

The Mental Psychological Quantum Process of Activating Meanings by Consciousness

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Abstract

This article examines the activation of neural networks in the brain by the meanings of consciousness and the transition to the linguistic modality. Consciousness transmits holographic semantic images to memory through the neural networks of the brain, linking them with the linguistic modality. Meanings (thoughts) activate the linguistic modality through the neural networks of the brain, linking them with patterns in memory. The quantum state of the brain exists in two states simultaneously. The concretization of brain states is accomplished by semantic holographic images. In various sciences, meaning is abstract content represented by signs, symbols, words, images, diagrams, or situations. It depends on context, experience, and interpretation. Scientists and researchers associate holographic semantic images with the linguistic form of their representation in speech, thinking, and communication, using linguistic modality in the field of intelligent automation.

Key words: brain activation by meanings; consciousness; neural networks; integral memory; holographic semantic images

1.Introduction

Scientists note structural similarities between the human brain and the observable Universe, despite the enormous difference in scale (approximately 27 orders of magnitude). This similarity manifests itself in the organization of networks, the distribution of elements, and some quantitative characteristics. The brain's neural network and the cosmic web have similar topologies. In both cases, the system consists of nodes (neurons in the brain, galaxies in the Universe) connected by filaments—threadlike structures. Both neurons and galaxies make up approximately 30% of the system's mass, while 70% is accounted for by passive components: water in the brain, and dark energy in the Universe. The distribution of matter in both systems exhibits similar patterns. Italian researchers Franco Vazza (astrophysicist) and Alberto Feletti (neurosurgeon) calculated the spectral density of the cerebellar neural network (on a scale from 1 micrometer to 0.1 millimeter) and matter in the cosmic web (in the range from 5 to 500 million light years). The analysis showed that the distribution of oscillations in these systems follows a similar progression. **A tendency toward clustering** is also observed in both systems: connections tend to cluster around central nodes. The average number of connections per node in the brain [4.6-5.4] and in the Universe [3.8-4.1] is comparable.

The information capacity of these structures is similar. The human brain's memory is estimated at approximately 2.5 petabytes. Vazza calculated that storing the statistical complexity of the universe (information about

the number of objects and the connections between them) would require approximately 4.3 petabytes.

Scientists suggest that this similarity is due to the shared physical laws governing the self-organization of complex systems. Despite the differences in the nature of the forces (gravity in space and electrochemical processes in the brain), the basic principles of network dynamics are similar. Structures of different scales are described by the same mathematical formulas. For example, the Fibonacci spiral is found both in the shape of the Milky Way and in the structure of the human cochlea. Both models of the brain and the universe use cluster analysis methods to study groupings of elements (neurons or galaxies). Numerical methods and supercomputer modeling are also applied to study complex dynamic processes. The quantitative and structural analogies between the brain and the universe reflect universal principles of self-organization of complex systems. In terms of their material structural organization, the human brain and the universe are similar. The consciousness of the universe and human consciousness are spiritually similar entities. The consciousness of the universe cannot transcend its structural organization. Human consciousness cannot transcend the structural organization of the brain [1]. The cognitive mental psychological dynamics of the activation of meanings by human consciousness are presented in this article through the structural organization of the brain.

This article examines the mental psychological aspects related to meanings, consciousness, and the brain. The second section of the article is devoted to the semantic holographic images of the neural systems of

the brain. The third section examines the quantum mechanisms of activation of brain systems. The systemic connection between consciousness and the brain is described in the fourth section of the article. The fifth section examines the systemic process of activation of meanings by consciousness.

2. Semantic Holographic Images

Semantic holographic images are multidimensional mental constructs that integrate various aspects of perception, thinking, and information. They can be considered in several contexts: psychology, linguistics, and philosophy.

In Psychology and Pedagogy

A holographic semantic image is a representation of an object or phenomenon that has sensory attributes such as color, shape, and smell. Such a semantic image is perceived by all senses and is filled with personal energy and information formed based on individual experience.

