

2.4. CREATIVE ACTIVITY AS A MEANS OF COUNTERACTING THE CRISIS AND EXTREME FACTORS OF HUMAN EXISTENCE

Alexander Voznyuk

Abstract. *The purpose of the interdisciplinary research is to analyze the creative activity as a means of counteracting the crisis and extreme factors of human existence. This analysis is based on an interdisciplinary study of the systemic foundations of creativity. Six aspects of creativity studies have been outlined, covering: 1) The emergent nature of creativity in the context of explosive/bifurcation generation of the creativity process and its connection with chaos, uncertainty. 2) The process of creativity as "creativity for creativity's sake", revealing its non-pragmatic/non-targeted nature. 3) Motivation of the creative process. 4) The spatial creativity that presupposes the ability of a person to combine different and opposing things, thus expressing the self-referent, non-adaptive nature of creativity. 5) The material, "bodily" creativity, associated with the human organism, shows the connection of creativity with human health, thus counteracting the crisis and extreme factors of human existence. 6) The chronal nature of creativity, revealing its linear-evolutionary, developmental nature.*

Keywords: *human brain; synergetic approach; non-adaptive activity; diplasty; bisociation; talent; giftedness; infantilization; team spirit; extreme factors.*

Introduction

In modern civilization, with its crisis of the personality, the rise of technocratic thinking, and the necessity to counteract the negative social phenomena (one of which is the crisis and extreme factors of human existence), the criteria for creativity have undergone changes. The qualities of creative individuals that enable them to realize their potential, cultivate creative activity,

and ultimately enhance the social environment and interpersonal relationships are now valued.

Developed spirituality is evidently one of the key social demands for creative individuals capable of addressing the current social issues. Creative individuals, being the guardians of beauty and harmony in culture and nature, are characterized by an open personality stance, which includes a positive attitude toward themselves and the world, a suprapersonal/ nonpragmatic system of values, selfless interest in the world and others, and non-pragmatic motivation for activity (Corbett, 2018). This open personality attitude towards natural and social environment, connected with such qualities as activity, freedom, self-transcendence, and spirituality, may serve as a factor of creative activity and creative thinking being prerequisites for the realization of cognitive and other abilities through a superpersonal/non-adaptive orientation of interests and a profound curiosity about the phenomena of the world (Eysenck, 2003; Ryan & Deci, 2000).

Creativity is a vast concept in modern science, being one of the most prioritized areas of scientific research. Thousands upon thousands of scientific papers devoted to this research have been published for the last 100 years, revealing 12 major topics, covering such aspects as the psychology of creativity, organizational creativity, creative industries, business and management, etc., being studied in the contexts of digitalization, interdisciplinarity, multiculturalism, etc. 36 trends in creative study reveal a great variety of topics, from the discussions of cultural psychology, distributed creativity, religious meditation, creative happiness to the role that virtual reality plays in producing the creative outputs (Mejia et al, 2021; Runco & Jaeger, 2012; Glăveanu, 2014).

Current state of the issue

Analysis of the current socio-cultural situation has shown that creativity and cognate categories (giftedness, talent, genius, lateral thinking, etc.) are becoming key concepts in modern psychological and pedagogical sciences, aimed at revealing the fundamental foundations of effective educational activity. This, in

turn, leads to a deeper understanding of the problems related to the intellectual and creative development of young people, which is reflected in research focusing on the psychophysiological and psychophysical, cognitive and psychological, as well as philosophical and metaphysical foundations of creativity and its mechanisms.

The in-depth research into phenomenon of creativity enables it to be considered not only as the driver of human progress and the life of future human race/generations (Csikszentmihalyi, 1996), the essence and meaning of human life/existence, the fundamental aim of human development, the corner goal of educational activity, but also as the major tool/means of these activity and development. Creativity can be understood as an absolute entity – self-determined and self-referent “thing in itself”, existing for itself, thus embodying the esthetic ideal “art for art’s sake”. Creativity can also be examined as a generating source (factor, force) of the world, as H. Bergson showed in his teaching on “creative evolution” (Bergson, 2005; Montebello & Lapidus, 2007; Gabora & Kaufman, 2010; Gruber, 1988).

Creativity, being, to some extent, a paradoxical entity (Lambert, 2020), can be defined as a person’s capacity to produce work that is original and useful (Runco & Jaeger, 2012), revealing the basic characteristic/function of creativity as a *complex adaptive system* (Lambert, 2020). Creativity have been and are being studied in the plane of the cognitive mechanisms that facilitate creative thinking (Acar & Runco, 2015; Beaty et al., 2014; Haase et al., 2023; Heilman et al., 2003; Lloyd-Cox et al., 2023; Sweller, 2009), in the virtual sphere of creative incubation (Patrick, 1986; Soma & Joydeep, 2025) and daydreaming (Zedelius et al, 2021), within the ranges of associative effects (Bendetowicz et al, 2018) and bisociation (Koestler, 1964), as psychiatric deviations/accentuations (Csikszentmihalyi, 1996), the behavioral instrument of life success (Lambert, 2020; Simonton, 1984), leadership and managerial decision making (Simonton, 1984; Ford, Gioia, 2000), social processes (Perry-Smith & Shalley, 2003), and group creativity (Paulus et al, 1999; Jason & Hedrick, 2016), the healing factor of human organism (Sawyer, 2012; Zausner, 1998), revealing the mechanism of

person's psychological and somatic health and being the colossal resource for counteracting the crisis and extreme factors of human existence (Barron, 1963; Sanaz, Voznyuk et al, 2022), taking into consideration the hemisphere functions peculiarities of creativity (Rotenberg, 1993), et cetera.

Creativity, organizing the balance (through "middle way" strategy of thinking and behavior (Schooler et al, 2014)) within polar concepts and psychological states is realized "not by operating at a mid-point along a continuum, but by operating at and blending two more-extreme positions" (Lambert, 2020), thus revealing the transcendental character of creative process (Citko, 2019; Frankl, 1966; Garberich, 2008; Hartelius et al, 2007; Kharkhurin, 2015; Lajoie, Shapiro, 1992; Pronyakin, 2001; Sánchez-Capdequi & Beriain, 2023; Summa, 2017).

In the scientific explorations, increasing attention is being paid to problems of creativity and giftedness in their connection with the paradigm shift in modern education (Lo & Porath, 2017; Renzulli, 2000; Winner, 2000; Ziegler et al, 2012; Tae et al, 2018; Voznyuk et al, 2021).

The most interesting and innovative, as well as important and revolutionary, are the researches using the interdisciplinary cybernetic and synergetic approach (Penrose, 2016; Rotenberg, Arshavsky, 1991), expositing such aspects of creativity and the prospects of its study as "the order-chaos dynamic of creativity" (Lambert, 2020), "the self-organized criticality", "creativity and chaos theory" (Zausner, 1998), "chaos, creativity, and Guilford's structure of intellect model" (Richards, 2001), "the emergence of creativity" (Sawyer, 1999), "chaos, creativity, and community" (Richards, 1996).

Due to urgent need to fathom the fundamental basis of the Universe (Moreland, 2001; Voznyuk, 2025), and to understand the nature of creativity, being in some important aspects rather an enigma for scientific community, the systemic approach to studying human brain (Anokhin, 1963) and creativity is gaining momentum (Csíkszentmihályi, 1996; Guastello, 2011; Lichtenstein, 2000; Montuori, 2011; Poutanen, 2013; Puccio, Cabra, 2010; Saunders, 2011; Suwala, 2017).

We believe that due to our systematic research in the wide range of scientific areas (Voznyuk et al, 2021; Voznyuk, 2025), the study of creativity would reach new scientific pinnacles, including the understanding of the creative activity as a means of counteracting the crisis and extreme factors of human existence (Miroshnychenko & Voznyuk, 2025).

The **purpose** of our research is to analyze the creative activity as a fundamental counteraction to the crisis and extreme factors of human existence through an interdisciplinary study of the systemic foundations of creativity.

Materials and methods

Our interdisciplinary study in addition to the theoretical analysis of the problem field of creativity studies, the concept of functional asymmetry of the hemispheres of human brain (Voznyuk, 2017; Voznyuk, et al, 2021; Wang, 2023), the theory of stress (Selye, 1974), the information theory of stress (Simonov, 1991), the theory of cognitive dissonance (Festinger, 1962), cognitive schemes (Shickel, 2020), the theory of creativity as non-adaptive activity, that establishes a correlation between a person's internal motivation and their creative activity (Ryan, Deci, 2000), A. Maslow's provisions for the self-actualized personality (Maslow, 1976), the theory of psychological defense (Cramer, 2015), as well as the general systems theory, developed by Yuri Urmantsev (Urmantsev, 1986) and modified and developed by the author of the article, have been used (Voznyuk, 2023, 2025). The research is also based on the theory of frames (Goffman, 1974, 1986; Minsky, 1975; Moskiene, Rackeviciene, 2021; Schank, Abelson, 2013), on the ideas about holographic/fractal organization of the world (Bohm, 2008; Coleman, Pietronerom, 1992; Keel, 2024; Youvan, 2024), as well as on the synergetic approach being an interdisciplinary scientific tool aimed at cognizing the world in its wholeness and unity, with the help of which the researchers seek to build "conceptual bridges" between many scientific areas (Haken, 1995; Grindal, 2009; Massa, Mahony 2021).

Results and discussion

1. Neuropsychological prerequisites of creativity

One of the most important generalizations in the subject sphere of our research, as we believe, is revealed in the concept of the functional asymmetry of the human brain, which shows that the functions of the hemispheres are related to the basic processes of the human being (Voznyuk, 2025; Voznyuk et al, 2021; Wang, 2023). Moreover, the hemispheric asymmetry expresses the general asymmetry of space and time in our Universe (refer to "Gibson's law of right-side stimulation" – (Sedgwick, 2021; Voznyuk, Hogobets, 2023)).

In general, the hemispheres employ the left–rational and right–irrational strategies of cognition and world mastery, which must be integrated for an accurate reflection of reality and a true picture of the world. V. L. Deglin, studying the hemispheric features of the reflection of the surrounding world, and in particular its spatial characteristics, came to the conclusion that both hemispheres refract space in an erroneous way, but these errors have a directly opposite nature, when the left hemisphere is characterized by the expansion of space, and the right – by the approach of separate elements to the observer. That is, the left hemisphere strives to distance a person from the environment, while the right hemisphere strives to integrate a person into it. However, the functional coherence of the hemispheres, the compromise between them leads to the alignment of spatial deformation, that is, the adequacy of the perception of volumetric space on the plane of the retina is achieved, when the volumetric and the planar, being geometric antagonists (which is demonstrated by the dichotomy of the geometries of Euclid and N.I. Lobachevsky), are harmonized and brought to a common sensory and cognitive "denominator" (Chernigovskaya, Deglin, 1986).

The human development proceeds from the right-hemisphere aspect of the psyche (in an infant, both hemispheres show the lowest index of asymmetry and function as a single whole, mainly according to the principle of the right hemisphere) to the left-hemisphere, and from it to the state of functional synthesis of the hemispheres (Voznyuk et al, 2021; Wang, 2023).

Thus, we have the philosophic scheme/algorithm of development revealing the triadic and dialectic character: (1) theses → (2) antitheses → (3) synthesis. According to this algorithm, we can understand the development of forms of activity in ontogeny and phylogenesis:

- (1) *Play* (right hemispheric spontaneous activity that is not aimed at achieving pragmatic goals and exists for its own sake, similar to "art for art's sake"). In most ancient (primitive) communities, there was no sharp boundary between work and leisure.
- (2) *Work* (left hemispheric purposeful activity aimed at achieving certain pragmatic goals). Only during the Industrial Revolution did we observe the differentiation of work and leisure, when the latter began to be associated with non-working time.
- (3) *Creativity* (the inter-hemispheric activity that reiterates the play, but at a higher level of development, since it has the characteristics of both play (spontaneous, self-determined activity), and work (the activity that manifests a certain practical result). In creativity, work and leisure are combined and intertwined.

Under such conditions, the onto- and phylogenetic dynamics of the hemispheres realizes the movement from the subconscious (right hemispheric) to the conscious (left hemispheric) aspect of psychic activity, and from the latter – to their functional synthesis revealing the superconscious entity (Simonov, 1991) as a creative status of a person (as evidenced by encephalographic studies, the hemispheres are functionally synchronized in a meditative and creativity state (Murphy et al., 1997)), which characterizes the state of unity of opposites, which at the level of mental reflection of reality is realized in the fundamental phenomenon – *the diplasty* – not characteristic of animals the fundamental ability of a human being to combine opposite attitudes, concepts, psychophysiological states in one integral/paradoxical context (Valček, 2009; Shteba, 2020; Yesayan, Naghdyan, 2023), revealing the epistemological/social phenomena of absurdity, paradox, chaos, ambiguity. And the diplasty, as a psychological state, represents the mental/cognitive strategy to decrease the

level of entropy in nervous processes (Rotenberg & Arshavsky, 1991).

The diplasty, considered to be the main/fundamental factor of evolution of the *Homo sapiens* (Porshnev, 1976), is a phenomenon of integration of two elements that exclude each other (for example, in linguistics this is the oxymoron – a figure of speech combining contradictory, mutually excluding complex concepts/words with opposing meanings, like “living dead”, “old news”, “genius stupidity”, “deafening silence,” “strong weakness”, “organized chaos”), which activates *bisociation* (the simultaneous mental association of an idea or object with two fields ordinarily not regarded as related (Koestler, 1964)) – a synergistic mechanism of human creative activity, since contrary to associative connection of concepts, which appear under the influence of deeply rooted schemes of experience (that is, based on the reiteration of concepts arising in time and space and being associated with similarity, contiguity or contrast), the bisociations appear as a result of combining ideas that do not have an obvious commonality and connection between them, being objectively new and sometimes seem unnatural, chaotic, paradoxical, contradictory and hence – creative (Dubitzky et al, 2012; Zeng, 2013).

The hemispheric synthesis involves the full unfolding/realization of the resources of the “right”, creative aspect of the psyche (the essence of which lies in the ability to think holistically, polysemantically, combining and integrating facts and realities belonging to different and even polar spheres of our world), and therefore the educationalists should not rush to replace the activity of the right hemisphere with the left one. Thus, the mind of a person in whom direct perception of the surrounding world and visual-figurative thinking were not properly formed in childhood may later receive one-sided development, acquiring an excessively abstracted mode. Some researchers believe that such purely one-sided left-hemispheric thinking leads to the formation of a schizoid type of person, characterized by an unambiguous “black and white” worldview (Raine, 1988).

