Japan Journal of Research

Original Article

Comparative Principles of the Structure of the Psyche of the Homo Sapiens and Artificial General Intelligence - PART 2

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Abstract

Significant dissociation of the parameters of the internal environment, destabilization of the systemic threshold of equilibrium and controllability of homeostasis leads to the emergence of compensatory need and an increase in uncertainty, which is considered as a measure of information symmetry. A deterministic equivalent reaction is the formation by the psyche of a systemic phase state in which the compensatory need is transformed into an information equivalent – an image, a Code. During the restoration of the homeostatic "current equilibrium", the updated Code becomes the content of consciousness, the dominant, acquiring the qualities of a resonant operator. Selective interaction with the external environment is carried out by consciousness, which we consider as the interface of the psyche/external environment systems with the dynamic and control functions of the two-way flow of information and regulatory algorithms. The goal-directed search activity of the psyche, initiated by homeostatic imbalance, is instrumentally realized through voluntary attention, and consists in searching for a parametric resonance of electro/magnetic parameters of the information equivalent of the need, the Code and the goal, the Code Key.

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- Received Date: 16 Aug 2024
- Accepted Date: 28 Aug 2024
- Publication Date: 31 Aug 2024

Keywords

homeostasis; regulation; uncertainty; adaptive oscillations; need; quasi-attractor.

Abbreviations

H: homeostasis; U: uncertainty; NR: norm; CI: confidence interval; CD: code; D: dominant; B: brain; RA: regulatory algorithm; C: consciousness; VAT: voluntary attention; HS: Homo sapiens.

Materials and discussion

An arsenal of regulatory algorithms is involved in balancing and maintaining the homeostatic equilibrium of an open self-regulating liquid biological system operating in a gaseous environment. In this study, homeostasis (H) is taken to mean a stable set of physiological/mental "current equilibrium" parameters. Homeostatic systems are characterized by continuous chaos of the state vector within quasi-attractors. The final state of the system state vectors is determined by the instability of the dynamics of parameters and global uncertainty for all functional systems of the body [1].

We emphasize the existence of the definition of "uncertainty" as a fundamental property of nature [2]. A distinctive feature of the quasi-attractor is the simultaneous existence of multiple chaotic and regular attractors in a limited volume of phase space at fixed system parameter values. A dynamic system, as a quasi-attractor, contains chaotic trajectories of parameters that have a limit set in the phase space. Despite its complexity, quasiperiodic motion is predictable.

The movement remains regular, despite the fact that the parameter's trajectory may never repeat itself exactly. Trajectories starting nearby in the coordinate system remain close to each other in development, which guarantees the possibility of long-term forecasting [3].

H regulation in the "norm" (NR) is realized without the participation of conscious levels of the psyche. We consider the parameters of NR, i.e. the equilibrium state of homeostasis, to be adaptive oscillations of parameter trajectories: for physiology – within the boundaries of the confidence interval of parameter values; for the psyche – within the boundaries of ethical/ aesthetic/ normative frames. Exceeding of NR boundaries by the adaptive oscillations, imbalance of the "current equilibrium", i.e. an increase in entropy, an increase in uncertainty, actualizes the compensatory need with subsequent psyche equivalents until both the cause of the imbalance and the compensatory need are eliminated.

In other words, we consider an equilibrium disruption, a significant imbalance of H, the emergence of a compensatory need to be a point/zone (of space/time) of increasing entropy and increasing uncertainty of the system (i.e., imbalance = need = increased entropy = increased uncertainty.). An afferent information flow from a point/zone of imbalance (physiological/mental) not exceeding the threshold level of sensation preceding the actualization of the encoded image of the need initiates a systemic "state of uncertainty that subjectively feels like asymmetry, disequilibrium of the environment" [4]. Destabilization of the systemic threshold of equilibrium and controllability of H leads to an increase in uncertainty, which is considered as a measure of information symmetry [5]. A

Citation: Kruglov AG, Kruglov AA. Comparative Principles of the Structure of the Psyche of the Homo Sapiens and Artificial General Intelligence - PART 2. Japan J Res. 2024;5(7):053

deterministic systemic reaction is the initiation of prognostic functions of the psyche, which create promising psychological constructs that motivate action/interaction, eliminate H imbalance, and minimize uncertainty. We consider the desire for a state of balance, a decrease in entropy, and the elimination of uncertainty in both the physiological and mental segments of the psyche to be a fundamental general biological factor. Understanding the scale of simplifications and schematization, we believe this direction is acceptable for analyzing the general structure of the studied phenomenon.