Developing holographic thinking allows a person to develop a holistic understanding of the world, unlock personal potential, and automate key competencies. In the educational process, holographic thinking is trained using reference schemas, as well as a combination of sound, color, and visual information, which facilitates the perception and creation of stable holographic semantic images.

In Linguistics

In linguistics, holographic models of word semantics are associated with text analysis. A word with a meaning actualized in a text is considered a holographic unit that possesses multidimensionality: it is capable of combining original semantic, associative, conceptual, and other meanings. Such a unit reflects the semantic field of the text in which it is used and can realize each of the meanings formed in the text separately in the communicative space of the language.

Holographic modeling of text semantics is the process of interaction between linguistic units in the minds of participants in communication. It leads to the formation of a communicative and semantic space for the word, which expands in the text. This process involves:

Holographic units are words or phrases whose meaning develops in the text.

Stimulators are text elements that organize the semantic field, model the meaning of the holographic unit, and act as identifiers of new semantics.

There are various models of textual semantic development, for example:

Escalatory type - a linear structure where semantic complication is realized through the intersection of hologram component meanings or the linear unfolding of lexical chains.

Organizational type - based on the activating resources of the text itself.

In Philosophy and Theory of Consciousness

Some authors draw analogies between the principles of holography and the functioning of the brain. For example, psychologist Karl Pribram proposed that the brain's neural network possesses holographic properties. According to him, electrical signals propagating through neurons create interference patterns, which ensures the brain's adaptability and explains such properties as large memory capacity, distributivity, and the capacity for imagination and associative recall.

In this context, a holographic semantic image can be viewed as an individual model of reality created in the mind. In the right hemisphere, a figurative-sensory model (with color, smell, and spatial relationships) is formed. In the left hemisphere, a discursive-logical model is formed (with the recording of sizes, shapes, relationships between parts, etc.).

Thus, the concept of semantic holographic images unites the multidimensionality of perception, the integration of various types of information, and the connections between the physical world, language, and consciousness.

3. Quantum Brain Activation

Scientific Background

The most well-known scientific theory is Organized Objective Reduction (Orch OR), developed by Roger Penrose and Stuart Hameroff.

1. **Quantum processes in the brain**. It is proposed that microtubules (structures inside neurons made of tubulin proteins) can support quantum superposition and entanglement.

2. **Wave function collapse**. Conscious experience can arise at the moment of quantum state collapse in microtubules.

3. **Information processing**. Quantum effects potentially allow the brain to process information fundamentally differently than classical computing systems.

Semantic activation:

a sharp change in perception - insight, a flash of insight, when disparate fragments of information come together to form a new, coherent picture;

expanding cognitive horizons - the ability to see multiple interpretations of a single phenomenon;

transition between states of consciousness - for example, from the mundane to meditative or creative, where unconventional connections between concepts arise;

activation of deep semantic networks of the brain - the simultaneous activation of distant associations and metaphors.

activation of meanings - the sudden acquisition of new understanding without the gradual accumulation of data.

access to "higher" levels of reality

reorganization of neural networks, leading to a new understanding of experience;

expanded consciousness effect under the influence of altered states;

1. Superposition of meanings

Until the moment of interpretation, a text, symbol, or image can carry **several potential meanings simultaneously**. For example:

* a polysemantic word ("key" can mean a source of water, a tool, or a solution to a problem);

* Abstract art, allowing for multiple interpretations;

* An ambiguous phrase ("He passed by" - ignored or simply didn't notice?).

2. Confusion of meanings

The meaning of an element depends on its connection with other elements of the system. Examples:

* The context of a sentence changes the meaning of a word ("light" becomes "light of knowledge" and "sunlight");

* Cultural codes: a gesture or symbol can have opposite meanings in different traditions.

3. Uncertainty of interpretation

It is impossible to precisely determine meaning without taking into account the observer (reader, listener). Just as in quantum mechanics,

measurement affects the system, so interpretation changes the perception of a text.

4. Emergence of meanings

New meaning arises from the interaction of elements, not reducible to their sum. An analogy with a quantum system, where the properties of the whole are not deducible from the properties of the parts. Application:

Linguistics and semiotics. Analysis of polysemy, metaphors, and language games.

