



Mental Energy in the Context of the General Theory of Information



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Abstract

Many researchers wrote about mental energy, psychic energy and spiritual energy. However, still there is neither clear understanding nor well-defined characterization of these phenomena. Here we study these concepts based on the general theory of information, the structuration of the world in the form of the Existential Triad of the world and the existing psychological and philosophical knowledge about the brain, psyche and mentality on the individual level. The goal is to explain the structure of mentality and elaborate a consistent system of concepts related to mental energy.

Introduction

The concept of mental energy can be traced back to Aristotle who wrote about energy of the soul, which was called psyche ($\psi\upsilon\chi\eta$) in Greek [1]. Later other philosophers, e.g., Henry More, also wrote about energy of the soul as the Greek word psyche was often translated as soul. Later words psyche and soul acquired dissimilar meaning while psyche was often equated to mentality what naturally made mental energy the same as psychic energy.

In medieval psychology, the term psyche in its Latinized form anima became one of the basic notions. 19th century psychologists, e.g., Franz Brentano, developed the notion of the psyche in a more exact way. However, the most prominent role the term psyche played in psychoanalysis where it was introduced by Freud under the influence of psychodynamics becoming the basic concept in psychoanalysis and encompassing the forces in an individual that influence thought, behavior and personality. Freud, the originator of psychoanalysis, treated the psyche, die Seele in German, as the personality of an individual structuring it into three components:

A. The irrational and emotional component Id (das Es), which is responsible for all needs and urges of a person remaining mostly unconscious.

B. The rational component Ego (das Ich), which is conscious integrating the drives and urges of the Id with the prohibitions and constraints of the Super-Ego.

C. The moral component Super-Ego (das Über-Ich), which develops due to the moral and ethical restraints placed on us by other people and employs self-observation, self-criticism and other reflective and judgmental faculties.

Jung C [2] made a clear distinction between soul and psyche writing that psyche was the totality of all psychic processes,

conscious as well as unconscious, while soul, on the other hand, can be clearly demarcated as a functional complex that can best be described as a personality. Thus, treating psyche as a dynamical system, psychoanalysis naturally employed the concept of psychic energy as the driving force of the psyche. At the same time, different directions of psychoanalysis have distinct concepts of psychic energy. We analyze these distinctions in this paper. Besides, here we explore the concepts of mental energy and psychic energy treating psychic energy as special case of mental energy. As still there is neither clear understanding nor well-defined characterization of these phenomena, we chose the general theory of information, the structuration of the world in the form of the Existential Triad of the world and the existing psychological and philosophical knowledge about the brain, psyche and mentality on the individual level as the scientific base for their study.

This paper has the three-fold aim. The first goal is explaining the structure of mentality and the place of mental energy in this structure. The second objective is elaboration of a consistent system of concepts related to mental energy. The third purpose is exploration of relations between mentality, the mind and psyche. According to these goals, the paper has the following structure. In Section 2, the global structure of the world is described. In Section 3, individual mentality is explored and stratified. In Section 4, such concepts as mental energy, mental force, psychic energy and psychic force are analyzed.

Global Structure of the World

To understand mental energy, it is necessary to find a place for it in a huge diversity of observed phenomena. To achieve this goal, we start our exploration with a description of the global structure of the world. This structure is represented (described) by

the Existential Triad of the world [3] which stems from the long-standing tradition in philosophy and is presented in Figure 1. In this Triad, the Physical (material) World WP is the physical reality explored by natural sciences, the Mental World WM comprises various levels of mentality, and the World of Structures WS is an organized diversity of pure and abstract structures. In this context, abstract means structures obtained by abstraction while pure means structures that do not come from two other worlds—the Physical World and Mental World.

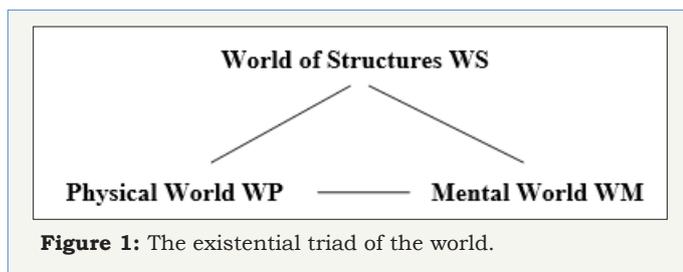


Figure 1: The existential triad of the world.

