

Mechanism of Intuition

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Received: January 09, 2018; **Published:** January 19, 2018

Abstract

Intuition is a cognitive process with an outcome of downloading the right information, as required by the systems, from wisdom arranged in manifold in each and every point of nature. To have intuition the systems has to be in the state of intuition; within the subsystems of the systems there required to be vertical synchronization, absence of any horizontal bias and a within-without harmony. Intuition initially happens at the level of the psyche without or with the support of organ brain. The brain supports this process with its own dynamics and translates this intuitive information in behavioral response. This paper describes author's opinion on the mechanism of intuition.

Keywords: *Intuition; State of intuition; Translational value of Intuition in AI, Business Management and Science of meditation*

Volume 2 Issue 1 January 2018

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About Intuition

Intuition is a process leading to an outcome. The process is non-conscious. However the outcome is conscious. The outcome is the right information offering a practical solution to the systems. Albert Einstein used to do science on the basis of his intuition. Many emperors of the past and present-day politicians have reigned their kingdoms on the basis of their intuition ("gut feelings" and "hunches"). Accomplished spiritual leaders often offer decision on the basis of this intuition ("mystical insight" which is an affectively charged judgment). Intuition is beyond logic and reasoning. Logic and reasoning are often studded with metaphor. Both have a metaphor map in their structure [1]. Intuition is completely free of any metaphor. In fact, intuitive knowledge modifies and resets existing logic and reasons. Robert Campbell has described how intuition and logic have shaped human evolution [2]. For all practical purpose, intuition is a conclusion with a sense of certitude on the basis of little information and without any aid from senses, incubating thoughts and reasoning. In contrast, incubating relevant thoughts are essential for insight. In intuition, nothing is left to be censured. Intuition is already censured and carved out as a final and certain product. Intuitive information is always accurate and right as required by the systems for a practical solution of the problem, the systems might or might not have encountered once. Intuition could also be a designated way of nature-consciousness to use a primed system for delivering a practical solution necessary and sufficient for many systems' survival, growth and evolution. One system's intuition might often work counterintuitive for others, which initiates churning and transformation of the society the systems belong to. Intuitive process is non-conscious and the outcome of intuitive process is sudden, unpredictable and immediate, but is always all-inclusive and holistic. The outcome, intuitive information, makes the systems instantaneously conscious of it. Intuition

Citation: AK Mukhopadhyay. "Mechanism of Intuition". *Current Opinions in Neurological Science* 2.1 (2018): 356-361.

thus defies decision-theorist’s postulation that accuracy of decision is often inversely related to decision speed [3]. A good review on intention is more than 20 years old [4]. The mechanism of intuition is yet to be known. Vaughan [5] stated that intuition is “.....knowing without being able to explain how we know”. However, intuition is not privy to human beings. It happens in all living creatures possessing an organ called psyche. Following is an attempt to decipher the mechanism of this subjective (first person’s perspectives) intuition from third person’s perspectives as required for doing science. We will first consider its mechanism at the psychic level and then at the context of the brain dynamics and finally in the context of cerebral cortical dynamics.

Mechanism of intuition at the psychic level

To have intuition, the system has to be in the state of intuition. What described below is how this state is achieved from the canvas of consciousness. In author’s earlier paper [6], the composite model of psyche, its structure and operation have been discussed. Consciousness, self, life, mind and information are constituents of psyche, each of which has a specific operation and joint operation with one or the other member. Joint operation of self and mind with retrieval of requisite memory results in intelligence. Intuition in this context may be looked as intuitive intelligence. In genesis of intelligence (Table1), when memory is confined to only informational memory, the intelligence generated might be called ‘dry’ intelligence! When episodic memory stored within self also contributes to the development of intelligence, what results is ‘moist’ intelligence. If during this recruitment of memory, life-tested experiences are also involved, the intelligence becomes enriched and emotionally ‘juicy’. Finally, with involvement of operation of consciousness in such genesis, intelligence appears “crystallized” as intuition [7].

