

# Study on the Spatial Characteristics of Mental Phenomena

Nikolay N. Gubanov

National Research University  
Bauman Moscow State Technical University (BMSTU)  
5/1, 2nd Baumanskaya Street, Moscow, Russia 105 005  
E-mail: gubanovnn@mail.ru

Nikolay I. Gubanov

Tyumen State Medicine University (TyumSMU)  
b. 54, ul Odesskaya, Tyumen, Russia 625 023  
E-mail: gubanov48@mail.ru

Elena Turova

Tyumen State Medicine University (TyumSMU)  
b. 54, ul Odesskaya, Tyumen, Russia 625 023  
E-mail: gubanov48@mail.ru

Boris Zemtsov

National Research University  
Bauman Moscow State Technical University (BMSTU)  
5/1, 2nd Baumanskaya Street, Moscow, Russia 105 005  
E-mail: zemtsovbn@mail.ru

**Abstract**—In this paper we show that the ancient philosophers Democritus, Plato, Aristotle postulated the spatial localization of the soul. However, a view that spiritual phenomena have no spatial characteristics had become widespread after Descartes. In our opinion, this view is ungrounded. In this paper we use the data of modern psychology, psychiatry and neurophysiology to prove that sensory images (feelings, perceptions, ideas) have the following spatial characteristics: localization, extra-projection, and structure. Non-sensory elements of the consciousness (reasoning, emotions, needs) have spatial localization and spatial structure.

**Keywords**—space; localization of soul; types of existence; spatial parameters of sensory and mental images; the law of spatial projection of sensory images; subjective space

## I. INTRODUCTION

The issue of the link between spiritual phenomena, or the Ideal, and space has always been one of the most complicated issues of science and philosophy. People have long been interested in the question of whether mental phenomena have spatial characteristics, i.e., is there a mental world in the space, if so, in what way it exists. The solution to this problem is necessary to study the fundamental and always important philosophical problem of the relationship between the spiritual and the material. This issue was studied in depth by a prominent American philosopher and theorist Th. Nagel. He remarks, ‘the biggest difficulty in solving this problem is the notion that spatial phenomena cannot be assigned to mental phenomena, while physical phenomena, including physiological processes in the brain, are bound to have them’ [1]. The goal and novelty of this work are in substantiating the point that not only material objects but also mental objects have spatial characteristics. We should note that we consider the terms ‘mental’, ‘spiritual’, ‘ideal’

as equal in volume and encompassing all elements of the consciousness, any phenomena of the subjective reality.

## II. NOTIONS OF LOCALIZATION OF SPIRITUAL PHENOMENA IN THE HISTORY OF PHILOSOPHY

Most of the ancient thinkers postulated the spiritual localization of spiritual phenomena. For instance, Democritus and Epicurus believed that the soul is evenly distributed in the body of a person in form of special round movable atoms, while the rational part of the soul is located in the thorax. Approximately in the year 500 BC Alcmaeon discovered the visual nerves and concluded that the head brain is the organ of mental activity, hence, the soul of a person is located in its head brain. According to Plato, the soul is located in different parts of the body: its rational part is located in the head, the brain links the soul and the body, while the irrational part of the soul is located in the torso [2]. Aristotle did not agree that the brain was the thinking organ. Although his notion on the localization of the soul was not quite clear, at least he admitted that a part of the soul is located in the heart [3]. In this opinion, the only function of the brain is to cool down the working heart.

The notion that spiritual phenomena do not have spatial characteristics became particularly widespread after Descartes. According to him, only the bodily substance, i.e., the matter has spatial characteristics [4]. It is remarkable, however, that Descartes was not consistent in his views. He admitted a certain spatial localization of the soul by postulating that the interaction between body and soul takes place in the so-called pineal gland. This also proves that explaining the interaction of the material and spiritual is hard if it is assumed that the spiritual is non-spatial.

