Quantum and Classical Neural Networks for Modeling Two Modes of Consciousness: Cognitive Implications

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Abstract—Quantum bases of consciousness and free will are considered with implications of two cognitive modes of consciousness (direct religious/creative, characteristic of quantum-coherent transitional and altered states of individual consciousness, and indirect perceptually/rationally mediated, characteristic of classically-reduced normal states of individual consciousness), as well as conditions of transformations of one mode into another.

Keywords—Quantum & Classical Hopfield-like Associative Neural Networks; Two Cognitive Modes of Individual Consciousness: Quantum (Altered/Transitional States) & Classical (Normal States); Quantum Holography & Quantum Decoherence; Free Will.

I. INTRODUCTION

The prevailing scientific paradigm considers information processing within the central nervous system as occurring through hierarchically organized and interconnected neural networks [1-3]. Alongside with the development of experimental techniques enabling physiological investigation of interactions of hierarchically interconnected neighboring levels of biological neural networks, significant contribution in establishing the neural network paradigm was given by theoretical breakthroughs in this field during the past two decades [2]. It seems that this hierarchy of biological neural networks is going down subcellular cytoskeleton level, being according to some scientists a kind of interface between neural and quantum level [4] - the last one having within the Feynman propagation version of Schrödinger equation analogous mathematical formalism as the Hopfield associative neural network, implying possibility to implement the model of quantum associative neural networks’ parallel information processing both on software’s level in classical digital computers and hardware’s level in any of numerous physical media which can realize holography, with tremendous potential physical and engineering implications [3] (However, it should be pointed out that quantum associative neural networks, working in the multi-dimensional Hilbert state space, ought to be distinguished from Deutch-based quantum computing algorithms with logic gates, working in two-dimensional Hilbert state space of qubits [5]).

The mentioned analogy opens additional fundamental question how quantum parallel processing level gives rise classical parallel processing one, which is a general problem of relationship between quantum and classical levels within the quantum decoherence theory as well [6]; naturally, the same question is closely related to fundamental nature of consciousness, whose indeterministic manifestations of free will [7-9], and other holistic manifestations of consciousness, like transitional states [9] and altered states of consciousness [10], conscious/unconscious transitions and consciousness pervading body [11] - necessarily imply that some manifestations of consciousness must have deeper quantum origin, with significant psychosomatic implications. Namely, as demonstrated by quantum-coherent characteristics of the Russian-Ukrainian school of microwave resonance therapy (MRT) [12,13], the acupuncture system is the only macroscopic quantum system in our body (while brain still seems not to be [14]) which might be related to consciousness;³ and as recent investigations show that any quantum system has formal mathematical structure of quantum-holographic associative neural network [3] - then (acupuncture-meridian temporary-reprogrammable)⁴ memory attractors of the quantum-holographic acupuncture network can be treated as psychosomatic individual disorders representing EM/MW (quantum) holistic records - which might represent biophysical basis of (quantum)holistic local psychosomatics [9,16,18]. At the same time, the mentioned analogy between mathematical formalisms of Hopf’s associative neural network and Feynman’s propagator version of the Schrödinger equation implies that collective consciousness is possible ontological property of the physical field itself [9,16] with various

³ An additional support that acupuncture system is really related to consciousness is provided by novel meridian (psychoenergetic) therapies, with very fast removing of persistent phobias, allergies and other psychosomatic disorders [15] - whose simultaneous effects of visualization of the psychosomatic problems and tapping/touching of some acupuncture points might be interpreted as a “smearing” of memory attractors of the psychosomatic disorders, through successive imposing of new boundary conditions in the acupuncture energy-state space during visualizations of the psychosomatic problems [16], cf. Fig. 1.

