerebral neurodynamics may be interpreted only in the sense that neurodynamic systems of the X type, considered in their actual and dispositional interrelationship, prove self-organizing, representing in the brain of the human individual the personal level of brain self-organization (the level of cerebral self-regulation of ego-systems). In other words, the conscious "I", with all its gnostical, evaluative and volitional aspects, is represented within the functional cerebral neurodynamic system (type X) as a self-organizing system.

Consequently, an act of the free will, such as in the case of making choices, and equally in the matter of generating sufficient interior strength to attain a worthy goal, is an act of self-determination. This thesis supersedes that of the incompatibility of the free will and determinism, but the latter is to be understood not only as external, but also as internal determinism which provides programs of self-regulating systems. Indeed, such types of informational causality express an act of self-determinism, which leaves no space vacant for a so-called homunculus (In detail, the question of free will in modern neuroscientific studies was considered in my article [15]).

Given such an approach, it is possible to plot perspectives governing research of cerebral organization which represent our ego-system, i.e. the code embodiment of the individual integrity of human subjective reality. The methodological key here is the principle of self-organization, which has already been sufficiently approved by contemporary science. This principle affords access to functional unity of self-reflection and self-control, and it shapes the concrete sense of the concept of self-determination.

All the above questions indicate the main points of the mind-brain problem and its theoretical difficulties. This problem includes philosophical aspects and requires deep methodological research. But it is precisely a scientific interdisciplinary problem. Numerous sciences take part in its development. A significant place here belongs to the results of artificial intelligence and information technology [16]. But the main place here belongs, of course, to various branches of neuroscience, especially to such direction as "Brain Reading". Significant results have been achieved in deciphering the brain neurodynamic codes of many psychic phenomena. Their clear brain correlates have of great importance for medicine and for the creation of new neurocomputer interfaces. The discovery and study of "mirror neurons" and "mirror systems" played a significant role in the development of the problem. It

is especially necessary to emphasize the importance of the achievements of psychoneurology, the outstanding works of V. Ramachandran and his staff [17], which serve the solution of the problems of treatment and neurorehabilitation of patients.

Conclusion

The largest representatives of neuroscience have repeatedly talked about the importance of a theoretical considering of the min-brain problem. I did it for many years and have proposed my own version of the theoretical solution to the main issues of the mind-brain problem (consciousness and brain). My theory has been developed in many works. It is most fully set forth in the book [18] and in a recently published article in English [19], in which it is clearly and concisely stated on the selected points, which makes it convenient for my opponents to criticize. I well understand that any theory is limited and must pass rigorous critical tests and that other, more solid theories are possible. Moreover, the successful development of the mind-brain problem in the last decade posed new questions and discovered new theoretical difficulties. This confirms the need for further development of the mind-brain problem as a condition for the development of effective experimental research.

In conclusion, I would like to note that an exposition of informational conception correlates well with a materialistic worldview and obeys to a fixed extent its fundamentals, such as in showing that the mind (the mental or psychical) is to be numbered among the functional qualities or as the prominent neurophysiologist Roger Sperry would say "the emergent properties" of highly organized material systems [20]. The development of this quality distinctly tracks the path of biological evolution, which makes it obey the most significant of our arguments. Furthermore, interpreting phenomena of consciousness as forms of information reduces the degree of their originality to the ranks of other phenomena of objective reality and increases their proximity with them. This in turn suggests that the assertion of Nagel and of many of his Western colleagues about the presence of "an explanatory gap" is false.

References

1. Dubrovsky D.I. (1980) Information. Consciousness. Brain, M.: Higher School. (In Russian)
2. Armstrong D. M. (1968) A Materialist Theory of Mind. L.
3. Levin, M.E. (1979) Metaphysics and the Mind-Body Problem, Oxford:arendon Press
4. McGinn C. (1989) Can we solve the mind-body problem? *Mind*, 98: 349–66.
5. Dennet D. C. (1991) Consciousness Explained. Little-Brown,
6. Chalmers D. J. (1996) The Conscious Mind: In Search of a Fundamental Theory. N.- Y., Oxford Univ. Press
7. Block, N. (2007) Consciousness, Accessibility and the mesh between psychology and neuroscience. *Behavioral and Brain Sciences* 30: 481–548
8. Gennaro, R. (2012) the Consciousness Paradox. Cambridge, MA: MIT Press.
9. Nagel T. (2001) the conceivability of the impossible and the problem of spirit and body. *Vopr. Filos.* 8; 98-114 (In Russian)
10. Nagel T. (1974) what is it like to be a Bat? *Philosophical Review*, LXXXIII, October.
11. Hempel C. (1949) the Logical Analysis of Psychology. *Readings in Philosophical Analysis* .New York.
12. Putnam H. (1969) the Mental Life of Some Machines *Modern Materialism: Readings on Mind-Body Identity*. New York, Chicago.
13. Damacio A. (2012) self comes to Mind. Constructing the Conscious Mind, London: Vintage Books
14. Matyushkin D.P. (2007) on the possible neurophysiological foundations of the nature of the inner "I" of the man. *Hum. Physiol.* 33: 1–10. (In Russian)

Neuroscience and Neurological Surgery

15. Dubrovsky D.I. (2019) the problem of free will and modern neuroscience. *Neuroscience and Behavioral Physiology*, 49(5), 629-639
16. Dubrovsky D.I. (2007) Consciousness. *Brain. Artificial Intelligence*, Moscow: Strategy-Center. Moscow. (In Russian)
17. Ramachandran V.S. (2011) the Tell-Tale Brain. A neuroscientist's Quest for what makes Us Human, New York. London
18. Dubrovsky D.I (2015) the problem "Consciousness and the brain": a theoretical solution. Canon+, Moscow (In Russian).
19. Dubrovsky David I. (2019) "The Hard Problem of Consciousness". Theoretical solution of its main questions *AIMS Neuroscience*, 6(2): 85–103.
20. Sperry R. (1994). Perspectives of the Mental Revolution and the Rise of a New Scientific Worldview. In: *Brain and Reason*. Ed. by D.I. Dubrovsky, Nauka, Moscow, p .20-44. (In Russian).



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DOI: [10.31579/2578-8868 /102](https://doi.org/10.31579/2578-8868/102)

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