



Resonant Actualization of Cultural Codes as a Determinant of Mental and Social Transformations (Part 2)

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Abstract

The cumulation of cultural codes forms and structures the integral matrix of information capacity - the cognitive thesaurus (CT) of the psyche. The dissociation of the parameters of the current balance of somatic/mental homeostasis initiates a compensatory need. The “need” extracts from the CT (actualizes) the “image” of the cultural code - a representable informational equivalent of the “need” (“dominant”). Being the content of consciousness at the time of relevance, “dominant” acquires the properties of a resonant operator, a dominant focus, forming control mental constructs. Actualization of the “dominant” initiates the activity of the “action result acceptor.” For the actual dominant, the “action result acceptor” is an indicator/corrector, a frequency matching censor (resonance): perceptual dynamics of operational images of external presentation (“code key”) to the parameters of the “dominant” (code). Decoding the physical parameters of the “code” provides the potential to regulate the resonant impact on the arsenal of “cultural codes” of CT through moderation of the “code key.” The CT, through the “action result acceptor” (the extra-conscious regulator of the actual autozoetic forms of mental activity), programs and formats the somatic/psychic continuum of the individual. The integral matrix of the CT, having a location outside the conscious sector of the psyche, including the imperative corrector of the perceived sector of the psyche associated with the emotional register, determining/correcting the main vectors of the regulation of the life continuum, is meaningfully close to the philosophical/psychological criteria of the main cognitive regulator of the person activity, defined as the soul. (**International Journal of Biomedicine. 2022;12(4):675-678.**)

Keywords: cultural code • neuronal networks • cognitive thesaurus • spatiotemporal transformation • soul

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Abbreviations

ARA, action result acceptor; CC, cultural codes; CT, cognitive thesaurus; GC, generator-converter; SPT, spatiotemporal transformation.

Basic Part

All kinds of extra/interoceptive information in the fields of reception are converted into afferent electrical (frequency) and magnetic patterns. Afferent information undergoes spatiotemporal transformation (STT): the transformation of energy (light, sound, chemical, mechanical) of the carrier at the entrance to the system, transfer to analyzers, divergence/convergence, actualization, generation of cognitive products,

displacement from consciousness, compression (reduction of redundancy while maintaining the completeness of the information).⁽¹⁾ The operational sequence of brain activity is as follows: the transformation of physical signals of the external environment into electromagnetic afferent flow>transformation of electromagnetic signals into mental constructs>generation of an efferent flow of control constructs of the psyche. We believe it can qualify the brain as a “generator-converter” of energy/information. The constructive result of the activity of the “generator-converter” is the nervous and cognitive constructs⁽²⁾ of the psyche (“dominant”) - control signals formed on the basis of redundant information and STT. In this message, “dominant” is a generalized definition of organized hierarchized constructs (packages) of cognitive information

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carriers: actual>de-actualized>repressed from conscious levels of the psyche>circulating in closed neural circuits.⁽³⁾ Actualized by a compensatory need (above-threshold dissociation of the parameters of the current equilibrium of homeostasis), “dominant” becomes a resonant operator, a dominant focus, transforming into a generator of structures of mental sequences that ensure the restoration of homeostasis. In other words, “dominant” is formed and implemented as a neural association containing an encoded informational equivalent of a need with the potential to generate mental constructs upon actualization (“program” of GC).

Central generators of rhythmic activity require neither sensory inputs nor time-consistent information from outside.^(4,5) The need for central generators of rhythmic activity in energy (metabolic) supply should be emphasized. The redundancy of afferent information creates the possibility of forming and structuring more than one (i.e., non-deterministic) type of behavioral activity, creating and coordinating behavioral programs implemented by neural generators. The redundancy of the information flow allows for the possibility of complication with the direct interaction of the neural generators. In other words, we believe that the brain is a “generator-converter” of energy/information of a set of neural associations that provide processes for both the “nervous” and “cognitive” sectors of the psyche aimed at ensuring the stability of somatic-psyche homeostasis. We share a common view on the storage of information in the brain in the form of frequency patterns circulating in closed neural circuits, the activity of which is reduced to a few stable states that perform the functions of information retention with error correction and reproduction of retained conditions.^(3,6)

Having undergone STT and being forced out of consciousness, the “dominant” retains a stable frequency pattern of electric/magnetic parameters (“code”) of the perceived and transformed image - “the informational equivalent of the object.”⁽⁷⁾ The arsenal of stored electromagnetic patterns of “dominants” (packages of information carriers) is the basic potential, the informational thesaurus of the psyche. The extraction of the “dominant” in the event of a “need” (actualization in consciousness, the acquisition of the functions of a resonant operator), along with the generation of mental constructs, initiates the mechanism of the action result acceptor (ARA). It is assumed that the ARA is implemented by a network of intercalary neurons in-ring interaction, which is a model of the future result with the expected feedback from the action results. Mismatch initiates an orienting-exploratory reaction.^(8,9)