The conclusion that creativity is realized in the plane of paradoxical synthesis of the functions of the right and left hemispheres is confirmed by studies of creative individuals who

are characterized by mutually exclusive features: 1) Creative individuals have, on the one hand, enormous physical energy, and on the other hand, they are often in a state of calm and rest; 2) They are both strict and naive; 3) Within the framework of their personality, playfulness, frivolity and strict discipline, responsibility or irresponsibility are combined; 4) Their fantasy and sense of reality are integrated; 5) They manifest themselves as both extroverts and introverts; 6) They are modest and at the same time proud; 7) They avoid stereotypes in the field of gender roles; 8) They show both a rebellious spirit and conservatism; 9) while seeking physical peace, they simultaneously demonstrate a true passion for work, and they also objectively evaluate their work; 10) The openness and sensitivity of creative people often leads them to empathize with suffering and pain of others; on the one hand, they seek comfort, and on the other, they are able to sacrifice it for the sake of an idea (Csíkszentmihályi, 1996).

Three more personality characteristics are associated with originality of thinking: dominance, sensitivity to emotions, manifestation of femininity in men, and the connection between creative abilities and such personality traits as narcissism. In this, creative individuals often identify with others and easily adopt new social roles. Other qualities of creative people are as follows: self-discipline in work; ability to postpone material pleasures; resistance to frustration; independence of judgments, high level of autonomy; tolerance, openness to uncertainty, paradox, absurdity, propensity to risk, high level of self-initiation, and desire to perform tasks as best as possible. They also demonstrate the ability for broad categorization and idiosyncrasy (increased sensitivity to some non-specific stimuli/signals), to establish non-obvious patterns. It is noted that creative people have the highest "I" strength, which is positively correlated with average neuroticism (Barron, 1963; Eysenck, 2003; Rogers, 1961).

2. The systemic composition of creativity

As has been noted, our research on creativity is based on modified general systems theory (Voznyuk, 2025). Let us present a synopsis of the modified General Systems Theory.

Due to the integral character of the Universe, the existence of the latter is regulated by some fundamental/universal laws/principles, which in the context of Yuri Urmantsev's general systems theory are revealed in the "law of system rearrangements", being a systemic universal/frame that presupposes seven possible fundamental types of systems, when any systemic entity can be transformed/rebuilt in seven ways: by changing relationship, quantity and quality, being designated as: A (relationship), B (quantity), C (quality). Due to them, we have seven basic combinations: A, B, C, AB, AC, BC, and ABC, representing the basic types of systems (Figure 1) (Urmantsev, 1986; Voznyuk, 2025).

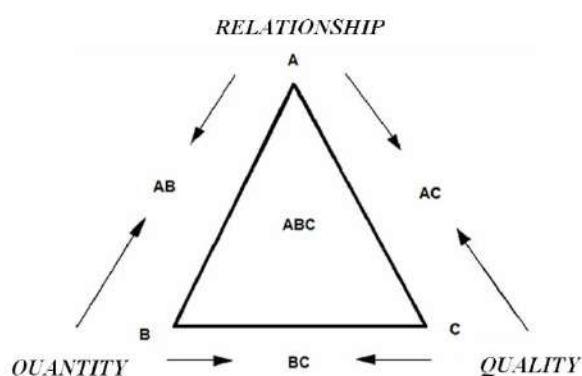


Figure 1. The representation of reality according to the general systems theory

Let us present some more triangles. The triangles of L. R. Hubbard (1976): the top triangle represents the KRC triangle – knowledge, responsibility, and control. The lower triangle consists of the ARC triangle – affinity, reality, and communication (these elements are united in understanding). Also interesting is Sternberg's triangular theory of love (Sternberg, 1986). According to R. Sternberg, perfect love involves a form of love that can be represented as a triangle that consists of three basic dimensions: passion, intimacy, and commitment.

The color representation of the systemic organization of reality serves as a visual demonstration and definitive proof of the basic model of general systems theory (Figure 2).

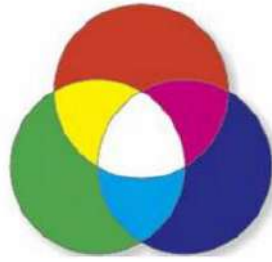


Figure 2. **Color interpretation of the systemic organization of reality**

If the elements of the model “relationship”, “quantity”, and “quality” are understood as fundamental categories of human cognition, then in the structure of the systemic triangle, these categories determine additional fundamental categories – “measure”, “sign”, and “interaction”. So we have the main logical-ontological categories (universals) of reality (Figure 3).

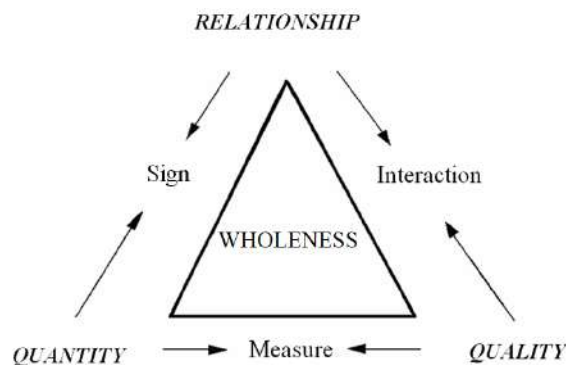


Figure 3. A fundamental model of reality, demonstrating the coordination of its major logical and ontological categories/universals

At large, the presented fundamental model of reality, revealing its principally systemic nature, can be considered as one of the fundamental models of creativity, stemming from the *philosophical universals* the ancient philosophers were eager to reveal (Moreland, 2001), finding their way to modern science in the forms of *frames* (Goffman, 1974, 1986; Minsky, 1975; Moskiene, Rackeviciene, 2021; Schank, Abelson, 2013), *holographic, fractal structures* (Bohm, 2008; Coleman, Pietronerom, 1992; Keel, 2024; Youvan, 2024), and the like which embody the attempts to find/built certain interdisciplinary universals/laws (Voznyuk, 2025).

As is known, "measure" is a philosophical category that expresses the integral and organic unity of quantitative and qualitative certainty of an object/phenomenon; accordingly, in the systemic triangle, the category of measure is actualized in the focus of the correlation between *quality* and *quantity*. In the context of types and forms of matter, "measure" being indifferent to specific physical characteristics can be put in correlation with "space", being also an "indifferent entity" that can be understood as an extension, a certain container where the objects of reality are located, and the events of our world take place.

The correlation/connection of "quantity" and "relationship" enable to appear the concept of "sign" being the category that captures the formal-logical relationships of abstract quantitative values, giving us an idea of quantitative gradation/dichotomy of different values (such as "more – less", etc.), and revealing the process of changing the parameters of the elements of this gradation. And this forms an idea of a *sign* and of quantitative changes, which, in turn, forms a conception of "time" being the formal and logical scale of quantitative changes taking place in the objects and phenomena of reality (a short moment → a second → a minute → an hour → a day → a week → a month → a year → a century → a millennium → an eternity).

The correlation of "quality" and "relationship" gives us the idea of "interaction" actualized as a result of the qualitative heterogeneity of our world. Thus, we have the relationship of qualitative values that form the idea of a qualitative gradation of values (such as "better – worse", "strong – weak", "large – small", etc.), as well as the idea of changing parameters of the objects on the scale of this gradation forming the concept of "motion/interaction" that lead to qualitative changes of the objects.

At the same time, the category "relationship" in the systemic triangle correlates with such a form of matter as the physical vacuum, expressing according to its nature a relationship in its pure, real form, because *the physical vacuum* can be understood as an environment of the relations of virtual particles, being the material basis of the Universe.

The “*quantity*” in the systemic triangle correlates with such a form of matter as “*substance*”, which, due to its discrete/structural composition, reveals discrete (numerical) characteristics.

The “*quality*” in the systemic triangle correlates with such a form of matter as “*field*”, being realized as a qualitative entity in the process of interaction of material objects (Figure 4).

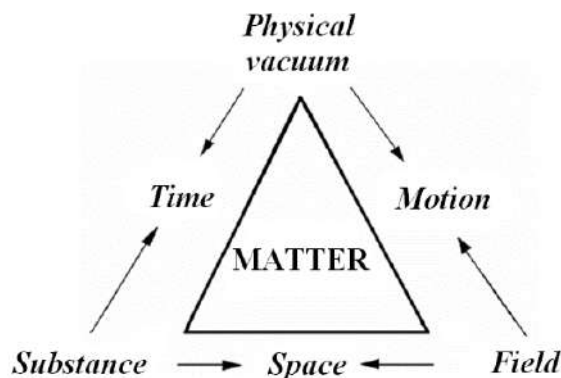


Figure 4. **The systemic composition of the matter**

The world exists, as the materialistic philosophy states, according to *the four philosophical principles* (1. general connection of objects and phenomena of our world, 2. unity, integrity of the world, 3. generality of motion and development), 4. system and structural organization of the world), and *the three laws of dialectics* (1. interpenetration of the opposites, 2. negation of the negation, 3. transformation of quantity into quality).

These determine the major *tools of conceptual thinking*: *the diplasty* (being the ability of a person to unite opposite psychological states and polar logical contents of the notions), *the analysis* (being the ability of a person to differentiate the constituent parts or features of objects and phenomena), *the synthesis* (being the ability of a person to create the combination of components or elements to form a connected whole), *the comparison* (being the ability of a person to compare the phenomena or events with each other), *the abstraction* (being the ability of a person to isolate the major features and to operate them outside the specific situation), *the generalization* (being the

ability of a person to bring to reduction of various concepts into a single category), *the systematization* (being the ability of a person to bring to reduction of some categories into a logical system).

For us, it is crucial to situate the peculiarities of human intellectual development within a systemic context. J. Piaget understood the intellect as a system of logical operations, representing the realization of mental actions, possessing the property of reversibility, which allows the main properties of objects to be preserved. J. Piaget defined the process of intellectual development in terms of different stages, similar to the mathematical concept of groups. The grouping is understood by J. Piaget as a closed and reversible system, being a logical/axiomatic model that the scholar can use to interpret certain facts. All operations in the grouping are organized according to certain criteria (Piaget, 1950; Voznyuk, 2025):

1. *Combinability/transitivity*.

2. *Reversibility*.

3. *Associativity*.

4. *Identity*.

5. *Tautology*.

Further, we have two additional criteria.

6. *Reflexivity* expresses a person's ability to correlate the logical actions with themselves.

7. *Universality* of thinking tends to exhaustive coverage of all logical/mental cases, both in the sphere of actual and potential reality.

Let us correlate the major aspects of creativity studies (most of them have been mentioned above) with the composition (types and forms) of the matter (Figure 5).

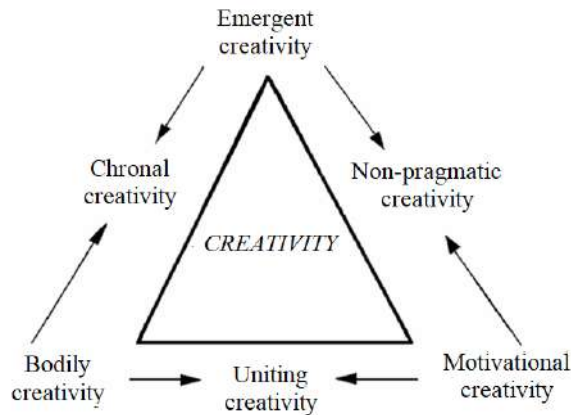


Figure 5. **The systemic composition of creativity**

Physical vacuum: The emergent nature of creativity in the context of explosive/bifurcation generation of creativity and its connection with chaos, uncertainty, suprasituationality, and transcendentality. *Emergent creativity.*

Motion: The process of creativity as “creativity for creativity’s sake”, it’s non-pragmatic/non-targeted. *Non-pragmatic creativity.*

Field: Motivation of the creative process, which involves field- or motivational-based effects. *Motivational creativity.*

Space: The space of creativity that presupposes the ability of a person to combine different and opposing things, revealing the self-referent, non-adaptive nature of creativity. *Uniting creativity.*

Substance: The material “body” of creativity, associated with the human organism, which reveals the connection of creativity with harmony and human health. *Bodily creativity.*

Time: The chronal nature of creativity, revealing its linear-evolutionary, developmental nature. *Chronal creativity.*

The analyzed entities can be correlated systematically (Table 1).

Table 1.

**Systemic correlation of important entities
of philosophy and natural science, as well as the major aspects
of creativity studies (Voznyuk, 2025)**

Forms and types of matter	Logical and ontological universals	Principles and laws of dialectics	Criteria of cognitive operations	Conceptual thinking tools	Major aspects of creativity studies
Physical vacuum	Relationship	Interpenetration of opposites	Identity (inversion)	Diplasty	Emergent creativity
Substance	Quantity	Structural organization of the world	Reversibility	Analysis	Bodily creativity
Field	Quality	Generality of movement	Tautology	Synthesis	Motivational creativity
Motion	Interaction	Transformation of quantity into quality	Associativity	Comparison	Non-pragmatic creativity
Time	Sign	Negation of the negation	Reflexivity	Abstraction	Chronal creativity
Space	Measure	Integrity and unity of the world	Combinability (transitivity, composition)	Systematization	Uniting creativity
Matter	Wholeness	General ties/connections of objects and phenomena	Universality	Generalization	Creativity

3. The chronal and emergent nature of creativity

Creativity, revealing the developmental/ evolutionary aspects, encompasses a range of cognate categories, including giftedness, talent, genius, and lateral thinking (Bono, 1977), among others. The evolutionary algorithm of this development can be illustrated by the Japanese proverb (quoted by Masahiro Yokotani), according to which "When you're ten, they call you a prodigy. When you're fifteen, they call you a *genius*. But once you hit *twenty*, you're just a normal *person*" (refer to Rotenberg, 1993).

In this regard, the data of psychological research are interesting: children under the age of five give up to 90% of original answers when tested, seven-year-olds – up to 20%, and

adults – only 2% (Guilford, 1973; Torrance, 1963). E. Torrance, studying the characteristics of creative thinking in different segments of the population, showed that creativity has a peak at the age of 3.5 to 4.5 years, and also grows in the first three years of schooling, decreases in the next few years, and then can receive an impetus for development (Torrance, 1963; Csikszentmihalyi, 1996).

At large, we can trace the general way of creativity development passing from virtual ("potential-possible) to actual (actual-existing) state of creativity as it is. *The teleological paradox, or the paradox of development* consists in the fact that the new arises from the old (as really new) and at the same time not from the old, for in this case the difference between the new and the old disappears: If the new arose from the old, then it, accordingly, has been contained in it in a potential-virtual state and is not fundamentally new. At the same time, if the old arises from itself, that is, exists eternally, then this contradicts the axioms of the temporal order (French et al, 2010) and leads human consciousness to an epistemological "dead end" (Ringen, 1985).

In Darwin's works, a new species arises from the old and at the same time not from it. Saint Augustine expressed the essence of this paradox in the following words: "Every past is no longer existing, and every future is no longer existing; therefore, both the past and the future are shortcomings in the being". As Arthur Schopenhauer put it in the book "The World as Will and Representation", "No one ever lived in the past, no one will have to live in the future; the present is the form of life".

