

## **118 Framework of Consciousness from the Semblance Hypothesis of Memory**

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A causal relationship between neuronal activity and consciousness is not yet discovered. Here, we present the framework for consciousness derived from the semblance hypothesis of memory. A unit of memory, in the presence of an external or internal cue stimulus, results from the ability to induce specific postsynaptic events at the synapses of the neurons from the learned item without the requirement of action potentials reaching their presynaptic sides. For this, co-activation of the fibers from the item to be learned and the cue during learning need to induce specific changes that will later allow the cue stimulus alone evoke activation of a set of postsynapses that belong to the learned item. Oxygenation-state dependent functional LINKs are hypothesized to form between the postsynapses of the synapses belonging to the item to be learned and the cue during learning. During retrieval, by re-activating these functional LINKs the activity from the cue stimulus spreads to the postsynapses of the synapses belonging to the learned item. Activating the postsynapses belonging to the learned item without activating their presynaptic terminals will evoke cellular hallucination of an action potential-induced synaptic transmission from presynapses belonging to the learned item inducing synaptic semblance. When more than one postsynapse (dendritic spine) of a neuron gets depolarized through the functional LINKs, during memory retrieval, it enables spatial and/or temporal summation of excitatory postsynaptic potentials to evoke an action potential. The activity from this neuron propagates in the downstream network that belongs to the learned item and induce network semblance (creating hallucination of sensory inputs from the learned item). The net effect of synaptic and network semblances provide virtual sensation of a stimulus in its absence, which is memory. Since there are several suggestions that consciousness is related to some form of memory (Crick and Koch, 1998; Ramachandran and Hirstein, 1997; Rosenbaum et al., 2007), it is reasonable to formulate a framework for consciousness from semblance hypothesis. Neuronal activity from the hippocampal and cortical oscillations as well as those that are triggered by background environmental stimuli activate a non-specific set of neurons result in the formation of highly non-selective semblances named as primary semblances. The prominent one among them is named as consciousness semblance (C-semblance). Qualia can be described as a primary semblance formed from sensory inputs from a single sensory system. Secondary semblances form in the presence of a cue stimulus used in previous associative learning. Examples include memory, decision-making and path finding. Tertiary semblance occurs as a response to a novel cue stimulus and may result in more than one semblance leaving the animal with an option to choose from. If the semblances are of nearly equal strength, choosing one of them becomes a probability problem similar to that in quantum mechanics. Extent of previous associative learning and the nature of the problem (cue) giving rise to tertiary semblance may explain the existing arguments for and against “free will”. This work should be considered as unproven until it is verified against experimental evidence.