Level of Intelligence	Involvement of different Operators and different Memory	Rooting of Intelligence	Alternative nomenclature suggested by author
Level I	Mind, Self, Information and Informational memory	Mind-rooted intelligence	'Dry' intelligence
Level II	Mind, Self, Information, Informational and episodic memory	Phenomena-rooted intelligence	'Soft' intelligence
Level III	Mind, Self, Life, Information and Informational, episodic and experiential memory	Emotion-rooted intelligence	'Juicy' intelligence
Level IV	Consciousness, Life, Self, Mind, Information and informational, episodic and experimental memory, wisdom manifold.	Wisdom-rooted Intuitive intelligence	'Crystal' intelligence

Table 1: Four types of Intelligence have been described depending on the levels of operation, involvement of different operators and recruitment of different kinds of memory.

The base of the canvas from which intuition originates is consciousness, which operates in layers. Supporting consciousness supports i.e., upholds autonomous operations of mind, information, self and life. Participating consciousness contributes for those operations in need. Intervening consciousness censures with the razor of “no” if anything is wrong for the systems. Creative consciousness experiments and creates. Intuition is thus a product of creative consciousness, intervening consciousness and participating consciousness while supporting consciousness has been the upholder of the joint operation of self, life, mind and information and all are in absolute agreement with the final output. Information within wisdom-manifold of nature-consciousness is translated as intuitive information while the psyche remains in the intuitive state.

To sum up, physical signaling systems including data and facts are supported and supervised by intelligent mind. 'Self' and 'life', in turn, support mind. Mind reports to self and gets its strength from life. Self and life are supported by consciousness, which frequently participates, occasionally intervenes and rarely does experiment for new creation from the wisdom manifold in its ground state. Intuition is the final product where all the elements of psyche are in absolute agreement in the stated context. Intuition, therefore, is a physical, mental, emotional and spiritual amalgam where reasoning (self, mind, information, memory), feelings (self, life and mind) and instincts (life, consciousness and self) concur with the worldview in the context.

In a unicellular organism, protein molecules at the junction of cell membrane and cytoskeleton coordinate the intuitive state. Cell membrane takes care of the environment and cytoskeleton coordinates the subcellular organelle such as nucleus, mitochondria, and lysosomes with the cell membrane.

Mechanism of intuition and the whole brain information dynamics

The brain neither generates consciousness nor uses consciousness. It is consciousness, which uses brain for its manifestation. Psyche remains the interphase between the 'within' and 'without' of the systems brain. The whole brain of the organism has to support this psychic mechanism of intuition and translate this into behavior.

The information dynamics of the brain grossly follows a vertical hierarchy along with a horizontal balancing act. From below upward brainstem, diencephalon, limbic brain and cortical brain are parts of this vertical hierarchical information dynamics of the brain. Evolutionarily this is the hierarchical systems-nesting of reptilian, mammalian and neo-mammalian (human) brain, the "Triune Brain" as described by P. D. MacLean. Right and left cerebral hemispheres are participants in the horizontal information dynamics of the brain. That left and right brain are different in their functions was proven by split-brain experiment of Roger Sperry in 1970s. However it is yet to be found out whether the two halves of the brain process different kinds of information or process it differently (digital/analog/holographic), or their circuitries of processing, feed back and feed forward loops are different! How during the process of intuition, these two halves of brain concur!

Usually for all ordinary non-conscious circumstances there is no observable cosmo-cortical (outside-inside, within-without) communication. However, the author is of the opinion that for any conscious happening within the brain or for conscious output from the brain this cosmo-cortical communication is required. This is in agreement with the view of Hippocrates, the father of Modern Medicine, who thought that the brain is supportive and transmissive for consciousness.

During the process of intuition, the brain is surely 'open' to supracortical domain for information at the nature's Point of wisdom. Intuition is the result of brain dynamics in the context of this Point of wisdom-manifold in nature through the interphasing of psychic operations. In this brain-state there is synchronization of vertical hierarchical information brain dynamics. There is absence of any hemispherical bias. There is cosmo-cortical (within-without) harmony! This is the state of intuition of the brain (Figure 1) when the intuitive information could be translated into behavior.