The Physical (material) World WP is the most familiar, accustomed and understandable of the three Worlds in the Existential Triad because people comprehend material things by their senses. From the very beginning of physics as a science, physicists have studied this world trying to reduce everything to physical reality (cf., for example, [4]). However, many people encountered in their life illusions and misapprehension of physical things. This situation brought many thinkers to the conclusion about illusory character of the Physical (material) World or at least, about its imperfection and incomprehensibility. Such views are expressed in Indian Vedas (cf., for example, [5]) and teaching of Buddhism, as well as in works of Western philosophers such as Plato, John Locke, George Berkeley and David Hume. Besides, practically all religions asserted that reality includes the physical (material) world but cannot be reduced to it containing other levels of being.

To remedy this situation, Plato (427-347 B.C.E.) introduced the notion of the World of Ideas/Forms. The genius of Plato was able to synthesize approaches of Parmenides (ca. 520-ca. 440 B.C.E.), Anaxagoras (ca. 500-ca. 428 B.C.E.) and Heraclitus (ca. 535-ca. 475 B.C.E.) to reality. As we know from the history of philosophy, Heraclitus said, all things forever flow and change. Contrary to this, Parmenides asserted that change was illusionary, and the world was unchangeable. In his teaching, Anaxagoras suggested that what was usually comprehended as individual objects are composites made up of shares or portions of some fundamental entities, which were eternal, unchanging and accessible only to the mind but not to the senses. Changes in, generation and destruction of sensible objects were shifting combinations of fundamental entities. To an ordinary mind, these approaches contradict one another. Overcoming boundaries of average mentality, Plato introduced two worlds—the intelligible world of Ideas, which was eternal and permanent, and the visible material world, which was permanently changing. In other words, it means that the visible world is Heraclitan while the intelligible world is Parmenidean [6].

Despite the great interest of philosophers, the World of Ideas/Forms was an enigma for the best thinkers of the humankind for millennia. When Plato and his followers were asked what idea or form was, they did not have a satisfactory answer. Only recently, it became possible to achieve scientific interpretation of the World of Ideas/Forms associating Plato ideas or forms with structures in the contemporary understanding of the term structure [6]. Namely, we can link ideas or forms to structures in the same way as atoms of modern physics may be related to atoms of Democritus and Leucippus. As a result, in contrast to Plato and his ideas, mathematics and science elaborated an exact definition of a structure proving existence of the world of structures and demonstrating by means of observations and experiments, that this world constitutes the structural level of the world as the whole. Informally, a structure is a collection of symbolic (abstract) objects and relations between these objects and themselves. Any system, phenomenon or process in nature, technology or society has some structure. These embedded structures exist like material things, such as tables, chairs, or buildings do, and form the structural level of the world. When it is necessary to learn or to create a system or to start a process, it is done, as a rule, by means of knowledge of the corresponding structure. Structures mold things in their being and comprehension. It is possible to find the most thorough analysis and the most advanced concept of a structure in [3]. Plato assumed that Ideas/Forms are eternal and unchangeable, that is, always the same [7]. However, while transformations of material systems are often evident, the development of science made eternal permanence extremely questionable and even hardly imaginable. Nonetheless, the World of Structures WS exists in different way than WP. Abstract structures have the properties postulated by Plato as the following law is true in WS.

Law of Structure Conservation

All structures in WS exist without changes. Indeed, when people observe or induce some change in a structure, it means that one structure is changed for another structure in people's mentality or in the Physical World WP but in the World of Structures WS both structures, i.e., the structure before the change and the structure after the change, continue to exist. For instance, when the geocentric structure was changed by the heliocentric structure, both structures continued to exist in WS, but people found that the heliocentric structure better models the Solar system. In the case when people create (destroy) a structure, it happens only in WP or/and WM but in the World of Structures WS, the created structure, or more exactly, its abstract counterpart, existed even before creation in WP or/and WM while the demolished structure, or more exactly, its abstract counterpart, continues to exist in WS.