N. Hartmann was one of the most prominent thinkers of the 20th century to defend the idea of the non-spatial nature of the mental phenomena. He believed that physical and

biological layers of being exist only in space and time, while the two immaterial layers (psychic and ideal) exist only in time [5]. The view of the non-spatial nature of the spiritual phenomena was shared by many Russian authors. For instance, L. A. Abramaya wrote, “the question where the Ideal is located should be subsided, as the Ideal is not characterized by any spatial characteristics, including spatial localization. We cannot deny that in that respect Descartes was right by teaching that the dimension as an embodiment of spatiality is an attribute of material, but not spiritual substance. The question “Where?” has to do with things, not ideas” [6]. The notion of the absence of spatial parameters of the Ideal leads to the following paradox: if the question of “where?” has nothing to do with the ideas, then it means that ideas exist nowhere, i.e., they do not exist. Plato in “Timaeus” was right to notice that, “everything must be somewhere, in some place and take up some space, while what is neither on the ground nor on the heavens seems not to exist.” [7].

A. M. Anisov put forward the concept of types of existence depending on whether objects have spatial and temporal properties. In total he identified four thinkable types of existence: 1) objects having both spatial and temporal characteristics (physical reality); 2) objects that do not have dimension and do not vary in time (ideal reality); 3) objects that do not have dimension, but evolve in time; he named the reality that has no spatial characteristics but lasting in time the temporal reality; 4) objects that have dimension but do not vary in time [8]. The first type forms the world of physical objects. According to Anisov, both the second and third groups form the mental world. It is a world of non-physical being. The fourth type is empty, i.e., such objects do not exist. Anisov believes that the mental world was, in fact, a temporal word at the first stage. It is only after that it was added with an ideal component (around the 4th century BC).

### III. SPATIAL CHARACTERISTICS OF MENTAL PHENOMENA

We believe that the notion of the non-spatiality of the mental world is a scientific and philosophical misconception. Therefore, the task of the paper is to make the contribution to the dismantling of the century-long misconception. We will use the information approach to the problem of the Ideal created by D. I. Dubrovskii [9] as an important methodological tool.

In our opinion, it is necessary to identify two different aspects of the problem of the relationship between the ideal and space when discussing it. The two aspects are expressed by the following questions: 1) Is it justifiable to discuss spatial localization of ideal, if so, where exactly it is localized? 2) Is the subject given the spatial parameters of the ideal in the express experience? We should note the following with regard to the first question. The ideal was not the status of the self-consistent being, it always has its material carrier (code), the information content of which it serves. The code is a material object; therefore, it is localized [10]. Therefore, the ideal also has spatial localization which is integral with the material as the information with its code and the property of the substance in general. D.I. Dubrovskii remarks, “As any determined information, the phenomenon

of the subjective reality is located in its code which is a neurodynamic system having its specific spatial and temporal characteristics” [11]. Every mental phenomenon corresponds to its ensemble of neural activity, the space of this ensemble is the space of this phenomenon. When the brain codes of the consciousness are deciphered, we will have concrete data on this space.

Let us pass over to the other aspect of the problem “the Ideal and space”: are the spatial parameters of the ideal given to the subject directly? Let us preface this by saying that the subjective reality can be subdivided into two parts for the purpose of our further study: 1) the Ideal, acting in form of the sensory images (feelings, perceptions, and motions), i.e., the sensory-perceptive sphere of the consciousness. 2) the Ideal in the form of mental images (notions, judgments, reasonings, i.e., rational forms) and also emotions, desires, self-consciousness, and volition. These two parts differ in having information about their spatial parameters, i.e., whether the spatial characteristics of the subjective reality are given to the personality directly [12].

The experience of introspection indicates that the spatial parameters of the Ideal having to do with the second part of the consciousness are eliminated for the subject. It means that they are not given to it in the direct experience in the same way the substrate properties of the neurodynamic codes are eliminated for the subject. The subject does not feel them. A person does not feel that the reasoning, emotions, volition, self-consciousness are formed by the activity of the head brain. An uneducated person may not know that the brain is the organ of reasoning. A person does not feel these subjective phenomena in anywhere in the space, they seem non-spatial for the person, although the person may understand that they are located in the head and move with the person when it, for instance, moves. Thus, although thoughts and other non-sensory elements of the consciousness are located in the head brain, their spatial characteristics are eliminated for the subjects [13].