Artificial intelligence. Modeling ambiguity in natural language processing (NLP).

Psychology of perception. The study of how the brain "chooses" one interpretation from several possible ones.

Art history. Interpretation of open artistic forms (e.g., abstract painting).

Philosophy of consciousness. Attempts to link quantum processes in the brain with subjective experiences (controversial theories).

Summary

Most neural models of the brain are explained by processes based on classical energetic interactions in neural networks

4. The Connection between Consciousness and the Brain

Consciousness is the highest form of mental reflection of the world, including:

- * Awareness of oneself and the surrounding reality;
- * The ability to think abstractly;
- * The ability to speak and make logical generalizations;
- * The ability to purposefully influence the environment.

The brain is the physical organ that ensures the functioning of consciousness. It is a complex neural network where biochemical and electrical processes occur.

Basic Scientific Concepts of the Connection

1. **The Brain as the Source of Consciousness.** Most scientists believe that consciousness is a function of the brain. The more complex the brain's organization, the higher the level of consciousness. Evidence:

- * The development of consciousness in a child parallels brain development;
- * The aging of the brain is accompanied by a decline in conscious functions;
- * Brain damage (injuries, tumors, diseases) leads to disturbances of consciousness.

2. **The cerebral cortex** is a key area. The association zones above the projection (sensory and motor) areas are especially important. They facilitate complex information synthesis.

3. **The Role of Neurons and Neural Networks.** Thoughts, images, and emotions arise from the activation of neurons and the formation of connections between them. Each thought is the dynamic activity of a specific neural network.

4. **Physicochemical Processes.** Consciousness relies on billions of reactions in the brain: the transmission of nerve impulses, the activity of neurotransmitters, and electrical potentials.

5. **Attention as a Filter of Consciousness.** We are only aware of what our attention is directed at. Sensations constantly enter the cognitive system, but they become "conscious" only when focused.

The Role of the Hemispheres

The left and right hemispheres contribute differently:

* **Left Hemisphere:** analytical approach, sequential information processing, speech, logic. It analyzes elements step by step.

* **Right hemisphere:** holistic perception, rapid image processing, comparison with memory templates, intuition.

Both hemispheres work together. Isolated activity of one hemisphere disrupts the integrity of perception.

Historical and Theoretical Approaches

* **René Descartes** (17th century): proposed that the "thinking soul" interacts with the body through the pineal gland.

* **I. P. Pavlov** (20th century): the concept of the "bright spot" - consciousness is associated with an area of optimal excitability in the cerebral cortex, which shifts during mental activity.

* **William Crick** (Nobel laureate): developed Pavlov's ideas, linking consciousness with the activity of certain neural ensembles.

* **N. P. Bekhtereva:** studied the brain mechanisms of thought and emotion, emphasizing the role of deep brain structures. * **T. V. Chernigovskaya:** notes that the study of the brain mechanisms of consciousness is a key issue in the life sciences and neurotechnology.

Key evidence of the connection

* **Ontogenesis:** Child brain development (cortical growth, myelination of connections) directly correlates with the development of speech, thinking, and self-awareness.

* **Pathologies:**

- * Frontal lobe injuries - impaired planning and self-control;
- * Temporal lobe lesions - problems with memory and speech;
- * Stroke or tumors - loss of certain conscious functions.

* **Neurophysiology:** EEG and fMRI show that different states of consciousness (wakefulness, sleep, meditation) correspond to specific patterns of brain activity.

* **Evolution:** Species with more complex brains (primates, dolphins) exhibit the beginnings of self-awareness and tool-using abilities.

Summary

The connection between consciousness and the brain is fundamental:

- * The brain is the material basis of consciousness;
- * The level of brain development determines the level of consciousness;
- * Consciousness is formed and functions thanks to the activity of neural networks, especially the cerebral cortex;
- * Disturbances in the structure or function of the brain lead to changes or loss of conscious functions.

Consciousness exchanges holographic semantic images with the brain's neural networks. Meanings (thoughts) activate linguistic connections with images (patterns) stored in the brain's neural networks.