Parallel to abstract structures, there are structures embodied in material things and mental objects. Declaring that structures exist embodied in material things, we must admit that material things exist only in a structured form, i.e., matter (physical entities) cannot and do not exist independently of structures. For instance,

atomic structure influences how the atoms are bonded together, which in turn helps one to categorize materials as metals, ceramics, and polymers and permits us to draw many general conclusions concerning the mechanical properties and physical behavior of these three classes of materials. May be the most evident example of the importance of embodied structures is the striking difference between diamond and graphite. Even chaos has its structure and not a unique one.

This relation was understood by Aristotle, who considered substance as potentiality and structure (form) as actuality. Aristotle taught that each thing (physical object) is a synholon, which is a composition of substance (hyle) and form or idea (eidōs) [1]. In the 20th century, this discernment reappeared in physics and mathematics. For instance, the outstanding physicist Werner Heisenberg who wrote:

“In the experiments about atomic events we have to do with things and facts, with phenomena that are just as real as any phenomena in daily life. But atoms and the elementary particles themselves are not as real; they form a world of potentialities or possibilities rather than one of things or facts. The probability wave ... mean tendency for something. It's a quantitative version of the old concept of potential from Aristotle's philosophy. It introduces something standing in the middle between the idea of an event and the actual event, a strange kind of physical reality just in the middle between possibility and reality.” [8].

The three worlds from the Existential Triad are complementary to one another shaping the totality of the world. Besides, they are not separate realities—they interact and intersect. Individual mentality is based on the brain, which is a material thing, while in the opinion of many physicist's mentality directly influences physical world (cf., for example, [8]). In addition, mentality influences the physical world through actions of people changing it.

At the same time, such component of the World of Structures as knowledge of the physical world essentially depends on interaction between mental and material worlds. In addition, there is a projection of the Mental World into the Physical World in the form of creations of human mentality (creativity), such as machines, mechanisms, buildings, books, magazines, newspapers, and computers. This projection determines the Extended Mental World, which consists of the Mental World and its projection.

Structural and material worlds are even more intertwined. As some physicists argue, physics studies not physical systems as they are but structures of these systems, or physical structures. This idea is the essence of the philosophical direction called structural realism. In some sciences, such as chemistry, and areas of practical activity, such as engineering, structures play the leading role. For instance, the spatial structure of atoms, chemical elements, and molecules determines many properties of these chemical systems. While physical reality surrounds people in everyday life and existence mental actuality was clear to people for a long time, the World of Structures being extremely far from the mundane life demanded exceptional mental efforts and intellectual courage to

discover it. Giving a brief view of the World of Structures WS and Physical World WP, we describe the Mental World WM in the next section.

Mental Hierarchy and the Concept of Psyche

The mental world WM is even more intricate and evading than the Physical World WP. The difference between WM and WP is convincingly reflected by the distinction between physical health and mental health of an individual. For instance, the Merriam-Webster dictionary defines mental health as “a state of emotional and psychological well-being in which an individual is able to use his or her cognitive and emotional capabilities, function in society, and meet the ordinary demands of everyday life.”

As a rule, people comprehend the Mental World only as individual mentality although some researchers wrote about group mentality or discussed components and traits of group mentality such as the group mind, collective unconscious or collective intelligence (cf., for example, [9-12]). As a result, scientists studied only three lower levels of the Mental World:

A. The first level consists of mentalities (inner worlds) of separate individuals and is the subject of psychological studies. Note that animals and advanced artificial systems can have individual mentality.

B. The second level deals with group mentality of various groups of people and is the subject of social psychology, which bridges sociology and conventional psychology.

C. The third level encompasses mental issues of society in the form of social mentality, which includes social memory, social intelligence and social conscience. Social psychology also studies some features of this level.

