

Regulatory Algorithm as a Constructive Element of the Psyche of Homo Sapiens and Agi: Part 1

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ABSTRACT

Integral regulatory algorithms are used to determine the unstable "current equilibrium" of a homeostatic continuum. The regulatory algorithm (RA) is a circular closed dynamic psychophysiological construct that is structured as follows: homeostasis imbalance > need > goal image (information coded equivalent of need) > motive > goal-directed behavior > satisfaction of need > restoration of homeostasis balance. Integral RA are heteronomous metamerer (HM) comprising spatio-temporal segments of the homeostatic continuum of a biological organism. A HM is an electrodynamic structure of a branched algorithm with neurophysiological, behavioral, and somatofunctional derivatives. All stable vital physiological states of biological systems are formed by targeted, phylogenetically/ontogenetically formed integral regulatory algorithms that are heteronomous metamerer of the homeostatic continuum (RA = HM). Through its creative psyche, Homo Sapiens has expanded its range of interaction with the external environment beyond what other biological species are capable of. The socio-cultural needs of Homo Sapiens have given rise to a progressively increasing series of frustrations of ideal content realized by cycles of homomorphic goal-directed behavior (HGB) towards a goal image that is beyond the attainable. Cycles of completed HGB are segments/metamerer of the homeostatic socio-cultural continuum. A dynamic sequence of metamerer, cycles of HGB overcoming "barriers of uncertainty", on a population scale forms the dynamics and structure of the socio-cultural continuum of the HS population where the social construct is derived from a set of "cultural codes".

Keywords: homeostasis, regulatory algorithm, metamerer of homeostatic continuum, branching algorithm, need, oscillatory dipole, cultural code, uncertainty, artificial intelligence, RA: regulatory algorithm, HC: homeostatic continuum, HM: homeostatic continuum metamerer, CI: confidence interval, LS: liquid system, GE: gas environment, OD: oscillatory dipole, HGB: homomorphic goal-directed behavior, CC: cardiac cycle, HS: Homo sapiens, AGI: artificial general intelligence.

MATERIALS AND DISCUSSION

The vital activity of biological organisms, liquid systems (LS) functioning in a gas environment (GE), is ensured by a spatial/temporal homeostatic continuum (HC) consisting of subsystems that are psychophysiological, neurophysiological and somatofunctional segments of the whole organism. Integral structures, regulatory algorithms (RA), are responsible for balancing the unstable equilibrium of homeostasis (HC). Integral RA is a dynamic psychophysiological

construct that is structured as follows: HC imbalance > need > goal image (coded equivalent of need) > motive > goal-directed behavior > goal achievement > satisfaction of need > restoration of HC balance. In other words, RA is a closed circular information dynamic structure (1,2).

It is important to note that there exist cyclical RA that act continuously throughout the life of the organism. One such RA is the Cardiocycle (CC). It has a structure that can change in accordance with the dynamics of the current homeostatic RA, remaining the regulator of the 1st hierarchical level throughout life [3,4,5,6]. Structurally, the CC has a dualistic character, containing simultaneously: 1) the final product of the organism's regulatory activity is the blood of the boluses of the right sections of the heart (density, viscosity, biochemistry, etc.); 2) the initial regulatory product is the blood of the boluses of the left sections (structural metabolites of gas exchange, etc.); being an electrical, magnetic, and shock wave information regulator for all life support systems. Our data (3) demonstrate direct and reverse regulatory cardiac/cerebral connections, where the waveguides are the vessels entering and exiting the skull. The cardiac mean integral pressure (CMIP) (6) is a hierarchical level 1 regulator, a universal central rhythmic process that regulates the structure of the cardiac cycle, heart rate and synchronous neural and wave effects on the structures of the brain. The brain and heart are a single hydrodynamic structure with a phase-varying volume, configuration, and variable patterns of wave regulatory impulses. Cardiac arrest is an attractor of all regulatory HC algorithms (7).

The brain is considered as an integral functional dipole in which all qualitative characteristics of cognitive processes (memory, consciousness, etc.) are quantitative configurations of temporal patterns of electro/magnetic quantities [8]. We consider the psyche, as a derivative of brain activity, to be an arsenal of spatially distributed dipoles (OD) with their own topography, structure, and ranges of bio-effective frequencies. In our opinion, RA in the phase of relevance is an activated OD before the goal is achieved, relevance is lost, it is repressed and compressed (7,9,10).

We define integral regulatory algorithms (RA) as homeostasis metamerics (HM), quantized spatio-temporal segments of the homeostatic continuum (RA = HM). Structurally, the HM consists of the following components: 1) physiological construct (primary imbalance, informational afferentation/efferentation, restoration of balance); 2) mental construct (goal image, motive, goal-directed behavior using the gateway of communication and control - consciousness) (11, 12). HM is an active distribution system (possibly of a cellular topology) combining multiple elements, having bifurcations, intersections, and interferences of the circulating information/energy flow. In other words, HM is an energetic electrodynamic structure of a branched algorithm with neurophysiological, behavioral, metabolic, hemodynamic, and magnetic derivatives. The set of parameters of the HM contains the potential for objectifying its structure.

The parameter of the duration of HM action is the category of psychological time. The starting point of psychological time (1,2,11,12) is highly likely the appearance in the conscious levels of the psyche of the goal image, which is a psychophysiological stimulus for the actualization of the dominant (D), actualized by the RA (D= actualized RA). This is the starting point for the

formation of an estimated scale of the speed of achieving a result (psychological time), the end of which is goal achievement. In other words, subjective (psychological) time is a discrete category limited by the parameters of the HC metamere having a vector opposite to physical time, which is a category of action/interaction of the HM.