We believe that the ARA is an oscillating indicator of the coincidence/mismatch of the frequency parameters of the “code”/“code key”⁽¹⁰⁾ in the “cognitive” sector of the psyche. In other words, the primary imbalance of the “current equilibrium” of somatic/mental homeostasis forms a compensatory structure: need>image (the imaginable equivalent of a “need”)>motive>purposeful behavior, where the ARA is an indicator of the conformity of the matrix of “codes” (vital, social, ideal)⁽¹¹⁾ and perceptual dynamics of presented operational images, i.e., goal achievement vector.

We share the idea of human life as a spatiotemporal continuum of events, which is encoded by a continuum of

neurophysiological, vegetative-emotional, and somatic-functional reactions of the whole organism.⁽¹²⁾ The data presented earlier⁽¹³⁻¹⁷⁾ allow us to determine the dynamics of the configuration and vectors of interdependent changes in the continuum of metabolism and hemodynamics, which ensure the balancing of homeostasis, both for the “norm” and the “pathology.”⁽¹⁶⁾ We consider the exchange continuum as a matrix of the physiological “norm,” a comparison with which allows us to determine the vectors of changes in metabolism/hemodynamics in any pathology. Changes in the sets of correlation connections of the “norm” matrix are an indicator of the dynamics of vectors and the quality of metabolic connections that ensure stable hemodynamics and make up a continuum of a new (altered) level of homeostasis. For example, the transformation of signs, compositions, and vectors of metabolic regulatory relationships in hypertension reflects the mechanisms for ensuring stable hemodynamics under conditions of parametrically changed homeostasis.^(13,14) That is, stable hemodynamics in hypertension is provided by a different metabolic continuum compared to the norm. Changes in metabolism/hemodynamics with “pathology” are accompanied by changes in the psyche (we do not consider the arguments of the priority of physiology/psychology). We believe that specific changes in the psyche in hypertension (and any other pathology) are an external sign of structural changes in the somatic/psyche continuum aimed at finding the boundaries of sustainable functioning. A similar mechanism forms search (adaptive, homeostatic) forms of behavior in the event of an imbalance in the sphere of social and ideal needs of the individual. The suprathreshold (boundaries of hidden frames) deviation of the socio-psychological parameters of the personality/society interrelation forms the sequence: need>goal image (a conscious need code)>motive>motivational gradient that determines the vectors and duration of goal-directed behavior structures. Achieving the goal, both tactical and at the stages of long-term attitudes, eliminates the need, and forms the parameters of temporary equilibrium in the field of ethics/aesthetics, i.e., balances the socio-psychological homeostasis. The impossibility of achieving the equilibrium parameters of homeostasis initiates orienting/search reactions, which can reach amplitudes exceeding the threshold values of both somatic and mental segments of homeostasis. The result is adaptive changes in metabolism, hemodynamics, psyche, and achievement of a range of stable functioning, equivalent to the changed parameters, defined as “pathology.” Structural differences in the somatic/psyche homeostatic balance of “pathology” in comparison with “norm” (quantitative, qualitative, mental) suggest a transformation of compensatory needs and methods of their elimination. In other words, we consider “pathology” as an adaptive somatic/psyche dynamic of internal/external genesis with diverging vectors of searching for parameters of new homeostasis or development of final states.

The nosology of “pathology” determines the forms and vectors of adaptive dynamics, the structure of the transformation of compensatory needs and the arsenal of their informational equivalents (“dominants”), forming the dynamics of the somatic/psyche continuum, parametrically

different from the “norm.” Considering the physical properties of the informational equivalent of the need (fixed electromagnetic and hemodynamic identification patterns), we believe that decoding the “dominant” in the period of relevance is technically possible.

The creation of a “portrait” (electromagnetic, magnetic resonance, etc.) of the decoded “dominant” (the equivalent of “need”) provides the potential to regulate the resonant impact on the arsenal of “cultural codes” of CT through moderation of the “code key” to correct the equivalent of the transformed “need” in case of “pathology,” which creates the possibility of a regulatory impact on the somatopsychic continuum as a whole.