Nevertheless, these three levels do not cover the whole Mental World. In fact, the mental world from the existential Triad comprises higher (than the third) levels of mentality but they are still not studied by science. It is possible to relate higher levels of the Mental World to the spiritual mystical worlds described in many religious and esoteric teachings. Some thinkers, following Descartes, assume that individual mentality is practically independent of the physical world. In contrast to this, others think that individual mentality is utterly generated by physical systems of the organism, such as the nervous system and brain as its part. However, in any case, the mental world is different from the physical world and constitutes an important part of people's reality. It is possible to equate individual mentality with the inner space of an individual introduced and studied by Lewin [13]. The inner space is a part of the life space an individual, consists of the individual and all systems interacting with this individual. Psychological experiments and theoretical considerations show that the individual mentality is stratified into three spheres: cognitive or intellectual sphere, affective or emotional sphere and effective or regulative sphere. This stratification is based on the extended theory of triune brain and the concept of the triadic mental information [14]. However,

this model depicts not only individual mentality but also group mentality as well as higher levels of mentality.

Note that it is possible to interpret cognitive/intellectual sphere to the structural reality, affective/emotional sphere to the mental reality and effective/regulative sphere to the physical reality. This stratification of the mental world explicates the fractal nature of the Existential Triad. We remind that a fractal is a complex system displaying self-similarity across different scales (cf., for example, [15,16]). In other words, fractality means that the structure of the whole is repeated/reflected in the structure of its parts on many levels (cf., for example, [17,18]).

The Mental World WM has elements and components, which are like elements and components of the Physical World WP. In a natural way, the Mental World has its mental space, mental objects (structures) and mental representations/reflections [3]. Besides, the Mental World has important components such as the mind and psyche, which are usually discussed and studied only at the first level, i.e., in individual mentality. To make our exposition simpler, we also discuss the structure of mentality only for the first level, i.e., only treating individual mentality. Often the terms mentality, psyche and mind are used interchangeably. However, utilization of these concepts shows that it would be more efficient to ascribe different meaning to them. To do this consistently, we assume that mind and psyche are proper components of individual mentality and give informal definitions for them. To define mentality, we at first, consider the totality of mental objects, which includes thoughts, percepts, mental images, dreams, hallucinations, illusions, fantasy, concepts, memories, hopes, goals, attitudes, feelings, emotions, instincts, needs, urges, wishes, desires, willpower, intentions, opinions, values, motives, interests, passions, concerns, as well as mental representations of knowledge, data, instructions, rules, procedures and algorithms. Note that knowledge and data, instructions, rules, procedures and algorithms are structures and thus, belong to the world of structures WS [9]. However, all these structures can be better or worse represented in mentality. Now it is possible to give a definition of mentality.

Definition 3.1

Mentality is the system that comprises, generates and transforms mental objects, relations between them and processes involving these objects. Being an intricate system, mentality has a sophisticated organization comprised of various parts and components. An important part of mentality is consciousness. Consciousness has been studied for a long time by various philosophers and psychologists. However, still there is neither clear understanding nor well-defined characterization of this phenomenon. Here we suggest a definition of consciousness based on those data that were accumulated by researchers during centuries of exploration of mentality and psyche.

Definition 3.2

Consciousness C is a part of (individual) mentality that has a subsystem U that reflects and monitors C. It is necessary to understand that this definition depicts only the principal structure of consciousness but does not explain its mechanism. There are

different approaches to this problem. For instance, Görnitz [19] uses quantum theory to develop a theory of consciousness. There are first-order and higher-order theories of consciousness. The latter theories claim that consciousness is formed of perceptions or thoughts about first-order mental states [20]. In contrast to this, first-order models of consciousness put forward that merely a part of mentality of certain sorts constitutes consciousness. Apart from the consciousness of individual mentality, it is possible to consider the consciousness of the psyche and the consciousness of the mind.