It can be said that the goal of development is present in it as a potential (virtual, ideal) factor: since the process of development of any object and phenomenon of our world is aimed at a specific, and not at any result, the goal of the development of systemic entities is present at the beginning of their development, when the question of how the process of this development can be determined by a factor that does not yet exist as an objective reality can only be answered in one way – ideally) (Ringen, 1985) allows us to assume that the development of a system in the direction of increasing its complexity is ensured by control from the future – ideal and perfect state of the system, which in the

future will reach the highest possible level of its evolutionary complexity/perfection (refer to the phenomenon of “retrocausality” in physics (Simon, Evans, 2023; Rhawn, 2020; Meijer, 2012; Vedral, 2023) and psychology (Bem, 2011; Yuravljev, 2006; Anokhin, 1963).

Thus, the process of development of any system is controlled by its future virtual state during the transition from hierarchization to dehierarchization through the neutral zone of dynamic chaos, where the system is open to ultra-weak (informational) signals that originate from its future virtual state and act as evolutionary attractors of this system: In the context of synergistic knowledge, the development/change of objects can be presented in the form of a synergistic scheme of alternating hierarchical and dehierarchial phases of systems development, when systems pass the neutral (boundary, transformation, bifurcation) point of their development (Voznyuk, 2025).

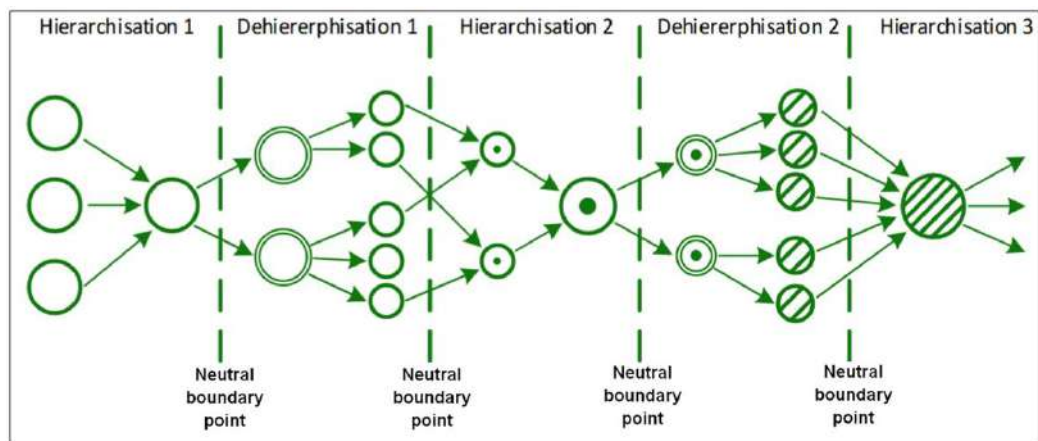


Figure 6. Alternating processes of changing the system's hierarchization and dehierarchization states through the neutral boundary point (bifurcation point): a synergistic “bead game.”

This algorithm of creativity development reveals the emergent nature of creativity in the context of explosive/bifurcation generation of creativity and its connection with chaos, uncertainty, suprasituationality, and transcendentalty (Figure 6).

The emergent nature of creativity underscores the importance of studying creativity development, which begins with the analysis of cognate categories, the first of which is *the category of giftedness* (Lo & Porath, 2017; Renzulli, 2000; Winner, 2000).

The study of gifted children allows us to conclude that giftedness can be understood as a fundamental concept (construct, paradigm) of modern education. At the same time, the issue of giftedness has many aspects. On the one hand, some researchers believe that a child's giftedness in a particular area of their life activity is inherent in every child.

On the other hand, some scientists argue that not all children are gifted. Giftedness can be considered both an actual characteristic of a child, visible on the surface of its activities, and a potential quality that needs to be "awakened", "freed", "unfolded", expanded, actualized, and developed.

While some researchers believe this process can occur at any stage of a person's life, others argue that giftedness is easier to actualize during specific (critical) points or phases in a person's developmental trajectory.

In this context, examples like the "Mowgli children," who were raised by animals at an early age, illustrate that such individuals, having missed sensitive developmental phases and being placed in a civilized environment, often remained at a primitive level of development. However, even primitive social environments provide subtle informational signals that can unlock the child's potential for humanity, which is likely to be further developed through specific environmental stimuli. A well-documented case involved a little boy kept by her parents in a closet until the age of six with minimal social interaction. Once released and placed in a civilized environment, he quickly caught up with his peers in development.

Another case describes a primitive and nomadic tribe in Paraguay, the Guayqui. J. Vellard, a French ethnographer, found a two-year-old girl abandoned at a campsite. He brought her to France, where she was raised in a modern environment. By the age of 20, she was indistinguishable in intellect and social integration from educated European women, having become an

ethnographer and mastered several languages. It is clear that if a girl who was "immersed" in modern human civilization were not 2 years old (when the most intensive process of maturation of the relevant mechanisms of the human psyche occurs), but 8-10 years old, the results of her upbringing would not be as brilliant. Such evidence highlights the potential resources of giftedness inherent in *Homo sapiens*, which are revealed and developed in suitable social environments. Furthermore, it emphasizes the role of sensitive periods, or "informational windows," in the development of living beings, particularly when they are open to specific environmental influences.

It should be noted that some researchers believe that giftedness is preserved in the mental structure of a person for a long period of their life in a "dormant" state; others believe that a person loses the characteristics associated with giftedness with age if they were not demanded by the educational/social system and actualized by this system (Lo, Porath, 2017; Renzulli, 2000; Winner, 2000).

Under such conditions, giftedness, in a certain sense, is associated with such characteristics of a person as genius, creativity, talent, etc., which can be differentiated in the plane of the dichotomy "actual-existing" (being present) – "potential-possible" (being in the perspective) (Table 2 below).

The analysis of the problem of children's giftedness reveals that a child is a multifaceted gifted individual, characterized by predominantly right-hemispheric brain development (up to 5-6 years old), a plastic psyche, vast emotional and sensory resources, highly dynamic mental processes, and a highly dynamic metabolism. It is possible to "unlock" giftedness, as an emergent entity (a systemic property of the whole, according to the synergetics view of the problem), through specific educational/developmental procedures. The principle of "talent as a synthesis of talents" suggests that various abilities of a child coexist within the psyche in a state of synergetic unity. The development of one talent is facilitated and potentiated through the development of others.

Table 2.

**Correlations of essential human characteristics
in the context of the dichotomy
"actual-existing" – "potential-possible."**

<i>Potential-Possible</i>	<i>Actual-Existing</i>
Right-hemisphere psyche	Left-hemisphere psyche
Cyclothymia	Schizothymia
Genetic inheritance	Epigenetic inheritance
Mind	Intelligence
Creativity	Creative artistry
Giftedness	Talent
Talent	Genius
Abilities/skills	Knowledge
Upbringing/"nature"	Education/"narture"

Childhood itself can have a profoundly positive influence on an adult, enabling them to reawaken this state. This was demonstrated in a psychological and pedagogical experiment conducted in 2020 at Zhytomyr Ivan Franko State University. During the first class with first-year students specializing in "performing arts," each of the 14 students was asked to read aloud a short English text with the aim of analyzing their English language proficiency. Errors in reading were not corrected. After that, the students were asked to imagine themselves as 5- or 6-year-old children and reread the same text as if they were in that age group. The number of pronunciation errors decreased significantly.

This phenomenon supports the *method of infantilization* being a psychologically positive regression into childhood. It is common knowledge in educational practice that memorizing large volumes of material often involves physical tension, resulting in a "micro-stress" and vegetative changes in a person's body. In such a state, learners appear "active", reminiscent of a pre-start position in a race. Classical pedagogy views this as an illustration of traditional principles of active learning. However, the research

by the Institute of Suggestology in Sofia (Bulgaria) confirmed that effective memorization may be accompanied by apparent passivity rather than physical tension. Infantilization encourages a relaxed state that facilitates hyper-memory processes (Sharlin & Polansky, 1972).

In this context, we can mention the phenomenon of "*basal genius*" of each child, which A. Maslow described as the "*principle of sacredness*," being inherent in all children and manifesting itself as their drive to achieve great goals (Maslow, 1976; Liedloff, 2008).

Under such conditions, it is important to note that the "release" of the child's sacredness complex in an adult can occur in critical conditions/life situations. Let us give an example.

In 1939, 25-year-old George Dantzig, a student, was studying at the University of California. One day, he was 20 minutes late for a statistics lecture. He quietly entered, sat down at his desk, and tried to understand what he had missed. The data for two math problems were written on the board. J. Danzig took these conditions as homework for the next class, copying the problems into a notebook. At home, he regretted being late for class, as the problems were very difficult. J. Danzig thought that he must have missed something important for solving them. After several days of hard work, he finally solved these problems. Satisfied with the result achieved, he rushed to the professor and gave him the notebook. The professor, Jerzy Neumann, inattentively accepted the solved problems; he somehow could not immediately remember that he had not given students such problems. When he later reviewed what the student had brought him, he was stunned: he remembered that at the beginning of one of his lectures, he had revealed to the students the conditions of these two problems – two unsolvable problems that the outstanding mathematicians of the time could not solve.

The realization of sacredness largely depends on the structure and content of the socio-pedagogical environment where the child grows. Let us give an example

In one experiment, the students with average intelligence levels were divided into two groups. One teacher was told that his students were exceptionally intelligent, while the other teacher

(with the same level of qualification) was told that his class consisted of low achievers. At the end of the year, testing showed significantly higher results among the "intelligent" group, even though the students initially had the same intellectual level as the students of the second teacher.

In standard psychology courses, R. Rosenthal and K. Fode instructed students to train rats to navigate mazes. Half were told their rats were specially bred for superior problem-solving, while the other half believed their rats were incapable. The "gifted" rats outperformed the "unintelligent" ones, proving how expectations shape results (Rosenthal & Fode, 1963).

In a genetics experiment described by Y. Gippenreiter in the book *"Introduction to General Psychology"*, a series of experiments aimed at understanding the connection between environment and heredity is described. In the experiment, "smart" (successful) and "stupid" (unsuccessful) rats were selected and bred based on their ability to quickly find a bait in a maze with a changing configuration. Crossings were carried out within each group, and this procedure was repeated for six generations. As a result of these experiments, convincing evidence was obtained regarding the effect of genetic predisposition on successful learning. However, if the conditions of the experiment were changed, the result also changed: the selected generation of "smart" rats was raised in an impoverished environment, where they were deprived of various impressions and the opportunity to actively act. As a result, it turned out that such rats during training in the maze acted only at the level of "stupid" animals raised in natural conditions. Opposing experiments with raising "dumb" rats in an enriched environment showed results approximately the same as those of "smart" rats raised in normal conditions.

These studies confirm the importance of upbringing conditions in the formation of abilities. The general conclusion that can be drawn from them is more significant: environmental factors have a weight comparable to hereditary factors, and can sometimes completely compensate for or, conversely, neutralize the effect of the latter.

Based on the aforementioned facts and other studies, we formulated a pedagogical axiom that is part of our developed

corpus of pedagogical axioms: *"The educator's perception (and overall personality characteristics) of the object of pedagogical influence can have a decisive impact on the educational process and its outcome."*

Thus, a child in early childhood can be considered a multifaceted (and even genius) gifted being. An example of this can be seen in the history of one Hungarian family.

People who came of age in the 1980s and 1990s might remember the meteoric rise of the Polgar sisters – Zsuzsa, Sofia, and Judit. Not only did they make it into the Guinness World Records, but these once "simple child prodigies" went on to become professional chess grandmasters. These girls boldly competed against male grandmasters and regularly defeated them, demonstrating that female chess players are as capable as their male counterparts. The upbringing of these prodigies might never have occurred without their father, Hungarian educator and psychologist Laszlo Polgar, who set out to prove to the world that raising geniuses is entirely achievable.

This case clearly demonstrates that the experiment of raising genius children, conceived by Laszlo Polgar, was a success. Despite certain challenges, the family managed to nurture extraordinary athletes who not only triumphed in prestigious tournaments but also defeated nearly all prominent male chess players. The youngest sister, Judit, became the youngest grandmaster in the world, surpassing Bobby Fischer's record by one month.

Undoubtedly, Laszlo Polgar was a talented or even genius educator, exceptionally consistent in pursuing his goal. He passed his talent to his children within the framework of so-called *epigenetic inheritance*. In this context, it can be argued that *human behavior and genetic information are mutually complementary: upbringing/educational influences the genome, and epigenetic changes can be inherited.*

In connection with the indicated type of heredity, we can say that human behavior and genetic information about a person (the human organism) are in a mutually complementary relationship, as upbringing affects the genome. At the same time, epigenetic changes can be inherited, when the genotype determines not

behavior as such, but rather the general principles of building the neural circuits responsible for processing incoming information and making decisions. These "computing devices" are capable of learning and are constantly rebuilt throughout life.

The absence of a direct and definitive correspondence between genes and behavior does not contradict the fact that specific mutations can alter behavior in a predictable way. A behavioral trait that initially appeared repeatedly as a result of learning can eventually become instinctive (innate), and this change can be "written" into the human genotype (Gene et al, 2008).

In this light, it can be stated that *developmental and pedagogical influences on the neural structure of the human brain can leave imprints on genetic structures*. These changes may be passed down to future generations, influencing heredity at the genetic level.

Experimental studies by researchers from the University of California have shown that a person's intention to perform any action not only changes the brain's biochemistry but also alters its size and structure. Mice placed in conditions requiring increased physical activity over several generations developed distinct skeletal and brain structures and exhibited a more intense metabolism compared to their less active counterparts (Kelly et al., 2012; Kolb et al., 2013; Waters et al., 2013).

This finding applies not only to positive but also to negative (stress-induced) changes. Negative events can trigger chemical reactions that fundamentally alter the way the neural networks in the brain interact, thereby reshaping their structure (Zerbi et al, 2019).

It is worth noting that genetic and epigenetic factors can sometimes *conflict with each other*. To illustrate this conclusion, we can cite a pedagogical fact reported by Robert R. Blake in 1997, which left a lasting impression on him. A boy, the son of a shoemaker, was ashamed of his social status. Determined to change his life, he studied diligently. After completing school with honors, he traveled to London to pursue a career as a lawyer. He worked and studied tirelessly, achieving fame and wealth. Years later, during a vacation, he returned to his parents and, for

nostalgia, began helping his father in the workshop. Immersing himself in simple physical labor – hammering nails and repairing soles – he realized he felt truly happy only in his father's workshop. He never returned to London, explaining that this primitive yet fulfilling work brought him genuine contentment.