⁴ According to Tibetan traditional medicine, an acupuncture procedure must be repeated every several months - presumably as a consequence of restituted patient’s mental loads from his mental-transpersonal-environment of closely related family members and enemies, that remained nonreprogrammed on the level of quantum-holographic collective consciousness, which might be supported by Tibetan pulse diagnostics based on 20 pulses, enabling precise diagnosis of psychosomatic disorders not only of the patient himself but also of his family members and enemies [17].
microquantum and macroquantum (both nonbiological and biological) excitations, which is widely spread thesis of Eastern esoteric/religious traditions [19] - and then memory attractors of the quantum-holographic space-time network of collective consciousness can be treated as psychosomatic collective disorders representing (quantum)holistic field records (including interpersonal hesychast-prayer finally-reprogrammable loads [20]) - which might represent biophysical basis of (quantum)holistic global psychosomatics [9,16,18]!

So it seems that the whole psychosomatics is quantum hologram, both on the level of individual and collective consciousness, which resembles on Hinduistic relationship Brahmman/Atman, as wholeness and its part which bears information about wholeness [19]. The mentioned quantum-holographic picture also implies that quantum-holographic hierarchical parts carry information on wholeness, enabling subtle quantum-holographic fractal coupling between different hierarchical levels\(^5\) - including quantum-holographic coupling of the acupuncture and genetic levels, with mutual quantum-informational control of ontogenesis and morphogenesis, starting from the first fertilized cell division which initializes differentiation of the acupuncture system of (electrical synaptic) "gap-junctions" [21]. Then emphasis on three front lines of psychosomatic medicine might also be pointed out [16]: hesychastic spirituality, with prayer-mediated final erasing of quantum memory attractors on the level of collective consciousness; holistic Eastern medicine, with acupuncture/psychotherapy-mediated temporary erasing of quantum memory attractors on the level of individual consciousness; and symptomatic Western medicine, with immunology/pharmacology/surgery-mediated alleviation of the somatized consequences of the carelessness on the first two front lines - with stressing religious/social implications that necessary activities on the second and third front lines, with neglect of the first one, have a consequence of further transfer of quantum memory attractors on the level of individual and collective consciousness in this and coming generations, thus accumulating quantum-holographic loads which afterwards cause not only illnesses, but also interpersonal fights, wars, and other troubles; this also implies necessity of re-consideration of educational/informational/political goals of our civilization, with re-orientation towards holistic gentle actions for global solutions of the "global risk society" [22].

In the following, we shall focus particularly on the quantum bases of consciousness and free will, and related two cognitive modes of consciousness, with conditions of transformations of one cognitive mode into another.

II. QUANTUM AND CLASSICAL NEURAL NETWORKS FOR MODELING TWO COGNITIVE MODES OF CONSCIOUSNESS

Really, we may speak of two cognitive modes of individual consciousness [9,16]: the quantum-coherent direct one (religious/creative, in altered and transitional states of consciousness) and the classically-reduced indirect one (perceptually/rationally mediated, in normal states of consciousness) - to which theoretical methods of associative neural networks and quantum neural holography [3] combined with quantum decoherence theory [23] might be applied.

The direct cognitive mode of individual consciousness may be related to weakly coupled consciousness-environment communication, within the nonlocal quantum-holographic/quatum-gravitational space-time network of collective consciousness (characteristic of quantum-coherent transitional and altered states of individual consciousness, in religious-esoteric transpersonal communications, of the quantum-gravitationally tunneled quantum-holographic-Hopfield-like electromagnetic/ionic out-of-body displaced part of the acupuncture network of individual consciousness, with the mentally addressed nonlocal environment-target, including anticipation in intuition, precognition, and deep creative insights [9,16] - being after quantum collapsing in classical/normal state of consciousness, through restituted strong coupling of quantum-holographic-consciousness-contents with the body, further subjected to indirect language/artistic/scientific filtering through extended reticular-thalamic activated system, ERTAS [1], thus classically-reducing initially obtained direct quantum-coherent information content - so explaining generally poor informational rationalization of the initial full quantum-holographic awareness of spiritual/religious mystical experiences.

