

## **Cognitive Neuroscience 2018: On the biological (or social) expedience of the mechanism of information integration in neural networks of the brain through mental phenomena**

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### **Abstract**

In essence, it is useful to model the brain in the form of a complex system of neural networks extend mainly from sensory to motor units to organize biologically or/and socially expedient motor actions, which change the surrounding physical environment to the subjectively desired direction. But to provide this behavioral expedience, a living system needs to accumulate and integrate (Tononi G., 2012) just biologically or/and socially expedient information. Such a paradigm can be more precise through the following set of statements: There are two kinds of neural networks in the brain, mechanisms of which are fundamentally different. Networks of the first kind carry into effect unconditional motor acts. They are formed on the basis of genetic memory, and the traditional neurobiological patterns can explain their informational activity. In such networks, the sensory input rigidly determines the motor output, what can be explained by means of neuroelectric, neurochemical, neuromolecular processes (in general, by means of physical processes). The biological expedience of such informational activity is grounded in the space-time structure of neural networks. And this space-time structure is based on information fixed in the genetic experience of a living being. Such networks are closed to a new (accumulated during life-time) information due to their nonplasticity and the absence of a mechanism for fixing a biologically expedient experience. For this reason, these networks cannot adapt a living system to environmental novelties. Such neural networks are localized mainly in the spinal cord and realize mainly homeostatic stability of the organism's inner environment. Such "stimulus-reaction neuronal networks" are causally independent of one another and cannot integrate "their own" information with other information without evolutionary more later neural networks which carry into

effect mental phenomena. Within the framework of the known physical laws, no law can explain biological (and social) expedience of self-organizing processes in living systems, except the processes occurring in living systems through accidents (mutations) accumulated in genetic experience - see point 1. On the other hand, the framework of bottom-up and top-down causation explains the integration of information by controlling networks through its subjective assessment using mental phenomena (mental images, sensations, emotions, etc. – see point 2. The results of this integration make possible modulating bioelectric processes that form muscle activity on the basis of a life-saving integrated experience.

### **References**

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