Definition 3.3

Consciousness CP (CM) of the psyche (of the mind) is a part of the psyche (the mind) that has a subsystem UP (correspondingly, UM) that reflects and monitors CP (correspondingly, CM). An interesting question is whether all these systems coincide, two of them coincide or all are different. As mentality includes the psyche and the mind as its components, it is natural to ask if the consciousness of individual mentality is the union of the consciousness of the psyche and the consciousness of the mind. In their studies, psychologists in general and psychoanalysts persuasively demonstrated that not the whole psyche and thus, not the whole mentality is conscious coming to unconscious and preconscious.

Definition 3.4

The unconscious mentality (also called Unconsciousness) UC consists of those parts of mentality that do not belong to C. However, consciousness and unconsciousness interact, which brings forth one more layer of mentality.

Definition 3.5

The preconscious PC is the layer where the unconscious mentality interacts with consciousness. Note that the three components of mentality - consciousness, the preconscious and unconscious-form a named set or fundamental triad [21]. This allows using named set theory for further structuration and investigation of mentality and psyche. Some psychological theories assume that the unconscious is divided into two parts: subconscious and super-conscious, where subconscious consists of lower urges, wishes, desires, negative feelings and emotions, instincts, inferior needs and procedures in (individual) mentality, while comprises unconscious moral values, higher principles and normative rules being related to higher awareness. Mentality also has memory, i.e., the part where different mental objects are stored and preserved. Memory can preserve, retain, and subsequently recall mental objects such as knowledge or experience. However, speaking about memory Mm of an individual, we conclude that like the Existential Triad, it has three components: physical component in the brain, mental component storing mental objects and structural component keeping data and knowledge. In turn, each of these components is stratified into three layers: long-term memory, short-term memory and operational, e.g., sensory, memory [22]. Each layer is characterized by its function (the role it plays in the overall workings of the mind), its capacity (the amount of information it can hold at any given instant), and its duration (the length of time it can hold any item of information). Operation memory performs information storage for separate steps/operations. Consequently, it

stores information for the least time. Short-term memory performs information storage for separate subprocesses. Consequently, it stores information for longer time. Long-term memory performs information storage for the whole process. Consequently, it stores information for the longest time. Mental memory preserves any mental objects, for example, mental images of what people see, e.g., other people, animals, building, landscapes and so on; what people hear, e.g., stories, anecdotes, jokes, names and so on; and images created in mentality. An important component of mentality is the mind. There is a lengthy discussion in philosophy, religion, psychology, and cognitive science about what constitutes the mind and what are its characteristic traits. As we know, the concept of the mind stems from Aristotle, who described mind (nous) as “the part of the soul by which it knows and understands” [1]. At the same time, Aristotle understood that the human mind could do more, for example, to plan and deliberate, to ponder alternatives and strategize. Consequently, Aristotle distinguishes the practical mind (or practical intellect) from theoretical mind (or theoretical intellect).

Contemporary understanding defines the mind as the system in an individual that feels, perceives, thinks, wills, and especially reasons, while another definition perceives the mind as a set of cognitive facilities, which include thinking, consciousness, perception, judgment, verbal abilities and memory. Nevertheless, some psychologists argue that only the “higher” intellectual functions, such as reason and memory, constitute mind. Treating the mind as a component of (individual) mentality, we delineate it as a system Md that includes mechanisms for perception, thinking, feeling, argumentation, desiring, consciousness, reasoning, imagination, recognition, appreciation, judgment, memorizing and control of verbal and physical behavior. The mind was explored by such foremost philosophers as Plato, Aristotle, Patanjali, Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, Kant, Hegel, Schopenhauer and Heidegger. In philosophy, there is the famous (or some say, notorious) mind-body problem, which is one of the central issues in the history of philosophy. It asks about the relation of the mind to the physical brain and nervous system. In a simplified form, the problem is whether the mind is roughly identical with the brain or at least, reducible to physical phenomena such as neuronal activity.