The indirect cognitive mode of individual consciousness may be related to strongly coupled consciousness-body-environment communication via space-time limited perceptual sensations, further processed by classical/electrochemical hierarchical neural networks and rationally filtered in conscious content by approximate empirical/artistic/scientific concepts dependent of cultural/scientific tradition and education of the inhabitants of some society (characteristic of classically-reduced normal states of individual consciousness in everyday communications, additionally filtered and amplified by ERTAS system - and afterwards transcribed in conscious content of the quantum-informational acupuncture network of individual consciousness, via brainwaves' EM fields every ~ 0.1 s - so generating normal "stream of consciousness" [9]).

of the realization of one of the classically decoherent states of attraction of the ground (healthy) MW state reduced state gives rise to stochastic state described by density matrix that energy surface changes gradually during the quantum-holographic MRT ULF states of the brain hierarchical neural networks. It should be pointed out that energy-eigenstate space (MW/dashed line) ultralowfrequency (ULF/full line) modulated EM/ionic states ( ), which after quantum collapsing in classically-

These cognitive modes of individual consciousness are presumably interchanged by periodicity of ~ 2-hour ultradian rhythm, both in waking and sleep states [24], which according to quantum-relativistic model of consciousness [9] might be the cause of corresponding changes in subjective sense in transitions between normal and altered states of consciousness (with dilations of subjective time sense and mixing of normally conscious and unconscious contents). According to this model, consciousness is subtle internal display in the form of EM component of the acupuncture EM/ionic system, as microwave/ultralowfrequency (MW/ULF) modulated quantum-holographic Hopfield-like neural network, in which complete information is continuously coded (both normally conscious and unconscious) from brain's neural networks (where synaptic coding is still electrochemical one), mediated by brainwaves as an interface. Then altered states of consciousness (REM sleep phase, hypnosis, meditation, hallucinogenic states, some psycho-pathological states, clinical death, ...) are consequence of an out-of-body displacement of the part of the acupuncture EM/ionic acupuncture system (when its "embedded" EM component of ionic currents propagates through slightly non-homogeneous low-dielectric weakly ionized out-of-body gaseous like structure) with ERTAS system switched off, while normal states of consciousness (normal waking state, non-REM sleep phase, ...) are realized without these displacements (when EM component of ionic currents propagates through strongly nonhomogeneous high-dielectric body tissues). It should be specially pointed out that in altered states of consciousness the EM component of ionic currents propagates both through the body and the displaced part of the ionic acupuncture system, but conscious contribution of the first ones is negligible due to the overlapping of non-amplified contents, while the second ones give rise to conscious contribution due to good temporal differentiation of the same contents - and hence it seems that condition for strong manifestation of altered states of consciousness is both switched off ERTAS and generation of the displaced (out of body) part of acupuncture EM/ionic system [9]. This is typically fulfilled in altered states of consciousness, when model also predicts mixing of normally conscious and unconscious contents, due to relativistic Doppler mapping of the "objective" brainwave power spectrum (as a superposition of \( \gamma, \beta, \alpha, \theta, \) and \( \delta \) bands) onto "subjective" zero-frequency peak - this being the reason for a role of REM-dreaming (and meditation) in integration of normally conscious and
unconscious contents (otherwise divided by normal daily brain functioning) around one dominant associative "ego" state, and consequently personality growth and alleviation of emotional conflicts [9].

The above-mentioned division in two cognitive modes of individual consciousness, quantum-coherent direct one (in religious/creative altered and transitional states of consciousness) and classically-reduced indirect one (in perceptually/rationally mediated normal states of consciousness) - is still non- quite sharp.