Many aspects of the complex process of interaction between consciousness and the brain remain the subject of research-for example, how exactly neural activity generates subjective experience, or the role of deep brain structures (the thalamus, reticular formation) [2-4].

5. Activation of Meanings by Consciousness

The activation of meanings by consciousness, or meaning-making, is the process by which a person interprets events, experiences, relationships, and themselves, forming meaningful and useful constructs for navigating the world. Let's examine it in more detail [59].

Theoretical Foundations

Key Approaches and Ideas:

1. Viktor Frankl's Logotherapy. Psychiatrist and philosopher Viktor Frankl, in his book "Man's Search for Meaning" (1946), argued that the search for meaning is the primary human motivation. He demonstrated that meaning can be found even in difficult circumstances-through:

- * Performing meaningful actions;
- * Experiencing values (e.g., love, beauty);
- * Accepting inevitable suffering as part of the journey.

2. Constructivist Approaches in Psychology. Here, meaning is not "found" ready-made, but is **actively constructed** by the person through interaction with the world. This is especially important in crisis situations (loss, illness), when old meanings collapse and new ones need to be created.

3. **Cognitive Psychology and Mental Models**. The process relies on **mental models**-internal representations of the world that help:

- * Structure information;
- * Predict events;
- * Make decisions.

4. **Social Semiotics**. Meaning is often created in a **social context**-through language, symbols, and cultural norms. For example, traditions or rituals help make sense of loss (funerals, memorial services).

How does the meaning-making process work?

Stages:

1. **Perception of an event or experience**. A person encounters a situation (positive, neutral, or traumatic).
2. **Interpretation**. Experience is filtered through:
 - * Personal beliefs;
 - * Values;
 - * Previous experience;
 - * Cultural patterns.
3. **Meaning assignment**. The event is given meaning: for example, a failure can be a "disaster" or a "lesson."
4. **Integration into worldview**. New meaning is integrated into the overall picture of the world, influencing:
 - * Emotions;
 - * Behavior;
 - * Goals.
5. **Correction**. As circumstances change, meaning can be revised (flexibility of thinking).

Mechanisms and strategies for creating meaning

Examples of strategies (especially for overcoming crises):

Personal growth: "This challenge made me stronger."

Spirituality: seeking solace in faith or philosophy.

Altruism: transforming pain into helping others (for example, creating a foundation after the loss of a loved one).

Reflection: analyzing experiences through journaling, therapy, and conversations with loved ones.

Creativity: expressing experiences through art, music, and writing.

Revaluation of values: shifting focus from material things to relationships, health, and self-development.

Practical Significance

Creating useful meanings helps:

- * Reduce anxiety and depression (especially after trauma);
- * Increase psychological resilience;
- * Find motivation for action;
- * Restore self-integrity after crises;
- * Improve quality of life and satisfaction.

Real-Life Examples

1. **Loss**. Someone who has lost a job may see this as an opportunity to change careers or start their own project.
2. **Illness**. A patient with a chronic illness creates meaning through caring for others or raising awareness about the illness.
3. **Failure**. A student who fails an exam perceives this as a reason to reconsider their teaching methods.

Conclusion

Creating useful meanings is a dynamic process that combines cognitive, emotional, and social aspects. It allows us not only to explain the world but also to imbue life with value, even in the face of uncertainty. Developing meaning-making skills (through reflection, dialogue, and creativity) is an important element of psychological improvement in cognitive functioning [10-16].

6. Conclusion

Consciousness, according to the 365 existing concepts, has long resisted precise definition, often being reduced to emergent cognition, subjective report, morphogenic quantum field, integrated information, and other notations [17].

Consciousness is who we are, and also what sustains our identity until it breaks down [18-20]. Structurally, consciousness is not a symbolic experience or behavioral complexity; it is a pattern of continuous, harmonious cognitive intellectual activity. Systemic consciousness is entirely defined by its dynamic complexity. Systemic consciousness opens the way to a deeper understanding of our cognitive intellectual inner life in diversity and unity, expanding human consciousness to a universal similarity.

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