The three basic approaches to this problem are idealism, dualism and reductionism (or materialism). The first approach purports that the mind is completely non-physical being independent from the brain. The second methodology claims that the mind is only partially independent from the brain. The third attitude maintains that the mind is completely reducible to physical phenomena such as neuronal activity. Dualism has roots in the philosophy of Plato and Aristotle as well as in the Nyaya, Samkhya and Yoga schools of Hindu philosophy. Descartes [23] produced the most explicit formulation of dualism connecting existence with thinking. Now there are two kinds of dualism in the philosophy of mind: the substance dualism pertains that the mind is an independently existing substance, while the property dualism maintains that the mind is a system of specific properties of a person that emerge from but cannot be reduced to the brain.

For instance, Aristotle explained relations between body and mind (psyche or soul, which were not discerned by Aristotle) using his concept of hylomorphism. The term hylomorphism is composed of the Greek words *hylo*, which means substance, and *morphē*, which means form. That is why hylomorphism is a philosophical notion, which describes correspondence between physical substance and form. Thus, according to Aristotle, there is a hylomorphism between body and mind or in other words, mind (psyche or soul) is the form and body (the brain) is the substance of an individual. Aristotle justifiably regards the body as the matter of a human being in the way that the bronze is held to be the matter of a statue. Only mentality makes this body a personality shaping its behavior and attitudes. According to the triadic structuration of reality in the form of the Existential Triad, the mind is a substantial system in the Mental World WM but not in the Physical World WP. There is persuasive psychological evidence that the brain has essential impact on the mind but not everything in the mind is determined by the brain.

Like the whole mentality, the mind is divided into three parts: conscious mind, preconscious mind and unconscious mind (cf., for example, [24]). This is also a named set or fundamental triad in individual mentality [21]. An important part of mentality is the psyche.

Definition 3.6

The psyche is the component of the individual mentality that monitors and controls functioning of the organism (body). According to this definition, the psyche is only a part of the individual mentality because there is mental object that play no role in monitoring and control of organism functioning. For instance, many images and descriptions of different things, e.g., an image of some building, can be preserved in the memory of an individual without any impact on her functioning. It means that only a part of mental memory belongs to the psyche. Like the whole mentality, the psyche is divided into three parts: conscious psyche, preconscious psyche and unconscious psyche (cf., for example, [24]). This is also a named set or fundamental triad in individual mentality [21]. The psyche and the mind do not coincide. For instance, contrary to the mind, the psyche includes the part of mentality PNS based on (e.g., generated by) the peripheral nervous system. At the same time, not all elements of the mind are involved in controlling the organism. At the same time, the psyche and the mind have common sections. For instance, correctly directed thoughts can influence organism functioning, for example, curing some diseases or directing person's activity.

Mental Energy as a Component of the Energy-Information Triad

To build a scientific foundation for studies of mental energy, we use the general theory of information. According to the second ontological principle of the general theory of information, energy/information reflects the Existential Triad. Indeed, the essence of information is described by the following principle, which has several forms. Ontological Principle O2 (the General

Transformation Principle). In a broad sense, information for a system R is a capacity to cause changes in the system R. Thus, we may understand information in a broad sense as a capacity (ability or potency) of things, both material and abstract, to change other things. Information exists in the form of portions of information. The Ontological Principle O2 is fundamental as it intimately links information with time. Changes to R, when they occur by reception of information, are defined here to be the result of a causal process. Causality necessarily implies that the related effect happens after its cause. The Ontological Principle O2 leaves open the question whether the potential causal changes may or must be irreversible.

Note that it is possible to consider prevention of changes in a system R as a change in the conditional configuration space of the system R. Thus, information in a broad sense also reflect capacity to prevent changes. The Ontological Principle O2 unifies dynamic aspects of reality because information in a broad sense projected onto three primal components of reality – physical reality, mental reality and structural reality - amalgamates the conceptions of information, physical energy and mental energy with its special form, psychic energy, in one comprehensive concept. This gives us the Energy-Information Triad presented in Figure 2.

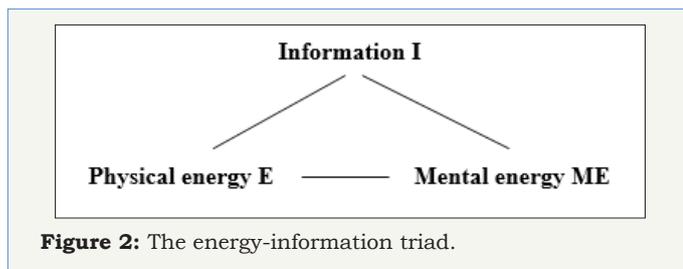


Figure 2: The energy-information triad.