The homeostatic continuum of vital activity of biological systems is formed by a sequence of heteronomous metameres (RA) of homeostasis, which ensure HC balancing. The data we presented earlier (13,14) allow us to determine the parameters (gas exchange/biochemistry/hemodynamics) of the physiological segment of RA: structure; configuration; dynamics and vectors of interaction of structural elements; strength of element connection; limits of the "normal zone" both in normal and pathological conditions. These data are the parameters of the structure, vectors and dynamics of physiological segments of RA in different regions of the body in the norm. In pathology, radical changes of RA occur in the structure of basic elements (15,16) and in the set and signs of interaction of the entire spectrum of metabolism to maintain hemodynamics adequate to the needs of the body.

In other words, when the psychophysiological continuum changes, vital parameters, formally being within the "normal zone", are provided by regulatory algorithms of a different structure. That is, there is a structural, qualitative change in the regulatory metamere of the homeostatic continuum.

Vital RA ensure the stability of the biological organism's HC. Natural adaptive oscillations of an individual's physiological parameters within the "normal zone" form adaptive oscillations of the somato-functional continuum. Synchronization and stability of vital parameters, as well as circadian rhythms of a biological organism, are provided by a multitude of RA as a result of total perceptual control of the state of the internal environment by the psyche. The unstable state of the "current equilibrium" of the HC is ensured by balancing the RA outside the conscious levels of the psyche until the adaptive resources of the parameter are exhausted, that is, until the limit values (boundaries of the CI) are reached. A significant violation of the boundaries of the "normal zone" of the parameter, going beyond the limits of the CI, excites an afferent information flow, a signal of the emergence of an imbalance at the point/zone of space/time of the HC. Imbalance (violation of information symmetry, emergence of uncertainty, increase in entropy) forms a "need", a mental construct, the purpose of which is to eliminate the imbalance, restore information symmetry through goal-directed behavior. The data we have provided (13, 14, etc.) allow us to partially formalize the design and structure of the elements of physiological RA. We believe that a complete constructive interpretation of RA will allow us to determine the physiological mechanisms of vector dynamics of RA in normal and pathological conditions and contains the potential for vector impact on RA with a given result.

In other words, we believe that all stable vital physiological states of the LS functioning in the GE are formed by targeted, phylogenetically/ontogenetically formed integral regulatory algorithms that are metameres of the homeostatic continuum. In pathology, the structural components of RA that provide vital functions change, reducing the stability of the system. The mental segment of the homeostatic metamere (RA) forms the image of the goal (information equivalent of the need) and goal-directed behaviors, ensuring the achievement of the goal,

elimination of imbalance, elimination of uncertainty, and restoration of symmetry of the HC. The actualized metamere (RA) of the HC becomes a "dominant" (D), an organized hierarchical regulatory construct of cognitive information, acquiring the functions of a resonant operator for the time of actualization.

The creative psyche of HS has expanded the range of interaction with the external environment beyond the limits available to other biological species. Before the appearance of qualitative changes in the psyche of HS (17,18), the range of parameters of objective reality determined the nomenclature, content, and methods of satisfying needs. The emergence of socio-cultural needs of HS has formed a progressively increasing series of frustrations of ideal content that cannot be satisfied and that create homomorphic cycles of approaching a goal that is beyond the achievable (2,13,17).

The phylogenetic dynamics of HS development has created stable correlations of necessity, possibility, and reality, the interference with the phenomenon of time of which has formed a dynamic sequence of "barriers of uncertainty" (19), that is, frustrating constructs. The creative psyche of HS, creating sequences of frustration constructs that form qualitatively new needs, has formed the predetermination of the cyclical development of cognitive dynamics with no prospect of completion (11). Each completed cycle of frustration complication of a virtual segment of a two-component external environment, a stage of homomorphic goal-directed behavior (HGB) that has achieved its goal, is a formed segment, a metamer of the socio-cultural continuum of the life activity of HS. Having no known dimensions other than temporal, mental HM includes all possible and conceivable types of spaces and dimensions, which allows us to assume their presence (the possibility of construction) in the mental formations of HS in a compactified (potential) state, with the possibility of their construction by the operational systems of the psyche. For HM elements (from the inside), it is a spatio-temporal structure with an unlimited (unknown to us) number of degrees of freedom.

The individual/population sequence of HGB/metamere stages forms the dynamics of the HS socio-cultural continuum containing the potential for vector structuring of society [20]. We consider the component of "cultural codes" in the socio-cultural continuum to be dominant in the formation of related social constructs (20,21,22) and to contain the potential for predictive modeling of the interaction of cultural codes and social constructs.

CONCLUSIONS

Regulatory algorithms are a structural unit, a metamere of the Homo Sapiens homeostatic continuum, for both vital and long-term ideal goals (separated by intervals of intermediate goals in a single plot sequence).

The homeostatic continuum of HS vital activity consists of sequences of regulatory algorithms/metameres of two main types:

- 1) psychophysiological metamere - creation/balancing of the continuum of physiological homeostasis, including blocks: informational (perception > imbalance > afferentation > efferentation > restoration of equilibrium); mental (apperception > goal image > motive > goal-directed behavior > achievement of result > restoration of system balance);

- 2) mental metamere - creation/maintenance of a consistent picture of the external environment > frustration constructs > needs outside of vital goals > ideal goal images > completed cycles of homomorphic forms of behavior > temporarily reduce frustration tension and have no prospect of completion.

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