The potential of unlocking a child's genius can be seen in various contexts, such as through *initiation-based learning* (Taylor et al, 2006). This sociocultural phenomenon, often associated with rites of passage, not only signifies social transition but also imparts transformative education to the initiated. Sometimes, initiation involves mystical procedures capable of fundamentally altering the psychological state of the participants, resembling A. Makarenko's "explosion method." Hypnotic states can also significantly enhance intellectual and creative potential. For instance, research indicates that a novice chess player can drastically improve their skills through trance techniques, which are also applicable to other areas of human activity (Hoye, 2013; Szmaglinska et al., 2023; Youvan & Duglas, 2024; Zahedi et al., 2024). Suggestopedic and other unconventional/innovative methods, aimed at activating altered states of consciousness, can result in extraordinary abilities (Lozanov, 1978). Examples include individuals gaining near-instantaneous calculation abilities (e.g., a farmer struck by lightning developing complex mathematical skills) or becoming polyglots (Frank, 1907).

One notable case is that of W. Melnikov, a contemporary polyglot, and another involves an American man, Michael Thomas Boatwright, who inexplicably began speaking Swedish after regaining consciousness. After the incident where sixty-year-old Boatwright lost his consciousness, he could only communicate in Swedish with doctors through an interpreter and failed to recognize himself in a mirror. Although he had visited Sweden several times, he was a U.S. citizen who had spent a decade teaching English in Japan.

So, giftedness should be regarded as a paradigm of modern education. A child under the age of 5-6, being predominantly right-hemispheric with a plastic psyche, possesses immense emotional and sensory resources, dynamic mental processes, and a rapid metabolism, representing a multifaceted gifted human being. Giftedness, understood as an emergent property

(a systemic characteristic of the whole, according to the synergetic perspective), can be "unlocked" and actualized through specific developmental/educational procedures.

In this context, one can discuss the concept of "basal genius," inherent in every child, which A. Maslow associates with the "principle of sacredness." This principle aligns with the children's social values and orients them toward higher goals – aspiring to achieve profound values. The realization of this principle depends significantly on the structure and content of the socio-pedagogical environment in which the child lives and develops. The "release" of this sacredness in adulthood often occurs during critical life conditions or situations.

Giftedness correlates with such characteristics as genius, creativity, talent, and wisdom, which can be differentiated through the dichotomy of "actual-existing" (present-oriented) and "potential-possible" (future-oriented).

There is a high possibility that childhood itself has a positive influence on adults who are capable of reactivating this state during their lives. In this regard, *the method of infantilization* – a psychologically positive regression into childhood (traditionally this phenomenon is studied within the negative educational trends and can be found in cross-cultural context (Sharlin, Polansky, 1972)) – can be used to enhance the educational process significantly.

Analyzing the relationship between giftedness/genius and their connection with genetic traits leads us to the conclusion that developmental and pedagogical influences shape the neural structure of the human brain. These effects may be "encoded" into a person's genetic structures and transmitted to future generations through heredity.

In the context of analyzing the problems of giftedness and creativity as its realization in the connection with human genetic characteristics, a conclusion can be made about the developmental and pedagogical impact of upbringing and education on the neural structure of the human brain, and the results of this impact can be "imprinted" in human genetic structures, which at the level of heredity can be transmitted to future generations of people. In this respect, the perspective of

our research may be focused on further investigation into the interplay between genetics, education, and neural plasticity to support and nurture human potential across generations.

4. The bodily, motivational, non-pragmatic, uniting nature of creativity

In this context, it is important to study the connection between human creativity (as a key factor of people's spiritual and intellectual development) and human health (Voznyuk, 2017).

Human health is one of the key values in our lives, and the study of health phenomena is a priority in modern science. It can be said that health, as the most complex and important object for cognition, exhibits an interdisciplinary nature, since only in the context of the efforts of various sciences can a holistic understanding of this phenomenon be achieved. Therefore, as the analysis of scientific sources has shown, there are more than 300 definitions of health (Boruchovitch, Mednick, 2002). It is advisable to focus these definitions on major health concepts, which can be reduced to such, as medical (presupposes medical signs and characteristics of health, being understood as the absence of diseases and their symptoms), biomedical (health is considered as absence of subjective feelings of ill health and organic disorders), biosocial (medical and social factors of health are considered in unity, with priority given to social factors), value-social (health is understood as a person's personal value).

Health is becoming a cornerstone value of human life. Accordingly, the study of the conditions for actualizing and maintaining people's health is an important task of modern human sciences, which constitute an interdisciplinary resource of our research.

Analysis of scientific literature on various aspects of health allows us to draw a conclusion that has the character of a postulate: health as a psychophysiological entity most fully characterizes the state of functional and somatic integrity of the human organism, which ensures the completeness and diversity of the entire set of processes of this organism (Voznyuk, 2020).

Loss of health by the human organism is realized as its loss of the above-mentioned state of integrity/coherence as a result of certain actions on the organism by the external and/or internal environment, which, according to the second law of thermodynamics, leads to an increase in entropy, that is, to the activation of the processes of decay of the organism due to the inconsistency of biorhythms and functions of its cells, organs and systems.

In the context of health problems, the integrity of the human body is also reflected in the fact that the body responds to any negative stimulus from the external environment with a single adaptive reaction – stress, the result of which can lead to various diseases (Selye, 1974). Stress, as a psychophysiological process, manifests as a holistic state because it is accompanied by a stable set of nonspecific bodily reactions common to most, if not all, diseases.

The above phenomenon suggests that at the root of many diseases lies a narrow set of causes focused around a single factor that leads to a weakening of the organism's vitality, narrowing its "space" of existence. This, in turn, leads to a distortion of the normal functioning of one of the "weak" links in the organism, which reveals a certain disease that is overcome by a single factor – immunity, the weakening of which is now considered the primary factor in any disease.

In general, stress, as the most common phenomenon of the modern social world, is, first of all, an information process, since it is a psychophysiological "shock" of the human body, caused to a lesser extent by negative/stressful effects of the external environment, and to a greater extent by the psychological and worldview negativism of the person himself. That is, the somatic reactions of the organism to a particular stimulus (irritant) of the external environment, due to the presence of large resources of the homeostasis mechanism (which implements the dialectical stability of the internal environment of living systems), as a rule, cannot lead to illness (here we do not consider the extreme conditions of existence of a living being).

In this context, illness occurs when the human body cannot adequately respond to external stimuli, primarily due to

psychological and cognitive distortions. The latter acts as a condition for the development of a multitude of harmful/negative psychological settings, social attitudes, emotional states, and value orientations, which, in turn, generate/actualize illnesses. Therefore, many specialists in various fields of knowledge conclude that the cause of many, if not all, human illnesses, being an adaptive reaction (Davydovskij, 1963), is related to a person's mental organization and, ultimately, to their spiritual, value-based, and worldview orientations (Hamer, 2000; Maslow, 1976).

The process of treating any disease is, in a certain sense, simple. It involves harmonizing a person's mental and spiritual worlds, thereby aligning their consciousness.

It should be noted that stress at the level of the main psychophysiological reactions of a person manifests itself in the form of emotions, which are an integral characteristic of the human organism, as evidenced by *the information theory of emotions* of P.V. Simonov, according to which an emotion is a person's reaction to a lack of relevant information: if a person feels a lack of information about a certain event that is relevant to them, then this emotional state forms an emotional and search reaction, in which the whole organism is involved. Thus, it has been experimentally demonstrated that emotion is a function of information, where emotion is realized as an organism's reaction to a lack of information about a particular life situation related to the future process of satisfying a person's needs (Simonov, 1991). As A.M. Svyadoshch wrote in his book "*Neuroses and Their Treatment*", a mental trauma is usually not something that is addressed only to the past, but something that threatens the future, creates uncertainty, and therefore requires a decision on what to do in the future. For example, even if the disease is a reaction to an event that seemingly just happened – the loss of a loved one, the departure of one of the spouses from the family, or an insult received – the psychotraumatic effect is largely determined by the significance of these events for the future.

Based on the information theory of emotions, it can be argued that a lack of information about the external world is an expression of situational uncertainty and ambiguity, which creates a stressful state of uncertainty in a person's future life.

At the same time, stress as a fundamental cause of diseases is realized not only in the process of emotional response to stimuli from the external and internal environment (which expresses the adaptive aspect of stress), but also as the process of impossibility/inability of such a response (which acts as a factor of disadaptation, distress).

The most complete psycho-energetic-behavioral component of health was studied by the Institute of Kinesiology (USA), the results of which research are presented in the books by P. Weinzwieg and D. Diamond, the director of this institute (Weinzwieg, 1988). Scientists have concluded that a positive mood and a positive attitude towards the world are a decisive factor in increasing a person's vitality and strengthening their immunity, with all the social and medical-biological consequences that follow.

Therefore, human health is an entity that expresses the peculiarities and level of integration of organisms into the environment, which in the language of synergetics is defined as the process of dissipation – the openness of the organism to the external world, with which it exchanges energy and information, reducing the level of its entropy and gaining access to the energy resources of the external environment. Under such conditions, health is a variable – a functional value that characterizes the body's ability to restore and maintain its homeostatic equilibrium unchanged. In this regard, health, which is characterized by a certain level of adaptation energy, can be expressed as the reciprocal of the amount of energy that the body is forced to spend to restore homeostasis after it is brought out of equilibrium (Hirt et al, 2016).

The disease, which is caused by a decrease in the vital (energy) tone of the human body, is triggered by stresses that act as an informational phenomenon and are a consequence of the informational uncertainty surrounding events important to a person. Thus, the decline in the body's energy tone is caused by stresses that have both external (such as weather conditions, intense physical exertion, or malnutrition) and internal causes.

Internal causes (dialectically related to external causes) include a "inharmonious" worldview and thinking of a person,

which can lead to the development of an "inharmonious", "pathological" attitude to life through the development of destructive psychological attitudes. This, in turn, leads to the depletion of vital energy. As experiments have shown, the decline in a person's vital energy occurs as a result of their negative attitude towards themselves and the environment, which is confirmed by the study of cancer and other diseases (Greer & Watson, 1985; Shekelle et al, 1981; Argyle, 1987): The cause of both cancer and other diseases is long-term, ingrained negative stress states/reactions of a person (hatred, anger, resentment, jealousy, etc.). On the contrary, a person's positive attitude towards life and the world increases the body's energy tone (Weinzweig, 1988).

There is an effective mechanism for completely reducing the information uncertainty of a person's social environment, not associated with numerous mechanisms of psychological defenses – faith in the Higher Mind (Absolute) as a person's conviction in the existence of God – the creative harmonious beginning of reality (James, 2008): as scientific research shows, believing people get sick less and live longer (Frankl, 1992; Abdel-Khalek, 2006; Li X et al, 2019; Yeager et al, 2014; Comstock & Partridge, 1972).

In light of the conclusion that stress is a primary cause of human diseases, let us examine the fundamental mechanism underlying the existence of modern humans, which is associated with the formation of psychological defenses as universal adaptive reactions of individuals to a stressful social environment.

The most comprehensive mechanisms of psychological defense have been studied within the context of the theory of cognitive dissonance, which demonstrates that we do not process information impartially, but rather distort it in a way that satisfies our previously acquired ideas (Aronson & Aronson, 2004; Festinger, 1962). At the moment of cognitive dissonance, a person seeks to free themselves from an ambivalent (double) paradoxical cognitive situation by distorting reality (which can be illustrated by Aesop's fable of "Sour grapes").

For example, when we bought some very expensive thing, which later turned out to be unnecessary, that is, not worth the

money paid for it, then we reveal two opposing cognitions (assumptions): either the thing is really valuable and worth the money spent, or we turned out to be "losers".

These two opposing cognitions, firstly, cannot peacefully coexist within the "black and white" consciousness of a person who possesses a binary "yes-no" logic of thinking. It is for this person that the above-mentioned problem associated with cognitive dissonance arises. Secondly, for a person characterized by "black and white" thinking, admitting to oneself a failure can be very problematic, as this can lead to a loss of self-esteem.

Thus, a person, characterized by a black and white, discrete-linear perception of reality, cannot overcome the contradictions between two opposing ideas (events). As a result of such discrete-linear information processing, a person loses an adequate perception of reality, which is, in fact, a fundamentally holistic, nonlinear entity, within which opposites coexist peacefully and merge into one another.

Social psychology has revealed many similar examples of cognitive dissonance, when in a problem situation, due to the emergence of cognitive discomfort in the event of a collision of two polar ideas (psychological states, life situations), a person rejects one of the ideas (psychological states, situation), since he/she is not able to "flirt with the absurd": As A. Camus noted, such people are beings who spend their lives convincing themselves that the reality is not absurd. However, openness to the absurd is characteristic of creative people being able to think in a paradoxical-multiple-meaning way, thus easily overcoming the cognitive ambivalence (duality) by combining polar cognitions (and psychological states) in a third intermediate cognition, being a neutral paradoxical entity. This is due to the openness of creative people to the absurd and paradox, thanks to creative paradoxical and metamorphic thinking and worldview, which reveals diplasty.

It should be noted that the process of cognitive dissonance occurs not only at the logical-behavioral, psychological, and worldview levels, but also at the psychophysiological and somatic levels of the organism, which, as we believe, is the cause of many diseases – psychic, psychosomatic, and somatic. The analysis of A.M. Svyadoshch's book *"Neuroses and Their Treatment"*, enables

to conclude, that the cognitive dissonance, appearing in the form of "confusion of motives" (a conflict of two opposite and equally strong motives of behavior), is a condition for the occurrence of neuroses, which are experimentally caused by strong excitation of the hypothalamus (in which both its departments are simultaneously activated), as well as in the process of the struggle of contradictory aspirations/motives in a person.

A person who acts as an open system and who perceives the world with complete trust, combining its polar aspects, is a creative personality who can better associate concepts with opposite meanings than with similar ones. Creative people can maintain a state of uncertainty for a long time, revealing their ability to reflect on and utilize multiple opposing ideas, concepts, representations, psychological, and psychophysiological states simultaneously. As a result, creative people can perceive and explore such relationships and connections that are inaccessible to those who are inclined toward clarity and unambiguousness (Rotenberg, 2020).

Here it should also be said that creativity as a process of integrating contrasting and contradictory entities and creating new integrities (meanings) is the main feature of the evolutionary mechanism. As F. Klix writes, the most important prerequisite for the emergence of a new quality is formed when two systems that have independently arisen to perform different functions enter into interaction with each other. This interaction generates a new quality, while the two initial structures are preserved in the new functional unity as its partial subsystems, which are unambiguous in nature (Klix, 1993). (Refer also to Simpson's paradox in psychological science: Kievit et al., 2013.)

As an entity that combines opposites, a creative person, according to some studies, is generally more psychopathic, psychotic (Eysenck, 1995), and creativity can be considered a compensatory mechanism for psychoticism, which becomes a factor in harmonizing a person.