About The Point

This is not any specific, special or certified Point! It could be any point in nature; here, there, anywhere! All information is packed at this point. Not merely information, all developed knowledge, all built-up experience and the universal wisdom are condensed at this point. If one has the downloading apparatus and possesses the skill to download this, one can have access to any of them. All signals eventually vanish here. All intention originates from here. Holistic universal sensor works from this Point. The Point has unparallel censoring property. Finally, from this Point emerges the Governing order of nature. Compare in the ladder of cognition; signal is non-intentional. Information is intentional. Knowledge acts as sensor. Experience has enormous censoring ability, and wisdom governs the systems.

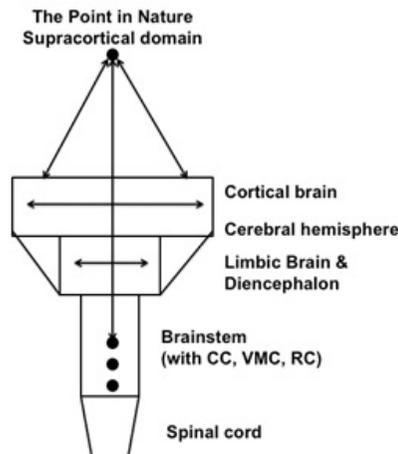


Figure 1: Vertical and horizontal brain dynamics during information processing and response. In addition to Brainstem, which is studded with cardiac center (CC), vasomotor center (VMC) and respiratory center (RC), limbic brain and cortical brain (MacLean's triune brain), the present author adds the topmost hierarchy of supracortical domain. Horizontally, there are left and right cerebral hemispheres. At the state of intuition, there is vertical synchronization, absence of hemispherical bias and there is cosmo-cortical (outside-inside) harmony.

As said, this pregnant dynamic point is not specific to any locality! It could be anywhere, - on this planet, on other planet, in interplanetary space, on a star, in interstellar or intergalactic space and inter-universal space. It is one of the greatest wonders how the whole contents in substance are packaged in an astonishing way at one single point! This appears more astonishing than "Astonishing Hypothesis" of Francis Crick on functioning of the brain! The point, further, is the reduced state of a sphere. All spheres of knowledge and experience could be condensed to one single Point. All mathematics starts from this one point. Universe originated from a Point. We all eventually are metamorphosed into this Point.

To sum up, every point in nature is pregnant with all-wisdom in terms of substance as well as packaging. It is the readiness of the systems to download this wisdom matters most in intuition. The wisdom embedded in nature-consciousness expresses itself as intuitive information through the systems when there is vertical synchronization of the sub-systems within the systems in absence of any lateral horizontal bias while there is undisputed within-without harmony across the boundary of the systems. The system is always a living entity, might be a biological cell, a brainless organism or an animal having brain. Intuition is frequent in simple organism and becomes rare as the organism becomes multi-cellular and multi-systems and increasingly rare in the complex human brain.

Mechanism of intuition in the context of cerebral cortical dynamics

Cerebral cortical neurons are open to download information from the Point, as described above, in the supracortical domain. Non-synaptic spines over the apical dendrites and the dendritic mat over the terrace of the cerebral cortex could be the "antennae" for this. Inter-phasing by psychic operations is essential for this downloading. The idea of "inverted neuraxis" [8] with its roots in the eternity and branches down below in the peripheral nerves is very relevant here. Further, intuition is not at the uppermost ladder of cognitive process. Illumination and revelation are still higher cognitive process. This requires to be understood in the context of cortical dynamics. Several billions of cerebral cortical neurons are disposed in six inseparable but delineable layers. However, the neurons in the lower three layers of cerebral cortex show group activity in modular fashion! Sir John Eccles [9] held the view that recruitment of modular groups of neurons in different spatio-temporal patterns is responsible for different flavors of consciousness. As said, this modular recruitment mostly involves neurons of lower three layers of cerebral cortex. Modular arrangement fades away as one move upwards from fourth to third, second and the topmost first layer of cerebral cortex. There could be a vascular watershed in between two stairs, upstairs and downstairs of cerebral cortex. Laminar necrosis of neurons of cerebral cortex in hypoxic brain is a common finding in