Dynamic perceptual control of the parameters of the internal environment (metabolism, gas exchange, hemodynamics, etc.) forms an afferent information flow that provides monitoring of the internal environment. Significant (exceeding the CI parameters) dissociation of internal environmental parameters initiates the emergence of a compensatory need, the purpose of which is to eliminate the imbalance. That is, the time a need arises, the psyche forms a systemic phase state (quasi-attractor) that includes a vector program of behavioral sequences for achieving a goal and lasts until the need is eliminated.

Electro/magnetic patterns from the imbalance location are a way of encoding information in biological systems [6,7] transmitted to the projection zones of the brain. We share the common point of view on the storage of information packets in the brain in the form of frequency electric/magnetic patterns circulating in closed neural circuits, the activity of which is reduced to several stable states that perform the functions of retaining and reproducing information [8,9]. Each ontologically/phylogenetically formed need has a coded information equivalent (image), the totality of which makes up the informational thesaurus of the psyche, an arsenal of regulatory algorithms (RA). Each RA has an authentic electro/magnetic frequency package – "code" (CD) [10,11]. "CD" is formed and implemented as a neural association containing the information equivalent of a need with the potential for generating mental constructs when updating and programming structures of goal-directed behavior.

In other words, the supra-threshold dissociation of homeostasis parameters initiates the actualization of CD, which, during the restoration of homeostatic balance, becomes the content of consciousness – the "dominant" (D), acquiring the qualities of a resonant operator [11]. The updated D generates constructs of goal-directed behavior to search for an object (code key) having parameters identical to the frequency characteristics of the D (need code) with the expected inverse positive afferentation of the interaction results. That is, the primary imbalance of the physiological "current equilibrium" forms a compensatory structure, the phase space of a quasi-attractor: imbalance>need>code actualization>image (representable equivalent of need)>motive>goal-directed behavior>interaction>need elimination.

The corrector of vectors and dynamics of goal achievement is an oscillating indication of the coincidence/mismatch of electro/magnetic parameters D and operational images of approaching the goal.

An imbalance of mental, social, ideal HS needs initiates adaptive reactions of a similar structure. Suprathreshold (boundaries of hidden frames) oscillations of mental/social parameters of the individual/society form the phase space of a quasi-attractor: imbalance>need>goal image (conscious equivalent of the need)>motivational gradient that determines the vectors and duration of goal-directed behavior>interaction>need elimination) [11].

Selective interaction with the external environment in the subject/object system is carried out by the psyche through consciousness, the operational tool of which is voluntary attention (VAT). Consciousness (C) is a gateway of the psyche responsible for selection and control of the conversion of incoming information and outgoing effector H regulation algorithms [12]. Functionally, we consider C as an interface between the psyche/external environment systems, the main functions of which are the dynamics and control of the two-way flow of information in the process of searching and interaction between CD (code) and object (code key) having close/coinciding electro/magnetic frequency parameters (10, 11). VAT is considered as "an ideal, automated form of control, organization of verification, identification of standard criteria, measures" [13]. As the main information channel of consciousness, VAT has the ability to separate or combine biological information channels (sense organs). Instrumentally, VAT is selectively directed, regulated attention of a limited volume that determines the reference points (framework) of an object and adjusts the focus of perception when parametric resonance occurs, followed by fixation and expansion of the range of interaction with a specific object. We believe that when studying the volume of VAT in an experiment, it is advisable to include, in addition to visual information, tactile, olfactory, etc.

In other words, the goal-directed search activity of the psyche, initiated by an imbalance of H, a compensatory need, instrumentally realized through consciousness, consists in searching for the parametric resonance of the electro/magnetic parameters of the information equivalent of the need – the image (code) and the goal (code key) [10,11.