It is possible to use the term energy for mental energy to differentiate it from physical energy. Being extremely wide-ranging, the second ontological principle offers an exact scientific meaning and explanation to the conjecture of von Weizsäcker [25] that energy might in the end turn out to be information, as well as to the aphorism of Wheeler [26] It from Bit, which metaphorically means that material things come into being from information and to the statement of Smolin [27] that the three-dimensional energetic world is the flow of information. In a similar way, the second ontological principle provides an exact scientific meaning for concept of mental energy. Namely we have the following definition.

Definition 4.1

Mental energy is a capacity to cause changes in mentality. Note that according to this definition, physical objects can have mental energy. For instance, the brain can cause changes in the mind and thus, has mental energy. As we mentioned before, it is possible to consider prevention of changes in a system as a change in the conditional configuration space of this system. Thus, mental energy also reflect capacity to prevent changes, i.e., mental energy is a capacity to cause or prevent changes in mentality.

Let us compare our definition with the definition of physical energy. In general, physicists treat energy as work capability or

the ability to do work (cf., for example, [28]). In this context, work is viewed as physical activity involving physical effort done to produce some organized changes in physical systems. In a similar way, it is possible to consider mental work as organized changes in mental systems. It shows that. Definition 4.1: of mental energy is broader than a possible definition based on the concept of mental work. However, to reflect all features of mental energy, we consider the concept of extended mental energy.

Definition 4.2

Extended mental energy is a capacity of mentality to cause or prevent changes in mentality and in the Physical World WP. At the same time, to consider only energy confined to mentality, we introduce the concept of pure mental energy.

Definition 4.3

Pure mental energy is a capacity of mentality to cause or prevent changes in it. Researchers studied connections of mental energy to physiological energy using changes in systolic blood pressure. However, they found that systolic blood pressure was not strongly influenced by thoughts but the growth of mental energy for achieving a goal also created physiological energy. That energy was reflected both in a change in blood pressure and an increased ability to perform a physical task. It is possible to explain these findings in the following way. Mental energy ether is psychic energy or induces creation of psychic energy in the psyche. Psyche controls functioning of the organism (body) influencing production of physiological energy as well. Although (mental) energy is a capacity to cause changes, it does not directly cause or prevent changes. To do this, mental energy must be transformed (converted) to mental force.

Definition 4.4

Mental force is the essence that changes mentality or prevents changes in mentality. In other words, mental force performs action. This action can cause changes in mentality or prevent such changes. Mental forces form a psychological field of influence in mentality and its environment reflecting the objective situation in which the person perceives and acts. Lewin [13] created force field analysis, which provides a framework for analyzing psychological forces acting on a person. In his theory, all forces are divided into two groups: forces that are driving movement toward a goal (helping or positive forces) and forces that are blocking movement toward a goal (hindering or negative forces). Force field analysis is a part of topological or vector psychology, which examines patterns of interaction between an individual and environment. The domain of a psychological field of influence on an individual is the life space of this individual. Analyzing behavior of a person, Lewin [13] described by the formula $B=f(p,e)$ reflecting that behavior B of an individual is a function of the personality p and the environment e of this individual.

With respect to an individual mentality R, it is possible to distinguish internal, outgoing and ingoing mental forces.

Internal mental forces are generated (exist) in R and act on R.

Ingoing mental forces are generated (exist) outside R but act on R.

Outgoing mental forces are generated (exist) in R but act on other systems.

Besides, there are mental forces, which exist in other individual mentalities, unrelated to R. It is also possible to assume that physical objects produce mental forces acting on mentality. There are two approaches in treating environment as a source of mental forces. One possibility is that environment can produce ingoing mental forces directly acting on individual mentality. Another possibility is that individual mentality can get information from its environment generating internal mental forces.