neuropathology following autopsy of the brain in neonatal death. There could also be an electrophysiological watershed between neurons of upper three and lower three layers of the cerebral cortex. However, there are occasions when the third layer neuronal activity is brought down to the operation of modular cortex of lower three layers. This is not possible without synchrony with second and first layer neurons and cosmo-cortical harmony. This results in intuition. In a cascading manner [10], incorporation of third layer cortical neurons in the executive machinery of downstairs modules of cerebral cortex results in intuition, third and second layer of cortical neurons results in illumination and, of third, second and first layers of cerebral cortical neurons results in revelation (Figure 2).

Incorporation of		Results in
Third layer cortical neurons	In the executive machinery of downstairs modules of cerebral cortex	Intuition
Third, Second layer of cortical neurons		Illumination
Third, Second and First layer of Cortical neurons		Revelation

Figure 2: The cerebral Cortex as a Supracortical Machinery. The figure is self-explanatory; how cascading involvement of upper three cortical layers in the activity of modular operons of lower three layers results in intuition, illumination and revelation.

To sum up, intuition requires to be supported by a finer information dynamics within the laminar layers of cerebral cortex. There is cascading merger of non-modular cortex with the modular cortex. The outcome is graded, initially as intuition, then as illumination and finally as revelation. All are interconnected with the whole; the self/subject, the world and the consciousness.

Perspectives

A theory of commonsense, “naïve physics” prevails in science of AI. Gestalt theory is also often tossed about. The practical translational value of this paper is in Artificial Intelligence, in how to develop systems with open information-processing capability. If one understands the mechanism of intuition correctly in the context of the psyche, whole brain dynamics and cortical dynamics, one is in a better position to apply this knowledge in subsystems of the robot, which in future could become successful to download the correct information from nature-consciousness in a stressful situation. This understanding is also important for construction of ‘open’ hardware and software. Second usefulness of this paper is in business management. When the management board is dysfunctional, data set is incomplete and the truth is beyond available facts, the intuitive state of psyche and the brain are the most valuable weapons for a successful leader. Intuitive managers are regarded as the assets of the organization. Third implication of research on intuition and having a tentative hypothetical mechanism of intuition is in understanding of the functioning of the spiritual brain, to distinguish exactly intuition from illumination, revelation, insights, premonition and differentiate creative intuition from operative intuition as described by Goldberg [11]. All could be considered as observable parameters for grading the achievements following meditation practice of variable duration.

Concluding Remarks

Intuition is not privy to brain. Intuition happens in unicellular organism and brainless animals. Most important organ for intuition is the psyche which acts as inter-phase between ‘within’ and ‘without’ of the systems. To have intuitive information, the systems need to be in the state of intuition. The process is non-conscious but the outcome is a conscious phenomenon for the systems. The literature

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on mechanism of intuition is scant. There is no adequate empirical research on intuition at psychological, neurophysiological and experimental level. Opinions on intuition are mostly subjective and are described in first person's perspectives. The statements made in this paper make author's opinion clear. The job for neuroscience has thus been defined in third person's perspectives. Logical next step is to cut the job into multiple interconnected tasks. A number of research questions could be formulated from this expressed opinion. This will generate research hypotheses for intellectual scholars to get enrolled in PhD programs of neuroscience, cognitive psychology, AI and consciousness science. Several new frontiers with connectivity are likely to open up such as role of premonition, tacit knowledge (implicit learning) and incubating thoughts in the process of intuition. Finally, we can hope that research on neuroscience is put on the right tract for posterity to beacon with.

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