

**Title :**            **The brain seen as a goal-oriented, self-organizing complex system**

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Our intuition assumes that there is a centre in our brain in which all relevant information converges. This, so our introspection, would be the place where the signals provided by our various sensory systems are bound together into coherent percepts of the surrounding world, where decisions are reached, where plans for future acts are elaborated and where adapted motor responses are programmed. Eventually, this distinguished site would be the place where the intentional self constitutes itself.

The results of neurobiological investigations design a radically different picture. The brain presents itself as a highly distributed system in which a very large number of processes occur simultaneously and in parallel without requiring coordination by a central convergence centre. The connectivity graph of the brain is characterized by a dense network of mainly reciprocal links between the chains of processing nodes that span between the sensory and executive organs. This specific architecture resembles in many respects small world networks and raises the question, how the multiple operations occurring in parallel are bound together in order to give rise to coherent perception and action.

Based on data obtained from investigations of the visual system mechanisms will be discussed that could accomplish the binding of distributed processes into coherent representations. The hypothesis will be forwarded that temporal coherence serves as an important organizing principle and that this coherence is achieved by the synchronization of oscillatory activity in distinct frequency bands