The situation is quite different when it comes to the spatial characteristics of the sensory images. Among their spatial parameters, we should identify spatial localization, spatial extra projection and the structure of the extra projection – the geometrical form [14]. Sensory images as well as other psychic phenomena are located in the brain. Their spatial localization is not given to the subject in the form of direct experience. In that respect, the feelings and perceptions do not differ from other phenomena of subjective reality. The difference is that the subject is given in direct experience other spatial characteristics of the sensory images: their spatial extra projection and its structure. These characteristics correspond with a high degree of accuracy to the spatial characteristics of the objective reality being reflected provided the analyzers function properly.

The process of extra projection of the sensory images can be illustrated with a very simple, but highly informative experiment. One has to look at some object, for instance, a portrait on the wall, then close the left eye and push the right eye a little bit. The portrait will seem to be moving. Naturally, the portrait is hanging in its place and does not

move. What is moving? Is the image moving? No, it is inseparable from the brain where its carrier in the form of neurodynamic code is located. It is the projection of the image that moves in the outer space. From this experiment, it can be concluded that the subject is not given the subject directly, but its image. The image is localized in the brain, but it is projected on the objects. The projection is overlaid on the object and the parameters of the projection correspond to the parameters of the object. The image is being perceived as the object itself [15].

The extra projection of images is done differently for different analyzers. There are contact analyzers (tactile, thermal, gustative) and distant analyzers (visual, acoustic, olfactory). The first group reflects the properties of objects that directly act on the receptors. The second group reproduces the properties of objects acting on the receptors via material intermediaries (light for visual, mechanical oscillations of a medium for acoustic perception, the molecules of smell for the olfactory perception). In the case of contact analyzers, the feelings are projected on those areas of the body surface where the stimuli act on the receptors of the analyzers. In the case of distant analyzers, the feelings are projected on the same locations of the space where the object being reflected are located [16].

The spatial projection of feelings and perceptions is described by the law which was earlier called the law of spatial localization of feelings and perceptions [17]. Considering that it is not the subject that is directly given the localization itself, but the projection of feelings and perceptions, it would be more correct to name this law as the law of spatial projections of sensory images. According to this law, the brain uses the experiences of the previous acts of reflection and perceptive-objective activity to project the feelings and the perceptions outside on the reason causing them. As a result, the sensory images of the objects and phenomena of the objective reality seem to us to be located where the objects and phenomena are located.

If the sensory images did not have spatial characteristics, the perception of space by a person would be impossible, as it can only be done with sensory images. In general, a person has no other form of direct contact with the world, other than sensations integrated into its practical activity. The psychological studies have long unraveled many peripheral codes of the information about spatial parameters of objects. For vision it is the number of stimulated receptors of the retina (for the dimensions of an objects), the value of disparity (for the distance to the object and the relief depth), the structure of the pulse activity in the centrifugal channels of the vision system (for dimensions, distance, shape of objects) [18]. These codes correspond to certain psychic analogs in the sensory images themselves. In view of this, we cannot agree with the opinion of Hartmann, Abramyan, Anisov that the Ideal has no spatial parameters.

Anisov poses the question, how it is known that mental objects have no spatial characteristics. He answered, "From experience... According to the data...of the experience, no one has ever seen anywhere anything similar to dimension, value, etc. in the ideal objects ... Physical objects are

compared by the size, by the occupied space and so one; but this can neither be done to the ideal nor temporal objects. It is incorrect to state that the concept of the Universe takes up more place than the concept of the atom ... There is no distance in the world of mental objects". [19].

We can note the following with respect to this notion. Not all knowledge is given in the form of experience, all nominal reality is not given in the form of experience, but it exists nonetheless. That fact that the spatial characteristics of the mental images are not given us in the form of direct experience does not mean that they do not exist. Notions are localized within the brain where the neurodynamic codes for these notions are located, but their spatial localization is not given to us in the form of direct experience, just as the thought that brain is the carrier of consciousness is not given us in the form of experience. As we have already mentioned, a highly uneducated person may not even know about this. In phylogenesis, the information about the link between the brain and the consciousness phenomena was considered vital for the successful activity of a subject. It would even probably be an obstacle to learning about the outer world. Let us imagine that we would be able to observe the outer world and simultaneously sense how the nerve cells are functioning in our brain (the brain "movements"). When the neurodynamic codes of the notions and sensory images are decoded, we will know how much space is occupied by the notions and images. Every mental phenomenon in the brain corresponds to its pattern of neural activity. The space taken by this pattern is the space of the mental phenomena [20].

