Identifying Information Broadcast in Complex Networks

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Presentation Abstract Summary How the human brain is able to successfully utilise its massively parallel computational resources still remains elusive. One of the possible mechanisms through which integration could take place is via a richly connected set of nodes in the brain, as described by the Connective Core Hypothesis. In this article, we complement empirical evidence with computer simulations by investigating how a simulated neural network with modular, small-world connectivity subject to external stimulation uses its dynamic activity to broadcast information through its connective core. Using time-resolved versions of Mutual Information and Transfer Entropy we analyse the non-stationary time series of the network activity to identify influences between the modules and visualise how stimulus-related information originates, spreads through the connective core and finally subsides as the network returns to equilibrium. Our results show that information in the simulated network is broadcast as described by the Connective Core Hypothesis, hence providing supporting evidence through well-founded mathematical simulations and analysis.

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