Namely, in religious/creative altered and transitional states of consciousness, quantum-coherent direct mode might be transformed into classically-reduced indirect mode, in the case of strong out-of-body interaction consciousness-environment, with quantum-reduced out-of-body extrasensory perception of the mentally addressed environment, which transforms out-of-body displaced part of individual consciousness from non-stationary quantum-coherent state of the quantum-holographic Hopfield-like neural network in the above described stationary classically-reduced stochastic state of the classical Hopfield-like neural network. After interruption of this interaction, with returning out-of-body displaced part of individual consciousness in quantum-gravitationally mentally-channeled tunneling of the displaced part of individual consciousness upon its body, this information is further transcribed through (MW/ULF) EM interaction acupuncture system/nervous system and afterwards language/artistic/scientific filtered by the brain hierarchical neural ERTAS system (with accompanied “brainwave frequency” uprising thought from lower-frequency ULF (δ, θ) unconscious form of subliminal thought to higher-frequency ULF (α, β, γ) conscious form, with significant unconscious-contextual cognitive/linguistic and psychotherapeutic implications [25]. It should be also pointed out that mentioned (MW/ULF) EM acupuncture system/nervous system interaction has its threshold potential of the nervous electrochemical synapses (in contrast to practically non-existing threshold potential of the acupuncture electrical "gap-junction" synapses [9,18], which makes bodily acupuncture system an extremely sensitive quantum sensor) and therefore filters all thus extrasensory obtained information below nervous threshold potential, preventing it to be additionally language/artistic/scientific articulated by the brain hierarchical neural ERTAS system - enabling further processing of only that information which is sufficiently "emotionally colored“ i.e. has sufficient critical depth of MW/ULF EM acupuncture memory attractors (cf. Fig. 1), or has greater general acupuncture energetic potential (inborn or gained through various traditional techniques of stimulation, deep breathing, relaxation, meditation or prayer [18]).

On the contrary, the reverse nervous system/acupuncture system interaction - effective in transcription of language/artistic/scientific articulated brain information into conscious content of the acupuncture network of individual consciousness, mediated by ULF EM field of brain neural activities every ~0.1 s thus generating normal "stream of consciousness" and ULF-modulating acupuncture MW-memory attractors - is going without threshold limits. In this context, in perceptually/rationally mediated normal states of consciousness, the classically-reduced indirect mode can be transformed into quantum-coherent direct mode of individual consciousness after ULF EM transcription of the brain articulated information into conscious content during interaction nervous system/acupuncture system, in the case of short-lasting nonstationary excitations of acupuncture system in interactions with strongly changing environment [23] - like MRT or other types of acupuncture stimulation, inhalation of the air ions in deep yoga breathing and their redistribution over acupuncture system, different meditative and other psycho-muscular relaxation techniques, stressful situations, transitional and altered states of consciousness [18] - which transform the acupuncture system from stationary classically-reduced stochastic state of classical Hopfield-like neural network into nonstationary quantum-coherent state of quantum-holographic Hopfield-like neural network, which then collapses into following stationary classically-reduced state. This might be a model of perceptually/rationally induced strong intentional classical/quantum/classical stationary/nonstationary/stationary backward hierarchical (inter)actions nervous/acupuncture/nervous systems - i.e. model of free will.

III. CONCLUSION

In this paper, quantum bases of consciousness and free will are considered with implications of two cognitive modes of individual consciousness (the quantum-coherent direct one and the classically-reduced indirect one) - to which theoretical methods of associative neural networks and quantum neural holography, combined with quantum decoherence theory, might be applied.

The direct cognitive mode of individual consciousness might be related to weakly coupled consciousness-environment communication, within the nonlocal quantum-holographic/quantum-gravitational Hopfield-like space-time network of collective consciousness (characteristic of quantum-coherent transitional and altered states of individual consciousness in religious-esoteric transpersonal communications, including anticipation in intuition, precognition, and deep creative insights), while the indirect cognitive mode of individual consciousness might be related to strongly coupled consciousness-body-environment communication via space-time limited perceptual sensations, further processed by classical/electrochemical hierarchical neural networks and rationally filtered in conscious content by approximate empirical/artistic/scientific concepts dependent of cultural/scientific tradition and education of the inhabitants of some society (characteristic of classically-reduced normal states of individual consciousness in everyday communications - being generally poorer in information than full quantum-holographic awareness of spiritual/religious mystical experiences).

On these lines, the conditions of transformations of one cognitive mode into another are considered, as well as the model of perceptually/rationally induced strong intentional backward classical/quantum/classical stationary/nonstationary/stationary hierarchical (inter)actions nervous/acupuncture/nervous systems - i.e. model of free will.

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