If a creative personality is the strategic aim of human development, then the same aim of development is the creative person's fundamental property, which consists in the ability to include polar aspects of the world into a single conceptual and

ontological context, that is, to perceive the world as something holistic, integral and at the same time paradoxical/absurd (refer to the direction in pedagogical theory and practice "*The Pedagogical Paradoxology*" which have been developed in our works (Voznyuk, 2021).

It is this state that characterizes a creative person who possesses multi-valued, paradoxical, and nonlinear thinking, being free from stress as a result of "black and white," unambiguous, linear, and "sick" thinking, perception, and mastering reality.

Thus, we can make some conclusions concerning *the bodily and uniting creativity*.

Energy, as a measure of motion and changes in the organism, acts as a function of the biorhythmic integration of its parts due to the functional coherence of its cells, organs, and systems (Putilov, 2021; Zimecki, 2006), and also realizes its openness to the external environment, from which the organism draws energy resources. The loss of energy by the organism leads to a decrease in its vitality and immunity, as the process of disintegration within the organism occurs, increasing its entropy, or chaos in its internal environment. This state can be reasonably considered a disease.

The factor that leads to the disintegration of the organism is distress, a psychophysiological "shock" of the organism. Stress, in its most general form, can be interpreted as an emotional state associated with information uncertainty that a person experiences while attempting to satisfy certain needs. This emotional state of information uncertainty is manifested as negative mental reactions in a person and is triggered by negative emotional states, inferior psychological settings, and social attitudes, as well as anti-spiritual mental and worldview value orientations. This leads to a decline in vitality and weakens the body's immunity, thereby increasing the likelihood of certain diseases.

Negative states are overcome through a person's confidence in the harmonious order of the world. Another means of achieving human health is overcoming negative states through creativity as the ability to unite opposites, which crystallizes wholeness, revealing the synergistic phenomenon of the systemic properties

of the whole, which reduces the entropy of environments and systems, increases a person's vitality, and strengthens their immunity/ health (Rotenberg, Arshavsky, 1991, 1993), thus creating anti-entropy. Erwin Schrödinger, the Nobel-laureate, in 1944 stimulated the research in the field of entropy (as the state of uncertainty, as well as the level of systems' chaos when in a closed system, disorder increases) the physical foundation of which was laid by Rudolf Clausius (1865), Ludwig Boltzmann (1877), Claude Shannon (1948), and others.

In his book, E. Schrödinger originally stated that life feeds on negative entropy, or negentropy/anti-entropy (living organisms maintain order by drawing "negative entropy" from their environment); in a later edition, he corrected himself and stated that the true source of negentropy is free energy (Schrödinger, 1992). Thus, the stream of life, the evolutionary process, selects for "anti-entropic" adaptations that expend energy in order to maintain homeostasis.

As scientific research has shown, homeostatic psychological phenomena can be understood as "anti-entropic" adaptations that direct energy towards maintaining biopsychosocial order (Tooby et al., 2003). "Entropy refers to the amount of uncertainty, and in physiology and psychology this state of uncertainty is connected with person's experience of anxiety being linked to activation of anxiety-related brain circuits". Moreover, "For an organism to adapt to a complex, ever-changing environment, it is necessary for it to possess flexible cognitive and behavioral frameworks" (Hirsh et al, 2012, p. 310).

Any homeostatic psychological phenomenon "owes its existence to a precise configuration that wards off entropy, consuming energy to maintain its form in an open system relationship with the outside world... That is why the Second Law of Thermodynamics is the First Law of Psychology" (Tooby et al, 2003) that corresponds both 1) to the information theory of stress and emotions (Simonov, 1991) stemming from disorder and ambiguity of the environment and 2) to the mechanism of diplastic perception of reality (Rotenberg, Arshavsky, 1991).

The First Law of Psychology is realized in the behavioral sphere, revealing the fundamental goals of human life – achieving

happiness through pleasure, joy, delight, enjoyment, etc. However, many people are dissatisfied with a routine lifestyle, believing it does not provide a sense of well-being. At the same time, any positive stimulus received from the external environment can be defined as anti-entropic, counteracting entropy, which can express a certain degree of chaos. People who are unable to enjoy life are defined as suffering from an anti-entropy deficiency, which can lead to psychopathy or illness. Anti-entropy deficiency can be caused by genetic or acquired dysfunctions of the brain mechanisms that ensure feelings of well-being, pleasure, and happiness within a routine lifestyle. As a compensatory mechanism, people suffering from an anti-entropy deficiency may create psychological defense mechanisms that can sometimes be harmful to themselves or their surroundings (Aminoff, 2014).

Anti-entropy in creative activity presupposes the act of generating order and complexity from chaos. At the behavioral level, it requires focusing energy and intention. Creativity is considered an anti-entropic process since it presupposes organizing dispersed energy and information into an ordered, structured, and more complex state, such as the creation of art or a scientific hypothesis. This process counteracts the natural tendency of physical and mental systems to move toward disorder and ambiguity (Westbrook, 2021; Kajtez, 2023; Hills, Kenett, 2025; Fox, 2024).

In the context of thermodynamics, the openness of creative people to uncertainty means they are receptive to a system whose structure is highly complex, and the measure of its diversity approaches infinity. Under such conditions, a creative person with an understanding of thermodynamics is, in fact, a highly complex system, and in the context of cybernetics, they appear as a system capable of controlling everything (Bogg, 2024), thus resembling a god-like system. This conclusion is explained by the “cybernetic” proof of God's existence, developed by the clergyman Alexander Men, who considered God to be a supercomplex and most perfect systemic Being. If God is the rarest phenomenon in the Universe (as it is said in the New Testament, “No one has ever seen God...” – (John 1: 18), then from the point of view of information theory, God contains information reaching infinity. Information, according

to one of its definitions, reflects the structural diversity and the measure of complexity of systems (Floridi, 2010). Therefore, God as a system is the most diverse and perfect/complex entity (refer to Kalanov, 2010).

Uniting nature of creativity is realized in the field of inter-hemispheric activity (the synthesis of the right and left hemisphere functions of the human brain), revealed in the form of diplasty, that enables a person to be open to chaos, uncertainty, paradox, absurd, to actualize the process of sense crystallization through the integration and mutual transformation of an abstract sign and a concrete object, a word and an image, synthesizing the single and the general, the concrete and the abstract.

On the level of thinking and logical process diplasty is expressed in the paradoxical oriental (i.e. Buddhist and Indian) logic of four alternatives (Jayatilleke, 1967), where in the sphere of the relations of logical terms – assertion and negation – four logically equivalent alternatives take place: 1) either assertion (first); 2) or negation (second); 3) both (first and second at the same time); 4) neither the first nor the second.

Let us demonstrate thinking in the context of four alternatives: The answer to the fundamental question of philosophy (which is primary, matter or mind, material or ideal?) contains four logically equivalent answers: 1) matter is primary; 2) mind is primary; 3) both matter and mind are primary; 4) neither matter nor mind is primary. The fourth alternative is illustrated by the statement of David Bohm, who believes that matter and mind are embedded projections of a higher, fundamental essence, which is neither matter nor mind in its pure form (Bohm, 2008; Pylkkänen, 2016).

In general, the analysis of the logical content of the mechanism of diplasty allows us to speak of *two levels* of it, when at the first level of thinking a person is able to bring to unity the opposites ("both matter and mind are primary"), and at the second level of thinking ("neither matter nor mind are primary") not only the opposites are understood as separate entities, but each of them, in the language of philosophy, is transformed/reduced into something third (higher), which in the context of synergetics can be understood as an emergent

(systemic) property of the whole, which has been demonstrated with the help of D. Bohm's statement.

Under such conditions, thinking at the second level of diplasty allows a human being to think not only in an abstract-logical, unambiguous way, but also in a paradoxical, multiple-meaning way, which helps to carry out logical operations of systematization and generalization, thus fixing creative (direct and reverse) cause-and-effect dependencies/connections. In general, all cognitive operations, as well as tools of creative thinking, are implemented using thinking at the second level of diplasty, which appears as a system-forming factor for these operations and tools.

Uniting nature of creativity is realized not only through the ability of creative persons to unite the different and polar entities (psychological states/settings, social attitudes, value orientations, bodily states, concepts, etc.), but also it is revealed in the systemic and synergetic effect "the whole is more/greater than the sum of its parts" (Richter et al, 2010; Upton et al, 2014).

In the context of social processes this effect/principle can be found in such phenomenon, as "the spirit of the sports team" (Halldorsson, 2018), being revealed in the collective subject/game of activity (Koval, 2022; Nakonechna, 2018); the group creativity (Paulus et al, 1999; Jason, Hedrick, 2016), the joint activity (Voznyuk, A. et al. 2022); the organizational identity (Cheney & Christensen, 2001); the psychological climate (Ancona & Caldwell, 1992); the team roles (Belbin, 1993); the group mental states (S. Moscovici) (Moliner, Bovina, 2020); the virtual teams (Szewc, 2014), the team (cooperative) work/management/learning/teaching (Fisher, 1994; Whitfield, 1995; Clifford & Sohal, 1998; Parker, 1994; Lazarus et al, 2016; Mesmer-Magnus & DeChurch, 2009; Leithwood, 1998; Leplat, 1994; Begg & Davids, 2009), the brain storm, the professional spirituality (Hunt, 2021), Makarenko's temporary working teams (Cunningham, 2021), the self-directed temporal target business/management teams (when specialists from diverse subdivisions gather together for solving specific problems (Laage-Hellman, 2002), etc.

The motivational creativity is expressed in the fact that a creative person is characterized by the development of *internal*

motivation as a state of self-determination and self-sufficiency. As psychological research has shown, internal motivation as a psychological mechanism of human self-control and free will is realized in the so-called supra-situational creative activity (as a way of overcoming and transcending the existing life situation "here and now"). That is, internal motivation, which liberates a person from the determination of external environment, realizes a creative act, which appears as an activity free from external influences, a non-pragmatic activity for the sake of the activity itself, similar to "art for art's sake" (Ryan & Deci, 2000).

Internal motivation is formed on the path of non-pragmatic/creative activity (Corbett, 2018): Richard de Charms' experiments showed that if a person receives a reward for work that he/she does according to their free will, then the internal motivation for this activity will weaken; and if a person is not rewarded for an uninteresting activity undertaken solely for the sake of reward, then internal motivation for it may paradoxically increase (de Charms, 1983). This serves as an illustration of the mechanism of free will, which acts in the same way as bodies behave in a non-inertial world (their movement slows down in front of an obstacle, and accelerates outside of an obstacle), and is described by so-called imaginary numbers, similar to the square root of minus one (Simonov, 1991). This concept of free will was also explored in the works of scientists who spent time in concentration camps (Bettelheim, 1960).

Edward Dickey has shown that a person's sense of themselves as a competent doer and a self-determined personality reveals their basic needs. On the other hand, the satisfaction of these basic needs in a particular activity implements the mechanism of formation of internal motivation for this activity, just as the latter becomes a factor in the realization of the specified basic needs, with which another basic need is closely related – the need for meaningful relationships.

The above data allowed E. Dickey and R. Ryan to substantiate the theory of cognitive assessment, according to which a person in the process of a particular activity evaluates three parameters: *causal* (when a person seeks to find out the reason for their actions), *competence* (associated with finding out the effectiveness of the activity), and *social* (when a person involved

in the activity seeks to find out how much their activity contributes to the maintenance of meaningful interpersonal relationships) (Ryan & Deci, 2000; Miroshnychenko & Voznyuk, 2023).

Researchers believe that in conditions where a person confidently localizes the cause of their actions within themselves, considering themselves competent and integrated into the social system of significant relationships, such a person is characterized by internal motivation of their activity (behavior), and the activity itself acquires creative features, bringing the person success and psychological well-being. The latter includes the experience of happiness, a sense of meaningfulness and completeness in one's existence, a sense of self-actualization (Ryan & Deci, 2000), high vitality, and "the feeling of flying" (Maslow, 1976).

While the external motivation is realized with the help of rewarding actions concerning the mechanism of conditioned reflexes, according to H. Heckhausen, R. Ryan, E. Deci and some other researches, the internal motivation reveals the person's needs for self-development and personality growth; freedom of purpose and consequences of actions/behavior; willingness to "dissolve" in activity; joyful dedication to one's work, "flow effect" – complete immersion of a person in activity (Ryan & Deci, 2000; Maslow, 1976).

Here we reveal the god-likeness of a creative personality that is also explained by the fact that a creative person is characterized by non-adaptive, supra-situational behavior, since creative activity, in a certain sense, is not stimulated by external factors or the influence of internal assessments (behavioral factors), but is characterized by transcendence – going beyond the boundaries of a given goal (Ryan & Deci, 2000).

5. Some pedagogical implications of the systemic and synergetic understanding of creative activity

The systemic and synergetic nature of creativity reveals important educational extrapolations. One of these is the new educational direction – *The Pedagogical Paradoxology*, which is being developed in our work, opening new vistas to a holistic,

synergetic, and paradoxical paradigm of education (Voznyuk, 2020a, 2021a; Voznyuk & Manolov, 2019).

The pedagogical paradoxology is aimed at developing creative, non-linear, diplastic, paradoxical thinking in subjects in the educational process, implementing "the principle of cognition of the world as a holistic world, which is an intellectual and vital necessity. This universal problem will emerge in the future, as our fragmented, scattered disciplinary knowledge is deeply inadequate for understanding the increasingly global, transformational, multidimensional, polydisciplinary, and planetary realities and problems. Due to this multidimensionality, the Global, Multidimensional, Complex becomes invisible" (Morin, 1999, p. 19).

The mentioned dialectical and paradoxical thinking reveals the epistemological and social phenomena of absurdity, paradox, chaos, and ambiguity as educational tools of pedagogical paradoxology.

Within the realm of pedagogical paradoxology, we have developed a new algorithm for influencing participants in the educational process, which is one of the fundamental revelations of contemporary education and pedagogy.

This algorithm (that reflects the life scenario of human development in onto- and phylogenesis, implementing the movement from the right hemisphere (RH) to the left hemisphere (LH), and from the latter – to the synchronization of hemispheric functions (RH+LH)) has been substantiated in our article *'Upbringing process as a paradoxical phenomenon: the main aspects of a new paradigm of education'* (Voznyuk, 2021a) (Figure 7).

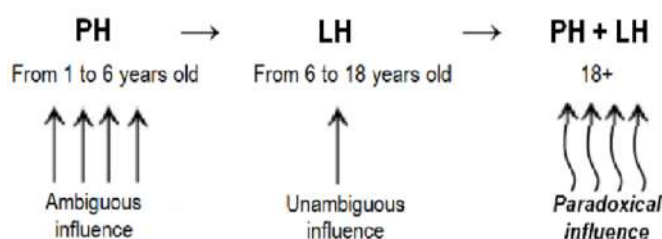


Figure 7. The algorithm of pedagogical influence on participants in the educational process reveals the psychomental, behavioral, and emotional scenarios of human development/evolution in ontogenesis and phylogenesis.

