

## Supplementary Materials for ‘May the 4C’s be with you: An overview of complexity inspired frameworks for analyzing resting-state neuroimaging data’

### Authors

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<b>Metric</b>	<b>Definition</b>	<b>Interpretation</b>
Node degree/degree centrality	The number of edges attached to a node	How well-connected a node is
Degree distribution	The distribution of all degrees of all nodes in the network	Random networks have Gaussian distributions. Complex networks have non-Gaussian distributions with a long tail towards high degrees. That is most nodes have few connections, but a few nodes have many connections.
Path length	Minimum number of edges traversed from one node to another	Efficiency is inversely related to path length
Global efficiency	Inverse of average path length	Ease of communication over the entire network
Clustering coefficient/transitivity	Probability of 2 nodes connected to a 3 <sup>rd</sup> node of being also connected to each other	Presence of locally well-connected communities
Betweenness centrality	Number of shortest paths between all other node pairs that pass through this node	Importance of this node for communication between other nodes
Hub	Node with high centrality (usually with degree centrality above chance levels)	Hubs are nodes that are relatively well-connected
Small-worldness	High clustering coefficient with short path length when compared to a given null model <sup>1</sup>	A small-world network balances the local clustering of regular networks and the global efficiency of communication of random networks

<sup>1</sup> Several definitions of a small-world network exist, which vary in the specific network attributes they consider and the null models they employ (e.g. random vs regular networks)

<b>Metric</b>	<b>Definition</b>	<b>Interpretation</b>
Rich club	High-degree nodes that are more tightly interconnected with each other than expected by chance	Presence of a tightly interconnected set of hubs facilitates global communication
Modularity	Estimated with clustering algorithms (may also be hierarchical, whereby modules are themselves divided into sub-modules)	Extent to which the network can be subdivided into communities of nodes (“modules”) that are highly connected within a community but sparsely connected between communities
Participation coefficient	Proportion of a node’s connections with different modules	Diversity of a node’s connections to nodes from other modules
Diverse club	Nodes with high participation coefficients	Nodes with high participation coefficients integrate information and coordinate connectivity between communities

*Supplementary Table S 1 Examples of graph theory metrics that are commonly employed in neuroscience. Note that a vast number of graph-theoretic metrics exist, both at the level of individual nodes and the whole network. Also note that many such metrics may allow for generalizations to weighted, signed, or directed networks*