Only objects (operational images) with stable or situational significance, depending on the degree of parametric similarity of the reference points of the object (code key) and the actual need (code), fall into the range of the parametric resonance search zone, with fixation and integration of VAT information channels. The search includes: object detection; object selection from the background; determination of the range of coincidence of the frequency electro/magnetic parameters of the code/code key; interaction with the object. The sequence of stages of satisfying the actual need for both physiological and mental content is realized through parametric resonance of the encoded equivalent of the need (image, code) and dynamic images (code key) obtained as a result of the search [10-12]. Elimination of H imbalance, elimination of uncertainty, "gestalt closure" occurs as a result of interaction with an object having parameters identical/close to the actual image, which is the content of consciousness.

Without discussing the priority of needs actualization, we believe that the current regulatory algorithm is the only meaningful plot of consciousness until the need for the interaction of subject/object systems is satisfied. Consciousness as an interface of interaction with the external environment is used by the operational functions of the psyche separately for vital and mental needs.

Biological species realize the formation of vital needs in the interaction of subject/object systems through direct contact of the subject with the external environment, through the senses, i.e. biological information channels.

Formation of mental needs of HS (ethics/aesthetics/regulatory codes, etc.), i.e. interaction with the virtual sector of the information universe [14] is realized through an intermediary, a communicator: priest, text, gadget, etc.

Conclusion

The desire for homeostatic balance both in the physiological and mental sectors is a fundamental general biological factor. Homeostatic imbalance, creating a need, forms the phase space of a quasi-attractor, the state vectors in which determine the phase trajectories of the parameters by the expected equilibrium state. The need for this space is transformed into an information equivalent – an image. The actualized image, which receives the properties of a resonant operator in the status of a dominant, becomes the content of consciousness for the time of actualization. Voluntary attention, as the operational tool of consciousness, is a mechanism of selective, voluntary action/interaction in the subject/object system on the part of the subject. The main function of voluntary attention is to search for the parametric resonance of the information equivalent of the need: a coded image with a dynamic image of the goal. Biological species form vital needs through direct contact with the external environment. The mental needs of Homo Sapiens are formed with the participation of communicators..

References

1. Pyatin VF, Yeskov VV, Aliev NSh, Vorobyova LA. Chaos of Parameters of Homeostasis of Functional Systems of the Human Body. Bulletin of New Medical Technologies. 2018; 25(1):143-153.
2. Kravchenko AI. Theses on Uncertainty. Universitates. 2014. pp. 14-19.
3. Beckman IN. Nonlinear Dynamics of Complex Systems. Moscow. 2018. 613 p.
4. Bauman Z. Fluid Modernity. Moscow. 2018. 613 p.
5. Milovidov VD. The Philosophy of Financial Markets. Moscow. 2013. 272 p.
6. Gutteman DD, Chabowski DS, Kadlec AO, et al. The Human Microcirculation-Regulation of Flow and Beyond. Circ. Res. 2016;118(1):157.
7. Krupatkin AI, Sidorov VV. Functional Diagnostics of Microcirculatory-Tissue Systems: Fluctuations, Information, Nonlinearity: a Guide for Doctors. Moscow. LIBROCOM. 2013. 416 p.
8. Eccles JC. An instruction-selection theory of learning in the cerebellar cortex. Brain Res. 1977;127(2):327-352. doi:10.1016/0006-8993(77)90550-9.
9. Hopfield JJ. Neural networks and physical systems with emergent collective computational abilities. Proc Natl Acad Sci U S A. 1982;79(8):2554-2558. doi:10.1073/pnas.79.8.2554.
10. Kruglov AG, Kruglov AA. Resonant Actualization of Cultural Code as a Determinant of Mental and Social Transformation. Part 1. International Journal of Biomedicine. 2022;12(3):476-479. DOI: 10.21103/Article12(3)_PV
11. Kruglov AG, Kruglov AA. Resonant Actualization of Cultural Code as a Determinant of Mental and Social Transformation. Part 2.IJBM. 2022;12(4).675-678.
12. Kruglov AG, Kruglov AA. Comparative Principle of the Structure of the Psyche of Homo Sapiens and Artificial General Intelligence. Part 1. Japan Journal of Research. 2024;5(4): 025. DOI: 10.33425/2690-8077.1112
13. Galperin P Ya Introduction to Psychology. 2nd ed. Moscow. University. 2000. 336 p.
14. Kruglov AG, Kruglov AA. Adaptive Changes in the Psyche of Homo Sapiens during the Period of the Singularity. Part 2. IJBM. 2021;11(1):68-72.