At the first stage of human development (up to 6 years), a small child, due to the predominance of PH processes in their emotional and mental spectrum, is open to ambiguous, ambivalent influences that are not mutually consistent and can even be contradictory.

At the second stage of human development, the left hemisphere's capacity for unambiguous, abstract, and logical thinking is developed, which enables a human being to navigate the field of causal relationships in reality. At this stage, it is advisable to establish a system of unambiguous socio-pedagogical influences on persons that do not contradict each other.

At the third stage of human development, due to the meditative-paradoxical nature of mental processes at this stage, the influences on persons can be varied, it can be both consistent with each other, and contradicting each other, because here a human being is open to any influences (both ambiguous and non-ambiguous) without harm to their mental, physical, and spiritual health.

The presented algorithm explains several scientific enigmas: 1) it resolves the paradox of the Cambridge-Somerville project (McCord, 2007; Voznyuk, 2021a) (when young people of the experimental group due to the positive socialization influences were forced to exist in an ambivalent socio-pedagogical environment, which led to a combination of criminalized/antisocial and pedagogical environments; as a result, young people have not been able to fully develop productive mechanisms for entering adulthood); 2) it clears up the dilemma "*ambiguous/unambiguous impact on the child*" in the sphere of which a "*splitting effect*" is possible. On the other hand, an unambiguous *impact* on the child can lead to the formation of paranoid affect, as written by Karl Leonhardt in his book "*Accentuated personalities*". On the other hand, the splitting effect on the child, according to Ronald David Laing (refer to his book *The Voice of Experience*, 1982) and Gregory Bateson (refer to his book *Steps to An Ecology of Mind*, 1972), can lead to a situation of "double clamp" ("double connection"), which can initiate the development of schizophrenia: a child is in a situation of double clamp when it receives from parents, from the environment the messages that contradict each other on behavioral, verbal and nonverbal levels.

At the same time, the algorithm of pedagogical influence can be applied in crisis and extreme conditions of human life, as any crisis can be understood as a synergetic state of a system's bifurcation (neutral/chaotic) point (Figure 6) where systems are open to weak influences/signals (Haken, 1995; Grindal, 2009; Massa & Mahony, 2021).

Conclusions

Due to interdisciplinary research with the help of the modified general systems theory, the six aspects of creativity studies have been conceptualized and explained: 1) The emergent nature of creativity in the context of explosive/bifurcation generation of the creativity process and its connection with chaos, uncertainty, suprasituationality, and transcendentality. 2) The process of creativity as "creativity for creativity's sake", revealing its non-pragmatic/non-targeted nature. 3) Motivation of the creative process. 4) The spatial creativity that presupposes the ability of a person to combine different and opposing things, thus expressing the self-referent, non-adaptive nature of creativity. 5) The material, "bodily" creativity, associated with the human organism, shows the connection of creativity with harmony and human health. 6) The choral nature of creativity, revealing its linear-evolutionary, developmental nature.

It has been shown that creativity involves the generation of synergy states of human organism (characterized by the property of *anti-entropy*, i.e., the ability to generate energy being the factor of wholeness), both in terms of epistemology and ontology, which involves the actualization of two polar aspects of culture – spiritual and material.

Creativity is understood as the process of building wholeness states/entities; as the functional unity of the right-hemisphere and left-hemisphere aspects of the individual's mental activity, it is predominantly an intuitive-right-hemisphere figurative-emotional process, which, however, is inconceivable without being filled with left-hemisphere content.

One of the main features of creative people is associated with the ability to paradoxical (multiple-meaning, non-trivial,

original, divergent) thinking, with openness to uncertainty, chaos, paradox, absurdity, with an orientation towards a non-pragmatic perception and mastering of the world; if we take into account that the modern world is entering a state of critical complexity – bifurcation, that is, uncertainty, then creative people in our time should occupy leading positions in socio-economic processes. Taking into account mentioned above, creativity can be analyzed in the context of non-Archimedean geometry in modeling consciousness. In ordinary (Archimedean) geometry, the distance between two points is always expressed by a real number. In non-Archimedean spaces, the "closeness" of points is defined differently: for example, two ideas can be "indistinguishably close" in the non-Archimedean sense, but infinitely distant in ordinary logic. This corresponds to the structure of thinking, where associations can work non-linearly.

Giftedness and creativity are understood as a paradigm of modern education. It is demonstrated that giftedness, in a certain sense, is associated with human characteristics such as genius, creativity, and talent, which can be differentiated in terms of the dichotomy "actual-existing" versus "potential-possible." It is revealed that there is a developmental and pedagogical influence on the neural structure of the human brain, and the results of this influence can be "imprinted" in a person's genetic structure, which, at the level of heredity, can be transmitted to future generations.

Creativity is analyzed as a cornerstone of human health. It is shown that creative people can maintain a psychophysiological emotional-cognitive state of uncertainty for a long time, possessing the property of reflection, using several opposing ideas, concepts, representations, psychophysiological states at the same time, which allows creative people to perceive and explore such logical-informational, cause-and-effect relationships and connections that are often inaccessible to those people who strive to achieve situational clarity and logical unambiguity. Under such conditions, creativity enables a person to overcome negative psychological states and extreme life conditions by integrating opposites, allowing them to form holistic structures that reveal the synergistic effect of the systemic properties of the whole ("the whole is greater than its parts"). This reduces the entropy of living

systems, increasing a person's vitality, strengthening their immunity, and promoting a state of health.

The algorithm of pedagogical influence is grounded, which can be used in crisis and extreme conditions of human life.

References

- Abdel-Khalek A. M. (2006). Happiness, health, and religiosity: Significant relations. *Mental Health, Religion & Culture*, 9(1), 85–97. <https://doi.org/10.1080/13694670500040625>
- Acar, S., & Runco, M. A. (2015). Thinking in multiple directions: Hyperspace categories in divergent thinking. *Psychology of Aesthetics, Creativity & the Arts*, 9(1).
- Aminoff, B. (2014). On Mechanisms of Human Behaviour: Legends of Desirable Anti-Entropy Deficiency Phenomenon Theory. *Indian Journal of Health and Wellbeing*, 5, 427–436.
- Ancona, D. G., & Caldwell, D. F. (1992). Bridging the Boundary: External Activity and Performance in Organizational Teams. *Administrative Science Quarterly*, 37, 634–665. <https://doi.org/10.2307/2393475>
- Anokhin, P. (1963). Systemogenesis as a General Regulator of Brain Development. *Progress in Brain Research*, 9, *The Developing Brain*, Amsterdam, Elsevier (pp.54–86).
- Argyle Michael. (1987). *The psychology of happiness*. Methuen & Co. LTD., London & New York.
- Aronson E., & Aronson J. (2004). *The social animal*. (9 ed.) Worth/Freeman.
- Barron, F. (1963). *Creativity and psychological health: Origins of personal vitality and creative freedom*. New York, NY: Van Nostrand.
- Beaty, R. E., & Kenett, Y. N. (2023). Associative thinking at the core of creativity. *Trends in Cognitive Sciences*, 27(7), 671–683. <https://doi.org/10.1016/j.tics.2023.04.004>
- Begg, D.W. & Davids, M. (2009). *Team teaching: Bold New Venture*. Bloomington: Indiana University Press.
- Belbin, R. (1993). *Team Roles at Work*. Oxford: Butterworth-Heinemann.
- Bem, D. J. (2011). Feeling the future: Experimental evidence for anomalous retroactive influences on cognition and affect. *Journal of Personality and Social Psychology*, 100(3), 407–425. <https://doi.org/10.1037/a0021524>
- Bendetowicz, D. et al. (2018). Two critical brain networks for generation and combination of remote associations. *Brain*, 141(1), 217–233. <http://dx.doi.org/10.1093/brain/awx294>

- Bergson H. (2005). *Creative evolution*. New York: Barnes & Noble Books.
- Bettelheim, B. (1960). *The Informed Heart*. N-Y: Free Press.
- Bogg Glenn (2024). *Sophisticate or Die. Wiener-Shannon-Ashby Law & Flat Structures*. URL: <https://hdtrance.com/f/sophisticate-or-die-wiener-shannon-ashby-law-flat-structures?srsId=AfmBOoqdg5tmwKQIfChFvkfAE2Hx-pdnI7tDmV1pn52okttLASOJGMV>
- Bohm, D. (2008). A new theory of the relationship of mind and matter. *Philosophical Psychology*, 3, 271–286. <https://doi.org/10.1080/09515089008573004>
- Bono, E. de (1977). *Lateral Thinking : A Textbook of Creativity*. Penguin Books.
- Boruchovitch, E. & Mednick, B. (2002). The Meaning of Health and Illness: Some Considerations for Health Psychology. *Psico-USF*, 7, 175–183. <http://dx.doi.org/10.1590/S1413-82712002000200006>
- Cheney, G. & Christensen, L. (2001). Organizational identity: linkages between internal and external communication. *The New Handbook of Organizational Communication: Advances in Theory, Research, and Methods*. 231–269.
- Chernigovskaya, T.V., Deglin. V.L. (1986). Brain Functional Asymmetry and Neural Organization of Linguistic Competence. *Brain Lang.*, 29(1), 141–53. [https://doi.org/10.1016/0093-934X\(86\)90039-8](https://doi.org/10.1016/0093-934X(86)90039-8)
- Citko, K. (2019). Creativity as the Act of Transcending Oneself and the World: from Creativity to Transcendence. *Creativity Theories – Research – Applications*, 6, 264–268. <https://doi.org/10.1515/ctra-2019-0015>
- Clifford, G.P., & Sohal, A.S. (1998). Developing self-directed work teams, *Manage. Decision*, 36(2), 77.
- Coleman, P.H., Pietronero, L. (1992). The fractal structure of the Universe. *Physics Reports*, 213(6), 311–389. [https://doi.org/10.1016/0370-1573\(92\)90112-D](https://doi.org/10.1016/0370-1573(92)90112-D)
- Comstock, G. W. and Partridge, K. B. (1972) Church attendance and health. *Journal of Chronic Diseases*, 25, 665–672.
- Corbett, R. (2018). *Why Are Artists Poor? New Research Suggests It Could Be Hardwired Into Their Brain Chemistry*. URL: <https://news.artnet.com/art-world/why-are-artists-poor-research-suggests-it-could-be-hardwired-1310147>
- Cramer, P. (2015). Understanding Defense Mechanisms. *Psychodynamic Psychiatry*, Dec;43(4), 523–52. <https://doi.org/10.1521/pdps.2015.43.4.523>
- Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York, NY: HarperCollins Publishers.
- Davydovskij I.V. (1963). Adaptive processes in pathology. (medical, biological aspect of the problem). (Article in Czech). *Lek Veda Zahr*, 18 (10), 198–204.

- De Charms, R. (1983). *Personal Causation: The Internal Affective Determinants of Behavior* (1st ed.). Routledge. <https://doi.org/10.4324/9781315825632>
- Dubitzky, W., Kotter, T., Schmidt, O., & Berthold, M. (2012). *Towards Creative Information Exploration Based on Koestler's Concept of Bisociation*. https://doi.org/10.1007/978-3-642-31830-6_2
- Eysenck, H. J. (1995). *Genius: The natural history of creativity*. Cambridge, UK: Oxford University Press.
- Eysenck, H. J. (2003). Creativity, personality, and the convergent-divergent continuum. In M. A. Runco (Ed.), *Perspectives on creativity research. Critical creative processes* (pp. 95–114). Cresskill, NJ: Hampton Press.
- Festinger Leon (1962). *A Theory of Cognitive Dissonance*. Stanford University Press
- Fisher, K. (1994). *Leading Self-directed Work Teams*, McGraw-Hill, Chesterfield, MO, 164–70.
- Floridi, L. (2010). *Information – A Very Short Introduction*. Oxford. <https://doi.org/10.1093/actrade/9780199551378.001.0001>
- Ford, C. M., & Gioia, D. A. (2000). Factors influencing creativity in the domain of managerial decision making. *Journal of Management*, 26(4), 705–732.
- Fox S. (2024). Minimizing Entropy and Complexity in Creative Production from Emergent Pragmatics to Action Semantics. *Entropy (Basel)*. 26(5), 364. <https://doi.org/10.3390/e26050364>
- Frank D. Mitchell (1907). Mathematical Prodigies. *The American Journal of Psychology*, 18(1), 61–143.
- Frankl V. (1992). *Man's Search for Meaning: an introduction to logotherapy*. N.Y.: Beacon Press books.
- Frankl, V. (1966). Self-transcendence as a human phenomenon. *Journal of Humanistic Psychology*, 6, 97–106.
- French, T., McCabe-Dansted, J., & Reynolds, M. (2010). *Axioms for Obligation and Robustness with Temporal Logic*. 66–83. https://doi.org/10.1007/978-3-642-14183-6_7
- Gabora, L., & Kaufman, S. B. (2010). Evolutionary approaches to creativity. *The Cambridge Handbook of Creativity* (pp. 279–300). Cambridge: Cambridge University Press.
- Garberich, M. D. (2008). The nature of inspiration in artistic creativity. 3348106 *Ph.D. Michigan State University, Ann Arbor. ProQuest Dissertations & Theses A&I database*.
- Gene, E. Robinson, Russell, D. Fernald, David, F. Clayton (2008). *Genes and Social Behavior. Science*, 322, 896–900.