We consider cultural codes (CCs) (integral images encoded in “dominant” patterns) as a fixed set of images associated with complexes of stereotypes integrated with the unconscious meaning of a thing/phenomenon in the context of culture.⁽³⁾ The totality of CCs constitutes the integral matrix of the cognitive thesaurus (CT). The CT results from the cumulation of CCs formed by education, upbringing, cultural landscape, social action, and interaction.⁽¹⁰⁾ The interference of the genotype and dynamics of CT determines the structure and vectors of the psychological development of the individual, the potential for creativity, and social adaptation (the structural frame of the personality).

The ARA is an indicator-corrector (frequency censor) of the limits of the admissibility of correlations: perceptual dynamics of the frequency characteristics of operational images of external presentation (“code key”) to the content of the CT matrix. We believe that the integral matrix of the CT, which is outside the perceived sectors of the psyche and includes the imperative corrector/indicator (ARA) of cognitive production associated with the emotional register, determines and corrects the main vectors of the individual’s life activity and is meaningfully close to the philosophical/psychological criteria of the main regulator of cognitive activity human, defined as “soul.” We believe that the resonant interaction also determines the indication/correction of the frequency correspondence/inconsistency for packets of sequential perceptual information (melody, theater, taste, etc.) to the standards of CCs in the CT. Education/upbringing implants stable ethical/aesthetic standards into the psyche, which form an arsenal of cultural code elements. The increase in the number, complication, and hierarchization of CCs,^(18,19) expanding the cultural potential, creates new compensatory needs, the structure of which does not always imply the possibility of their satisfaction. New needs are incentives for orienting-search behavior and an increase in the amplitude of adaptive fluctuations of the individual/society. For example, in the 18th century, the development of conceptual thinking created and scaled constructively new needs - “liberty, equality, fraternity” (with initial interference and subsequent cascading development along divergent trajectories), which became a bifurcation point that changed the social paradigm of “devotion and service” to “individualism and independence.” The result was an avalanche-like growth of individual/social frustration potential and social transformations of the 18th-20th century period.⁽²⁰⁻²²⁾

The ARA is activated when the “dominant” is actualized, determining the behavior by the ratio of the frequency parameters of the dynamics of operational images with the “standards” (CCs) of the CT matrix arsenal. Approximation of the frequency characteristics of the images of external presentation to the boundaries of the frequency range of CCs (hidden frames) forms behavior vectors by changing the evaluative sign of indication of the ARA correspondence of the “code”/“code key,” potentiated by the emotional equivalents of feedback (+, 0, -). The preconscious phase of the convergence of the frequencies of the “code”/“code key” (pre/perception) is subjectively felt as a vector emotional stress (+, 0, -) with equivalent changes in the heart rate (markers of the dynamics of the “dominant” actualization). In other words, the ARA (with an indication in the emotional register) is a vector regulator of the relation between the “dominant” (code) and the dynamics of operational images of the “code key.” The ARA is an imperative corrector of cognitive activity, where the CT matrix is an arsenal of standards that determines the parameters of the ARA oscillation by the boundaries of standards (ethical, regulatory, and other codes, hidden frames). Thus, the CT matrix programs and formats the individual’s life (socio/somatic/psychic) continuum, being outside the boundaries of conscious mental activity. ARA, an indicator of the CT frequency response dynamics and presented operational images, being neither energy nor a substance, determines the vectors and duration of the interaction of material information carriers (“code”/“code key”), the mechanism of interaction of which, as we believe, is an electromagnetic resonance.⁽¹⁰⁾ The fundamental basis of this design is a genetic predisposition (genotype) and the integral volume of the CCs. Genetic determinism and acquired properties of the psyche (quality, volume, level of essential awareness) are a structural filter of the information received and subsequent associative structures. This filter formats the parameters of the cognitive derivative of the psyche, a symbol (image+sense), determining the semantic content of the image, vectors, and forms of purposeful behavior aimed at stabilizing socio/somatic/mental homeostasis.

Conclusion

The cumulation of CCs forms and structures the integral informative matrix of the cognitive sector of the psyche - CT. The “need,” the above-threshold dissociation of the parameters of the current balance of somatic/psychic homeostasis, extracts (actualizes) the “image” of the cultural code from the CT, which is a conscious informational equivalent of the need. The actualized “code” acquires the properties of a resonant operator, a dominant focus for the time of relevance. Deciphering the physical parameters of the “code” provides the potential to regulate the resonant impact on the arsenal of “cultural codes” of CT through moderation of the “code key.”

The integral informational cognitive matrix, which is outside the conscious levels of the psyche, including the ARA (the corrector of the conscious sector of the psyche) associated with the emotional register, determines the main vectors for stabilizing the socio/somatic/mental homeostasis of a person.