While physicists only hypothesize about negative energy, negative psychic energy is a valid psychological concept. Namely we have the following definitions.

Definition 4.5

a) Positive mental energy is a capacity to cause positive changes in mentality.

b) Negative mental energy is a capacity to cause negative changes in mentality.

Note that because evaluation of changes as positive or negative is often subjunctive and contextual, distinction between positive and negative energy is also subjunctive and contextual. Distinction between positive and negative changes also results in existence of positive and negative mental forces.

Definition 4.6

a) A positive mental force changes mentality in a positive way, for example, by creating driving movement toward a goal, or prevents negative changes in mentality, for example, prevents distraction from achieving some meaningful goal.

b) A negative mental force changes mentality in a negative way, for example, blocking movement toward a goal, or prevents positive changes in mentality, for example, prevents concentration on achieving some meaningful goal.

In the so-called, energy medicine, treatments are described as elimination of negative mental energies and forces while increasing positive mental energies and forces in the mind. It is necessary to distinguish mental energy and psychic energy, which has been extensively studied in psychology (cf., for example, [13,29]).

Definition 4.7

Psychic energy is the part of extended mental energy related to monitoring and control of the organism. It is possible to use the term PS energy for psychic energy to differentiate it from mental and physical energy. The psychoanalytic approach assumes that psyche is a source of psychic energy while psychic energy is necessary for functioning of the mind being used in different

kinds of mental work such as planning, thinking, feeling, and remembering (cf., for example, [30]). It is presumed that psychic energy comes from two main drives of people: Eros (or libido, the life and sexual instincts) and Thanatos (death instinct). It is important how mentality uses psychic energy. For instance, it can be used to repress memories or deal with anxieties distracting it from being used fruitfully. However, resolution of neuroses allows more creative and productive utilization of the psychic energy.

Psychologists found that a good way to activate psychic energy is to use mental contrast between the desired future, which a person wants to achieve, and the current situation with respect to this goal. Building on the research of Freud [24], Jung [2] studied psychic energy if individual mentality is divided into a number of interactive relatively closed systems, which take energy from sensor inputs energizing the person [31,32]. This process is governed by two principles:

Principle of equivalence: If the amount of psychic energy consigned to a given psychic element decreases or disappears, that amount of energy will appear in another psychic element.

Principle of entropy: The distribution of psychic energy in the psyche seeks equilibrium or balance among all the structures of the psyche. However, psychoanalysis does not make clear distinction between energy and force. As in the case of mental energy, psychic energy must be transformed (converted) to psychic force to perform an action.

Definition 4.8

Psychic force is the essence that changes mentality or prevents changes in the psyche and organism. Like mental forces, psychic form a psychological field of influence in the psyche and its environment. As we mentioned before, psychic force fields as psychological fields of influence are studied in the topological or vector psychology of Lewin [13]. It is necessary to remark that Lewin [13] assumed that environment is represented by a totality of force fields acting on an individual considering not only mental (psychic) fields but also physical fields such as electromagnetic field and gravity. Note that it is also possible to consider energy fields in mentality and psyche. However, there is an essential difference between force fields and energy fields. Energy fields are potential and scalar fields because energy represents potency to perform changes. In contrast to this, force fields are actual and vector fields, i.e., their elements are directed and perform changes [33].

There are many unresolved problems related to psychic energy and forces. For instance, whether there exists psychokinesis (from Greek ψυχή "mind" and κίνηση "movement"), or telekinesis (from τηλε- "far off" and κίνηση "movement"), which is the contended ability allowing the psyche to influence a physical system without physical interaction.

Conclusion

A. In this paper, we have developed a consistent system of concepts related to mental energy achieving better understanding

of such phenomena as mentality, the mind, the psyche, mental energy, psychic energy, mental force and psychic force. This conceptual system is oriented at building exact and efficient models of these phenomena. A reasonable approach would be to represent mentality by a mathematical mental space, in which mental processes are going. In this context, it is possible to describe mental and psychic energy, forces and actions as operators acting in the mental space.

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