- Glăveanu, Vlad Petre. (2014). The Psychology of Creativity: A Critical Reading. *Creativity. Theories – Research – Applications*, 1(1), 10-32 <https://doi.org/10.15290/ctra.2014.01.01.02>
- Goffman, Erving. (1974/1986). *Frame Analysis: An Essay on the Organization of Experience*. Northern University Press.
- Greer, S. & Watson, M. (1985). Towards a psychobiological model of cancer: psychological considerations. *Social Science and Medicine*, 20, 773.
- Grindal, B.T. (2009). The Idea of Synergy and Its Bearing on An Anthropological Humanism. *Anthropology and Humanism Quarterly*, 1(3), 4–6.
- Gruber, H. E. (1988). The Evolving Systems Approach to Creative Work. *Creativity Research Journal*, 1, 27–51.
- Guastello, S. J. (2011). Nonlinear dynamical systems applications to psychology and management. In P. Allen, S. Maguire, & B. McKelvey (Eds.), *The Sage Handbook of Complexity and Management* (pp. 543–556). London: Sage.
- Guilford J. (1972). Intellect and the Gifted Gifted. *Child Quarterly*, 16, 175–184. <https://doi.org/10.1177/001698627201600301>
- Haase, J., Hanel, P. H. P., & Gronau, N. (2023). Creativity enhancement methods for adults: A meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts*. <https://doi.org/10.1037/aca0000557>
- Haken, H. (1995). An Introduction to Synergetics. *Open Systems & Information Dynamics*, 3(1), 97–130. <http://dx.doi.org/10.1007/BF02228811>
- Halldorsson, V. (2018). Team Spirit in Football: An analysis of players. Br'symbolic communication in a match between Argentina and Iceland at the men's 2018 World Cup. *Arctic*, 12, 45–68.
- Hamer R.G. (2000). *Summary of the New Medicine*. Amici di Dirk.
- Hartelius, G., Caplan, M., & Rardin, M. A. (2007). Transpersonal Psychology: Defining the Past, Divining the Future. *Humanistic Psychologist*, 35, 135–160. <https://doi.org/10.1080/08873260701274017>
- Heilman, K. M., Nadeau, S. E., & Beversdorf, D. O. (2003). Creative innovation: Possible brain mechanisms. *Neurocase*, 9(5), 369–379. <https://doi.org/10.1076/neur.9.5.369.16553>
- Hills, T. T., & Kenett, Y. N. (2025). An entropy modulation theory of creative exploration. *Psychological Review*, 132(1), 239–251. <https://doi.org/10.1037/rev0000511>
- Hirsh, J. B., Mar, R. A., Peterson, J. B. (2012). Psychological Entropy: A Framework for Understanding Uncertainty-Related Anxiety. *Psychological Review*, 119(2), 304–320. <https://doi.org/10.1037/a0026767>
- Hirt, E. R., Clarkson, J. J., & Jia, L. (Eds.). (2016). *Self-regulation and ego control*. Elsevier Academic Press.

- Hoye, S. (2013). Creativity and Hypnotizability in Creative Individuals. *Thesis for: Psy.D.* <https://doi.org/10.13140/RG.2.1.1568.1042>
- Hubbard, L. Ron (1976). *Modern Management Technology Defined: Hubbard dictionary of administration and management*. Bridge Publications.
- Hunt, C. (2021). *Critical Reflection, Spirituality and Professional Practice*. Palgrave Macmillan. <https://doi.org/10.1007/978-3-030-66591-3>
- James W. (2008). *The Varieties of Religious Experience: A Study in Human Nature*. Routledge.
- Jason, H., & Hedrick, J. (2016). Team Building: Proven Strategies for Improving Team Performance, 4th Edition. *Journal of Youth Development*, 3, 209–212. <https://doi.org/10.5195/JYD.2008.300>
- Jayatileke K. N. (1967). The logic of four alternatives. *Philosophy East and West. Hawaii, USA: University of Hawaii Press*, 17(1–4), 69–83. <https://doi.org/10.2307/1397046>
- Kajtez, N. (2023). *Entropy and Creativity, a Dialectical Approach*. Cambridge Scholars Publishing.
- Kalanov, T. (2010). The theoretical model of God: proof of the existence and of the uniqueness of God. *The General Science Journal*, 2, 1–14. <https://doi.org/10.17485/ijst/2009/v2i3/29419>
- Keel Ch. (2024) *The Conscious Dance: Quantum Gravity, Fractals, and the Fabric of Reality*. Kindle Edition.
- Kelly, S. A., et al. (2012). Functional genomic architecture of predisposition to voluntary exercise in mice: expression QTL in the brain. *Genetics*, 191(2), 643–54. <https://doi.org/10.1534/genetics.112.140509>
- Kharkhurin, A. (2015). The Big Question in Creativity Research: The Transcendental Source of Creativity. *Creativity Theories – Research – Applications*, 2, 90–96. <https://doi.org/10.1515/ctra-2015-0014>
- Kievit, R., W. Frankenhuys, L. Waldorp, and D. Borsboom. (2013). Simpson's paradox in psychological science: A practical guide. *Frontiers in Psychology* 4: 513. <https://doi.org/10.3389/fpsyg.2013.00513>
- Klix F. (1993). *Erwachendes Denken. Geistige Leistungen aus evolutionspsychologischer Sicht*. Spektrum Akademischer Verlag.
- Koestler, A. (1964). *The Act of Creation: the study of conscious and unconscious processes in humor, scientific discovery, and art*. Arkana. The Penguin Group.
- Kolb, E. M., et al. (2013). Mice selectively bred for high voluntary wheel running have larger midbrains, supporting the mosaic model of brain evolution. *Journal of Experimental Biology*, 1(216), 515–523. <https://doi.org/10.1242/jeb.076000>

- Koval, H. (2022). Psycho-semantic representation of a collective subject of volunteer activity in the structure of subjective experience. *Psychological Prospects Journal*, 39, 188–213. <https://doi.org/10.29038/2227-1376-2022-39-kov>
- Laage-Hellman, J. (2002). *Business Networks in Japan: Supplier-Customer Interaction in Product Development*. Routledge and CRC Press.
- Lajoie, D. H., & Shapiro, S. I. (1992). Definitions of transpersonal psychology: The first twenty-three years. *The Journal of Transpersonal Psychology*, 24, 79–98.
- Lambert, P. (2020). The Order-Chaos Dynamic of Creativity. *Creativity Research Journal*. <https://doi.org/10.1080/10400419.2020.1821562>
- Lazarus, M.N. et al. (2016). Correlation Team in Secondary Schools: A case study of Musoma Municipality in Tanzania. *Saudi Journal of Humanities and Social Sciences*, 26–31.
- Leithwood, K. (1998). Team learning process. In *Kenneth L. & Karen, S. L. (Eds.), Organizational learning in schools*. Netherlands: Sweets & Zeitlinger Publishers.
- Leplat, J. (1994). Collective activity in work: some lines of research. *Le Travail Humain*, 57(3), 209–226. URL: <http://www.jstor.org/stable/40659853>
- Li X et al. (2019) diffusion tensor imaging study of brain microstructural changes related to religion and spirituality in families at high risk for depression. *Brain Behav*, 9(2), e01209. <https://doi.org/10.1002/brb3.1209>
- Lichtenstein, B. M. (2000). Emergence as a process of self-organizing - new assumptions and insights from the study of non-linear dynamic systems. *Journal of Organizational Change Management*, 13(6), 526–544
- Liedloff, J. (2008). *The Continuum Concept: In Search Of Happiness Lost* (Classics in Human Development). Da Capo Press.
- Lloyd-Cox, J., Pickering, A. D., Beaty, R. E., & Bhattacharya, J. (2025). Toward greater computational modeling in neurocognitive creativity research. *Psychology of Aesthetics, Creativity, and the Arts*, 19(6), 1383–1401. <https://doi.org/10.1037/aca0000627>
- Lo, C. O., & Porath, M. (2017). Paradigm Shifts in Gifted Education: An Examination Vis-à-Vis Its Historical Situatedness and Pedagogical Sensibilities. *Gifted Child Quarterly*, 61(4), 343–360. <https://doi.org/10.1177/0016986217722840>
- Lozanov, G. (1978). *Suggestology and Outlines of Suggestopedya*, New York: Gordon & Breach.
- Maslow A.H. (1976). *The Farther Reaches of Human Nature*. N. Y.: Penguin Books.

- Massa, F. & Mahony, S. (2021). Order from Chaos: How Networked Activists Self-Organize by Creating a Participation Architecture. *Administrative Science Quarterly*, 66. <https://doi.org/10.1177/00018392211008880>
- McCord, J. (2007). *Crime and Family: Selected Essays of Joan McCord*. Philadelphia, PA: Temple University Press.
- Meijer, Dirk. (2012). Meijer D. K. F. (2012). The Information Universe. On the Missing Link in Concepts on the Architecture of Reality. *Syntropy Journal*, 1, 1-64.
- Mejia Cristian, D'Ippolito Beatrice, Kajikawa Yuya (2021). Major and recent trends in creativity research: An overview of the field with the aid of computational methods. *Creativity and Innovation Management*. 30(3), 475-497. <https://doi.org/10.1111/caim.12453>
- Mesmer-Magnus, J. R., & DeChurch, L. A. (2009). Information sharing and team performance: A meta-analysis. *Journal of Applied Psychology*, 94(2), 535-546.
- Minsky, M. Lee. (1975). A Framework for Representing Knowledge. In P. H. Winston (Ed.). *The Psychology of Computer Vision*. New-York: McGraw-Hill. Pp. 211-277.
- Miroshnychenko, O., Voznyuk, O., & Kryvonos, O. (2025). Methodological provision of determining individual typology peculiarities in winterers concerning the adaptation to extreme conditions of life activity. *Ukrainian Antarctic Journal*, 23(1), 120-143. <https://doi.org/10.33275/1727-7485.1.2025.747>
- Miroshnychenko, O. A., & Voznyuk, O. V. (2023) The motivation component of readiness for professional activities in the applicants for higher pedagogical education. *Zhytomyr Ivan Franko State University Journal. Pedagogical Sciences*, 3(114), 118-137. [https://doi.org/10.35433/pedagogy.3\(114\).2023.118-137](https://doi.org/10.35433/pedagogy.3(114).2023.118-137)
- Moghim, S., Voznyuk, A., Sinha, M., & Rybalka, V. (2022). Resilience to COVID-19 Pandemic. In: Adibi, S., Rajabifard, A., Shariful Islam, S.M., Ahmadvand, A. (eds) *The Science behind the COVID Pandemic and Healthcare Technology Solutions. Springer Series on Bio- and Neurosystems, vol 15*. Springer, Cham. (pp.543-558) https://doi.org/10.1007/978-3-031-10031-4_25
- Moliner, P., & Bovina, I. (2020). On Serge Moscovici's 95th anniversary: The theory of social representations - history, postulates and dissemination. *RUDN Journal of Psychology and Pedagogics*, 17, 542-553. <https://doi.org/10.22363/2313-1683-2020-17-3-542-553>
- Montebello, P., & Lapidus, R. (2007). Matter and Light in Bergson's Creative Evolution. *SubStance*. 36, 91-99. <https://doi.org/10.1353/sub.2007.0047>
- Montuori, A. (2011). Creativity: Systems approach. In M. A. Runco & S. R. Pritzker (Eds.), *Encyclopedia of Creativity* (2nd ed., pp. 414-421). San Diego: Academic Press.

- Moreland, J.P. (2001). *Universals*. McGill-Queen's University Press.
- Morin, E. (1999). *Les sept saviors necessaries a l'education du future*. Paris: UNESCO.
- Moskiene, L., Rackeviciene, S. (2021). Frame semantics methodology for teaching terminology of specialized domains. *Journal of Teaching English for Specific and Academic Purposes*, 9(4), Special Issue, 765-773. <https://doi.org/10.22190/JTESAP2104765S>
- Murphy, M., Donovan, S., Taylor, E. (1997). *The Physical and Psychological Effects of Meditation: A Review of Contemporary Research With a Comprehensive Bibliography, 1931-1996*. Institute of Noetic Sciences.
- Nakonechna, M. (2018). Inter-subject interaction in collective game activity. *Psychological journal*, 4(3), 110-122. <https://doi.org/10.31108/2018vol13iss3pp110-122>
- Parker, G.M. (1994). *Cross-Functional Teams*. San Francisco, CA: Jossey-Bass Publishers.
- Patrick, A. S. (1986). The role of ability in creative 'incubation'. *Personality & Individual Differences*, 7(2), 169-174. [https://doi.org/10.1016/0191-8869\(86\)90052-8](https://doi.org/10.1016/0191-8869(86)90052-8)
- Paulus, P. B., Brown, V., & Ortega, A. H. (1999). Group creativity. In A. Montuori & R. E. Purser (Eds.), *Socialcreativity* (pp. 151-176). Cresskill: Hampton Press.
- Penrose, R. (2016). *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics*. Oxford University Press.
- Perry-Smith, J. E., & Shalley, C. E. (2003). The social side of creativity: A static and dynamic social network perspective. *The Academy of Management Review*, 28(1), 89-106.
- Piaget, J. (1950). *The Psychology of Intelligence*. London: Routledge and Kegan Paul.
- Porshnev, B. F. (1976) *O začiatkoch ľudských dejín*. Bratislava, Veda.
- Poutanen, P. (2013). Creativity as seen through the complex systems perspective. *Interdisciplinary Studies Journal*, 2(3), 207-221.
- Pronyakin, V. (2001). Transcendental-Anthropological Groundings of Creative Thinking in I. Kant's Metaphysics. *Sententiae*, 3(1), 39-50. <https://doi.org/10.31649/sent03.01.039>
- Puccio, G. J., & Cabra, J. F. (2010). Organizational creativity: A systems approach. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge Handbook of Creativity* (pp. 145-173). Cambridge: Cambridge University Press.
- Putilov, A. (2021). Quo Vadis, Chronopsychology?. *Neuroscience and Behavioral Physiology*, 51. <https://doi.org/10.1007/s11055-021-01187-y>

- Pylkkänen, P. (2016). Consciousness in the light of quantum theory. In: *Prem Saran Satsangi, Stuart Hameroff, Vishal Sani, Pami Dua (ed.), Consciousness: Integrating Eastern and Western Perspectives* (pp. 23–34). New Delhi: New Age Books.
- Raine A, Manders D. (1988). Schizoid personality, inter-hemispheric transfer, and left hemisphere over-activation. *Br J Clin Psychol.* 27(4), 333–47. <https://doi.org/10.1111/j.2044-8260.1988.tb00798.x>
- Renzulli, J. S. (2000). The identification and development of giftedness as a paradigm for school reform. *Journal of Science Education and Technology*, 9(2), 95–114. <https://doi.org/10.1023/A:1009429218821>
- Rhawn, J. (2020). *Paradoxes of Time Travel: The Uncertainty Principle, Wave Function, Probability, Entanglement, Quantum Physics, Multiple Worlds*. Cosmology Science Publishers.
- Richards, R. (1996). Does the lone genius ride again? Chaos, creativity, and community. *Journal of Humanistic Psychology*, 36(2), 44–60
- Richards, R. (2001). Millennium as opportunity: Chaos, creativity, and Guilford's structure of intellect model. *Creativity Research Journal*, 13(3–4), 249–265. URL: <http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=5673217&site=ehost-live&scope=site>
- Richter, A. & Ennen, E. (2010). The Whole Is More Than the Sum of Its Parts" Or Is It? A Review of the Empirical Literature on Complementarities in Organizations. *Journal of Management*, 36, 207–233. <https://doi.org/10.1177/0149206309350083>
- Ringen, J. (1985). Operant Conditioning and a Paradox of Teleology. *Philosophy of Science*, 52(4), 565–577. URL: <http://www.jstor.org/stable/187440>
- Rogers, C. R. (1961). *Towards the theory of creativity*. Anderson H. H. (Ed.) Creativity and its Cultivation. N. Y.: Harber.
- Rosenthal, R., & Fode, K. L. (1963). The effect of experimenter bias on the performance of the albino rat. *Behavioral Science*, 8(3), 183–189. <https://doi.org/10.1002/bs.3830080302>
- Rotenberg, V. S. (1993). Richness against freedom: Two hemisphere functions and the problem of creativity. *European Journal of High Ability*. 4(1), 11–19. <https://doi.org/10.1080/0937445930040102>
- Rotenberg, V. S. (2020). The formation of two types of contexts by the brain hemispheres as a basis for a new approach to the mechanisms of psychotherapy. *The Divided Therapist: Hemispheric Difference and Contemporary Psychotherapy*. Taylor and Francis, 259–278. <https://doi.org/10.4324/9781003049876-10>