Through the ARA, the extra-conscious regulator of the actual (autozoetic awareness) forms of mental activity, the integral cognitive matrix programs, and formats human life as a whole, which makes it possible to consider it as a formation that is meaningfully close to the philosophical/psychological definitions of the main cognitive regulator of human life activity, formulated as the soul.

Competing Interests

The authors declare that they have no competing interests.

References

1. Shannon C. Works on information theory and Cybernetics [Raboty po teorii informatsii i kibernetike]. Trans from English. M.: Izdatel'stvo Inostrannoi Literatury.1963. [In Russian].
2. Vecker LM. Psyche and reality. Unified theory of mental processes. M.: Izdatel'stvo Smysl, 2000. [In Russian].
3. Eccles JS. An instruction-selection theory of learning in the cerebral cortex. N. Holland Biomedical Pres; 1976.
4. Sidorov AV. Central rhythm generators and functional activity neural networks of the brain. News of biomedical sciences. Minsk; 2010. [In Russian].
5. Arshavsky I, Deliagina TG, Orlovsky GN. [Central Pattern Generators: Mechanisms of the Activity and Their Role in the Control of "Automatic" Movements]. Zh Vyssh Nerv Deiat Im IP Pavlova. 2015 Mar-Apr;65(2):156-87. [Article in Russian].
6. Hopfield JJ. Neural networks and physical systems with emergent collective computational abilities. Proc Natl Acad Sci U S A. 1982 Apr;79(8):2554-8. doi: 10.1073/pnas.79.8.2554.
7. Anokhin AP. Psychic form of reflection of reality. Sofia. 1969.
8. Anokhin AP. Features of the afferent apparatus of the conditioned reflex and their significance for psychology. M. Questions of psychology.1955. [In Russian].
9. Shomes AP. Model of behavior of perception and thinking. M. Education. 2010.
10. Resonant Actualization of Cultural Codes as a Determinant of Mental and Social Transformations (Part 1). *International Journal of Biomedicine*. 2022;12(3):476-479. doi:10.21103/Article12(3)_PV.
11. Simonov PV. Need-information theory of emotions. M.: Voprosy Psikhologii. 1982. [In Russian].
12. Khrustalev YM. Philosophy of the psychosomatic problem. Philosophy of science and medicine. M. GEOTAR. 2009. [In Russian].
13. Kruglov AG, Gebel GY, Vasilyev AY. Impact of Intra-Extracranial Hemodynamics on Cerebral Ischemia by Arterial Hypertension (Part 1). *International Journal of Biomedicine*. 2012;2(2):89-95.
14. Kruglov AG, Gebel GY, Vasilyev AY. Impact of Intra-Extracranial Hemodynamics on Cerebral Ischemia by Arterial Hypertension (Part 2). *International Journal of Biomedicine*. 2012.2(2).96-101.
15. Kruglov AG, Utkin VN, Sherman V. Human Homeostatic Control Matrix in Norm. *International Journal of Biomedicine*. 2016;6(3):194-189. doi: 10.21103/Article6(3)_OA5.
16. Kruglov AG, Vasilyev AY, Sherman V. Human dynamics homeostasis control matrix in the norm with psychophysiological aspects. New York: IMRDC; 2016.
17. Kruglov AG, Utkin VN, Vasilyev AY, Kruglov AA. Spatial Synchronization of Hemodynamics and Metabolism in Norm. *International Journal of Biomedicine*. 2020;10(1):24-28. doi: 10.21103/Article10(1)_OA2.
18. Sumrow A. Motivation: a new look at an age-old topic. *Radiol Manage*. 2003 Sep-Oct;25(5):44-7.
19. Behjati M. The concept of Maslow's pyramid for cardiovascular health and its impact on "change cycle". *ARYA Atheroscler*. 2014 Jan;10(1):65-9.
20. Kruglov AG, Kruglov AA Adaptive Changes in the Psyche of Homo Sapiens During the Period of Singularity. (Part 1). *International Journal of Biomedicine*. 2020;10(2):95-100.
21. Kruglov AG, Kruglov AA. Adaptive Changes in the Psyche of Homo Sapiens during the Period of the Singularity (Part 2). *International Journal of Biomedicine*. 2021;11(1):68-72. doi:10.21103/Article11(1)_PV
22. Kruglov AG, Kruglov AA. Adaptive Changes in the Psyche of Homo Sapiens during the Period of the Singularity (Part 3). *International Journal of Biomedicine*. 2021;11(3):318-322 doi:10.21103/Article11(3)_PV.