The reasoning is a discrete simulation of the world, while sensory learning is analog modeling of it. There is no direct link between a notion and spatial characterizes of the object characterized by this notion. The notion of the Universe is not a model of the Universe itself, in the same way as the notion of the atom is not a geometrical copy of a physical atom. A notion is a description of an object using a set of words (discrete units). Each of these words, in turn, is described using other words and so on. That's why the space of a notion and the space of objects are quite different things [21].

The sensory reflection is quite different. It is analog modeling; therefore, it directly corresponds to the spatial parameters of the external world. It is only due to the law of spatial projection of the feelings and we can observe the correspondence of the projection of the mental image, and not the image itself, to the structure of the external environment. In sensory reflection, a spatial pattern is constructed from psychic modalities (modality of red, green, etc.). This pattern reproduces the structure of the external object and it is being projected on it. Contrary to Anisov's views, speaking about greater or less space taken up by the projections of the sensory images is not irrational at all. Here the direct experience itself confirms that mental phenomena have spatial properties [22]. For instance, when we see a school chalkboard with the text "The first of September" written on it, we relive the image of this board. We should keep in mind that it is the projection of the board image that is given to us directly, not the board itself. The projection of the board image is greater than the projection of the images

of the individual letters. The projection of the words “The first of” is located to the left of the projection of the word “September”. It is thanks to the spatial characteristics of the sensory images we have the information about the dimensions of objects, the distances between them, their mutual position in the form of direct experience. If that was not so, the following question would arise: where would we get the information about the spatial structure of the external world from?

All this allows concluding that the basis of the classification of the types of the existence of reality proposed by Anisov does not agree with reality. Both material and mental objects have both spatial and temporal characteristics. The difference between the material and mental world is that the objects of the first world have physical properties (mass, charge, inertia, etc), while the objects of the second world do not have them because they are pure information. The objects of the second world in and of themselves are fleshless and bodyless as the information content of the neurodynamic systems [23].

The space of the environment is a physical, external, or objective, space. The experience of this space in the person’s consciousness is the mental space. It can also be called a subjective, perceptive, psychic space. Some authors call it perceptual space, or visual space in case of vision playing the principal part in the reflection of space. The mental space is represented by the spatial characteristics of the sensory images given to the personality in direct experience, i.e., in the form of spatial extra projection and its structure (geometrical form). The mental space coincides with the physical space in case of normal perception, which is a requirement for the correct orientation of a person in the environment [24].

For adequate perception, the extra projection of the sensory images creates the impression of the equality between an image and the external object. This impression, in turn, determines the naive realistic paradigm and does not allow identifying the fact of the existence of the mental space. A person believes that external objects are given to it directly (not through images, as is the case) and there is only external, objective space – the space of perceived objects.

#### IV. CONCLUSION

The fact of the existence of the mental space is identified in conditions of incorrect perception. During multiple perceptions of an object the signals from receptors actualize (awaken) the existing notion about it, which accelerates the process of perception and hence it is useful. The readiness of notions depends on the inner paradigm of the subject. When a person experiences strong emotion, an incorrect paradigm may form. It may actualize the wrong notion which fully replaces the current sensory data, as, for instance, is the case of a person with the delusion of persecution who may take a robe for a hidden villain. This is how illusions occur. Under hallucinations or imaginary perceptions, sensory images in a person’s brain may be actualized under the internal paradigm without external stimulus. These images are projected outside and perceived as objectively existing things. Dreams

are connected systems of hallucinations. Under illusions, especially hallucinations, the mental space is significantly, sometimes dramatically different from the physical space. This is the difference from one another, the dissociation of the subjective and objective space, that identifies the fact of the existence of the subjective space. The identified difference, or dissociation, is observed not by the subject itself being the state of inadequate perception, but by another person, a doctor in case of a psychic pathology. Thus, the study of incorrect conditions of perception and altered states of consciousness is important for the correct understanding of spatial localization and projection of the mental phenomena.

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