- Rotenberg, V. S., & Arshavsky, V. V. (1991). Psychophysiology of hemispheric asymmetry – The "entropy" of right-hemisphere activity. *Integrative Physiological and Behavioral Science*, 26(3), 183–188. <https://doi.org/10.1007/BF02912509>
- Runco, M. A., & Jaeger, G. J. (2012). The Standard Definition of Creativity. *Creativity Research Journal*, 24(1), 92–96. <https://doi.org/10.1080/10400419.2012.650092>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Sánchez-Capdequi, C., & Beriain, J. (2023). Creativity, transcendence, and social constellations. *Current Sociology*, 72(2), 235–252. <https://doi.org/10.1177/00113921231190714>
- Saunders, R. (2011). Artificial Creative Systems and the Evolution of Language. *Proceedings of the 2nd International Conference on Computational Creativity, ICC 2011*.
- Sawyer, R. K. (1999). The emergence of creativity. *Philosophical Psychology*, 12(4), 447–469.
- Sawyer, R. K. (2012). *Explaining creativity: The science of human creativity* (2nd ed.). New York, NY: Oxford University Press.
- Schank, R. C., & Abelson, R. P. (2013). Scripts, Plans, Goals, and Understanding. An Inquiry Into Human Knowledge Structures. *Psychology Press*.
- Schooler, J. W. et al (2014). The middle way: Finding the balance between mindfulness and mind-wandering. *Psychology of Learning and Motivation*, 60, 1–33. <https://doi.org/10.1016/B978-0-12-800090-8.00001-9>
- Schrödinger, E. (1992). *What is Life?* Cambridge University Press.
- Sedgwick, H.A. (2021). J. J. Gibson's "Ground Theory of Space Perception". *i-Perception*, 12(3). <https://doi.org/10.1177/20416695211021111>
- Selye J. (1974). *Stress Without Distress*. Philadelphia: J. B. Lippincott Co.
- Sharlin, S. A., & Polansky, N. A. (1972). The process of infantilization. *American Journal of Orthopsychiatry*, 42(1), 92–102. <https://doi.org/10.1111/j.1939-0025.1972.tb02475.x>
- Shekelle, R.B. et al. (1981). Psychological depression and 17-year risk of death from cancer. *Psychosomatic Medicine*, 43, 117–125.
- Shickel, B., Siegel, S., Heesacker, M., Benton, S., & Rashidi, P. (2020). Automatic Detection and Classification of Cognitive Distortions in Mental Health Text. *2020 IEEE 20th International Conference on Bioinformatics and Bioengineering (BIBE)*, 275–280. <https://doi.org/10.1109/BIBE50027.2020.00052>

- Shteba, A. (2020). Diplasty of language categorization of mixed emotions. *Verhnevolzhski Philological Bulletin*, 22, 176-181. <https://doi.org/10.20323/2499-9679-2020-3-22-176-181>
- Simon, F., & Peter, W. E. (2023). Retrocausality in Quantum Mechanics. *The Stanford Encyclopedia of Philosophy* (Winter 2023 Edition), Edward N. Zalta & Uri Nodelman (eds.), URL: <https://plato.stanford.edu/archives/win2023/entries/qm-retrocausality/>
- Simonov, P.V. (1991). *The motivated brain: a neurophysiological analysis of human behavior*. Philadelphia: Gordon and Breach Science Publishers.
- Simonton, D. K. (1984). *Genius, creativity, and leadership: Historiometric inquiries*. Harvard University Press.
- Soma, Ch., & Joydeep, B. (20 Feb 2025). Poetic Break: Incubation for Associative Creativity. *Creativity Research Journal*, <https://doi.org/10.1080/10400419.2025.2466571>
- Sternberg, R. J. (1986). A Triangular Theory of Love. *Journal Psychological Review*, 93(2), 119-135.
- Summa, M. (2017). Toward a transcendental account of creativity. Kant and Merleau-Ponty on the creative power of judgment and creativity as institution. *Cont. Philos. Rev.* 50, 105-126. <https://doi.org/10.1007/s11007-016-9391-3>
- Suwala, L. (2017). On Creativity: From conceptual ideas towards a systemic understanding, In: *Brydges, Taylor et al. (Ed.): European Colloquium on Culture, Creativity and Economy (CCE) Working Paper Compendium*, Kunnskapsverket, Lillehammer, 82-111. <https://hdl.handle.net/10419/221767>
- Sweller, J. (2009). Cognitive bases of human creativity. *Educational Psychology Review*, 21(1), 11-19. <https://doi.org/10.1007/s10648-008-9091-6>
- Szewc, J. (2014). Selected Success Factors of Virtual Teams: Literature Review and Suggestions for Future Research. *International Journal of Management and Economics*, 38. <https://doi.org/10.2478/ijme-2014-0015>
- Szmaglinska, M., Andrew, L., Massey, D., & Kirk, D. (2023). Exploring the Underutilized Potential of Clinical Hypnosis: A Scoping Review of Healthcare Professionals' Perceptions, Knowledge, and Attitudes, International. *Journal of Clinical and Experimental Hypnosis*. <https://doi.org/10.1080/00207144.2023.2276451>
- Tae, L., Ramdani, Z., Prakoso, B., & Amrullah, S. (2018). *Systematic Review and Exploration of the Aspect of Creativity in the Context of Education*, 114-119. <https://doi.org/10.26499/iceap.v1i1.83>

- Taylor, J., Sharples, M., O'Malley, C., Vavoula, G., & Waycott, J. (2006). Towards a task model for mobile learning: a dialectical approach. *International Journal of Learning Technology*, 2. <https://doi.org/10.1504/IJLT.2006.010616>
- Tooby, J., Cosmides, L., & Barrett, H. C. (2003). The second law of thermodynamics is the first law of psychology: evolutionary developmental psychology and the theory of tandem, coordinated inheritances: comment on Lickliter and Honeycutt (2003). *Psychological Bulletin*, 129(6), 858–865. <https://doi.org/10.1037/0033-2909.129.6.858>
- Torrance, E. P. (1963). The creative personality and the ideal pupil. *Teachers College Record*, 65(3), 1–9.
- Upton, J., Janeka, I., & Ferraro, N. (2014). The Whole Is More Than the Sum of Its Parts: Aristotle, Metaphysical. *The Journal of craniofacial surgery*, 25, 59–63. <https://doi.org/10.1097/SCS.0000000000000369>
- Urmantsev, Y. (1986). Symmetry of System and System of Symmetry. *Computers and Mathematics with Applications*, 12(1–2), part B, 379–405. [https://doi.org/10.1016/0898-1221\(86\)90160-4](https://doi.org/10.1016/0898-1221(86)90160-4)
- Valček, P. (2009) Diplastie – návrat neostrého denotátu – kultura masového poselství v mentálním ohniskue-civilizace, In *Média dnes, Olomouc, Univerzita Palackého*, 101–112.
- Vedral, V. (2023). The Everything-Is-a-Quantum-Wave Interpretation of Quantum Physics. *Quantum Reports*, 5(2), 475–480. <https://doi.org/10.3390/quantum5020031>
- Voznyuk, A. (2017). A New paradigm of psychotherapy correction (rehabilitation) of the children with special needs. *American Journal of Fundamental, Applied & Experimental Research*, 3(6), 86–92. URL: <https://online.fliphtml5.com/vuiiz/ltqf/#p=1>
- Voznyuk, A. (2025). An interdisciplinary approach to education will help solve many of its urgent problems. *Forum for Education Studies*, 3(1), 1–32. 1948. <https://doi.org/10.59400/fes1948>
- Voznyuk, A., & Manolov, M. (2019). On the problem of human consciousness: from facts to theoretical speculations. *Diogenes*, 27(1), 48–62. <https://doi.org/10.54664/MTAC9243/>
- Voznyuk, A., Gorobets, S., Kubitskyi, S., Domina, V., Gutareva, N., Roganov, M., & Bloshchynskyi, I. (2021). Interdisciplinary Educational Technology based on the Concept of Human Brain Functional Asymmetry. *Postmodern Openings*, 12(2), 433–449. <https://doi.org/10.18662/po/12.2/316>
- Voznyuk, A., Kubitskyi, S., Balanovska, T., Chip, L., & Dorofyeyev, O. (2022). Synergetic simulation of managing processes in educational sphere in the contest of temporary self-ruled managerial target teams application. *Financial and Credit Activity Problems of Theory and Practice*, 3(44), 317–327. <https://doi.org/10.55643/fcaptp.3.44.2022.3749>

- Voznyuk, O. V. (2020). *Fundamental Factors of Human Health as Prerequisites for COVID-19 Prevention. Philosophy, psychology and pedagogics against COVID-19: Manual* / Ed. : V. V. Rybalka, A. P. Samodryn, O. V. Voznyuk and others; a team of authors. (pp. 223-250). Zhytomyr: Publisher O. Yevenok.
- Voznyuk, O. (2020a). [Paradox-oriented educational paradigm. New technologies of education](http://eprints.zu.edu.ua/31265/), 94, 332–334. URL: <http://eprints.zu.edu.ua/31265/>
- Voznyuk, O. (2021a). [Upbringing process as a paradoxical phenomenon: the main aspects of a new paradigm of education](http://eprints.zu.edu.ua/34063/). *Creative pedagogy*, 15, 21–30. URL: <http://eprints.zu.edu.ua/34063/>
- Voznyuk, O. (2023). Deepening the principles of media education based on the general systems theory. *Zhytomyr Ivan Franko State University Journal. Pedagogical Sciences*, 1(112), 29–38. [https://doi.org/10.35433/pedagogy.1\(112\).2023.29-38](https://doi.org/10.35433/pedagogy.1(112).2023.29-38)
- Voznyuk, O. V., & Hogobets, S. M. (2023). The formation of conceptual thinking in the participants in the educational process: a systemic approach. *Zhytomyr Ivan Franko State University Journal. Pedagogical Sciences*, 4(115), 50–64. [https://doi.org/10.35433/pedagogy.4\(115\).2023.5](https://doi.org/10.35433/pedagogy.4(115).2023.5)
- Wang, B., Yang, L., Yan, W., An, W., Xiang, J., & Li, D. (2023). Brain asymmetry: a novel perspective on hemispheric network. *Brain Science Advances*, 9(2), 56–77. <https://doi.org/10.26599/BSA.2023.9050014>
- Waters, R. P., Pringle, R. B., Forster, G. L., Renner, K. J., Malisch, J. L., Garland Jr., T., & Swallow, J. G. (2013). Selection for increased voluntary wheel-running affects behavior and brain monoamines in mice. *Brain Research*, 1508, 9–22. <https://doi.org/10.1016/j.brainres.2013.01.033>
- Weinzweig, P. (1988). *The ten commandments of personal power. Creative strategies for shared happiness and success*. N.Y.: Meridian Press.
- Westbrook, A. (2021). *The thermodynamics of the creative process*. Medium, March 8.
- Whitfield, J.M., W.P. Anthony & K.M. Kacmar (1995). Evaluation of team-based management: A case study. *J. Org. Change Manage.*, 8 (2), 17–28.
- Winner, E. (2000). The origins and ends of giftedness. *American Psychologist*. 55(1), 159–169. <https://doi.org/10.1037/0003-066X.55.1>
- Yeager, D. S., Johnson, R., Spitzer, B. J., Trzesniewski, K. H., Powers, J., & Dweck, C. S. (2014). The far-reaching effects of believing people can change: Implicit theories of personality shape stress, health, and achievement during adolescence. *Journal of Personality and Social Psychology*, 106(6), 867–884. <https://doi.org/10.1037/a0036335>
- Yesayan, G., & Naghdyan, R. (2023). Trinitary Approach as a Methodological Principle of Transcendental Psychology. *WISDOM*, 25, 31–41. <https://doi.org/10.24234/wisdom.v25i1.971>

- Youvan, D. (2024). *The Fractal Universe: A Revised Cosmological Principle and its Implications for Physics and Cosmology*. <https://doi.org/10.13140/RG.2.2.28755.80164>
- Youvan, D. (2024). *Unlocking Hypnagogic Creativity: Exploring the Cognitive Mechanisms of Inspiration in the Borderland of Sleep*. <https://doi.org/10.13140/RG.2.2.24671.27043>
- Yuravljev, B.V. (2006). Useful adaptive effect as a physiological process in functional systems of the organism. *Zbornik Matice srpske za prirodne nauke*, 111, 5-14. <https://doi.org/10.2298/ZMSPN0611005Z>
- Zahedi A., Lynn S., J., Sommer W (2024). How hypnotic suggestions work – A systematic review of prominent theories of hypnosis. *Consciousness and Cognition*, 123, <https://doi.org/10.1016/j.concog.2024.103730>
- Zausner, T. (1998). When walls become doorways: Creativity, chaos theory, and physical illness. *Creativity Research Journal*, 11(1), 21–28. https://doi.org/10.1207/s15326934crj1101_3
- Zedelius, C. M., Protzko, J., Broadway, J. M., & Schooler, J. W. (2021). What types of daydreaming predict creativity? Laboratory and experience sampling evidence. *Psychology of Aesthetics, Creativity, and the Arts*, 15(4), 596. <https://doi.org/10.1037/aca0000342>
- Zeng, Y. (2013). Humour and Creative Design: Twins or Partners?. *Journal of Integrated Design and Process Science. Bisociative Knowledge Discovery*. Springer Verlag. https://doi.org/10.1007/978-3-319-00020-0_0020
- Zerbi, V., Floriou-Servou, A., Markicevic, M., Vermeiren, Y., Sturman, O., Privitera, M., Ziegler, L. von, Ferrari, K. D., Weber, B., Deyn, P. P. D., Wenderoth, N., & Bohacek, J. (2019). Rapid Reconfiguration of the Functional Connectome after Chemogenetic Locus Coeruleus Activation. *Neuron*, 103(4), 702-718.e5. <https://doi.org/10.1016/j.neuron.2019.05.034>
- Ziegler, A., Stoeger, H., & Vialle, W. J. (2012). Giftedness and gifted education: the need for a paradigm change. *Gifted Child Quarterly*, 56 (4), 194-197. URL: <https://ro.uow.edu.au/edupapers/1220>
- Zimecki, M. (2006). The lunar cycle: effects on human and animal behavior and physiology. *Postepy Hig Med Dosw (Online)*, 60, 1-7.