**Glossary of Terms Used in this Study**

|  |  |
| --- | --- |
| **Term** | **Definition** |
| Adjacency matrix | A table used for graph analysis of a network where each cell has a value representing the link status for each node pair. For functional connectivity, this value can be a binary number indicating whether a connection exists, or a weighted number, representing the magnitude of the statistical correlation two given nodes.  |
| Amplitude | Measure of the size or strength of a wave cycle which is strongly influenced by the number of synchronously firing neurons. |
| Complex networks | Real-life networks which exhibit properties of intrinsic organization with different hierarchical clusters of nodes, hubs, and modules. Examples include social networks, the internet, airline traffic routes, protein networks, and brain networks. |
| Brain oscillations | Refers to simultaneous rhythmic waveform patterns being generated by synchronized populations of excitatory pyramidal neurons. Brain rhythms are thought to be a natural timing mechanism for information processing within and between brain regions |
| Coherence | Measures the stability or strength of phase or phase/amplitude coupling in a time series between two sites or two brain regions at a given frequency, expressed as a squared correlation co-efficient (from 0 to 1). Higher coherence values that are closer to 1 show the phase differences have less variability and higher consistency. |
| Current source density | Refers to the amount of undifferentiated electric current being generated by an active cluster of pyramidal neurons within a given voxel unit. |
| Degree | The number of nearest neighbors to which a given node is connected. |
| eLORETA | Stands for exact low resolution brain electromagnetic tomography. “Exact” refers to this method’s zero-error localization capability to test-point sources even under the presence of structured noise. It can be applied to surface EEG signals to estimate the distribution of current source density for a brain volume consisting of 6,239 voxels of cortical grey matter. Brain maps generated reveal a 3-dimensional distribution of intracortical activity throughout the cortex at spatial resolution within 5 mm3. |
| Frequency band | A portion of the frequency spectrum as a way of characterizing oscillations recorded in the raw EEG in the time domain. There is a direct mathematical relationship between the time domain and the frequency spectrum. Computers are used to instantaneously transform the oscillations into frequencies which traditionally divided into bandwidths according to an ascending order: delta (1-4 Hz), theta (4-7 Hz), alpha (8-12 Hz), beta (13-30 Hz), gamma (>30 Hz). Further subdivisions and different bandwidth specifications within the frequency spectrum are increasingly common. |
| Functional Connectivity | The time-based temporal correlations of synchronized activity between distributed regions of activated brain networks during the awake resting-state or when performing a particular cognitive task. |
| Graph Theory | A branch of mathematics that deals with the process of modeling the topology of networks to describe a dynamic complex system of interactions based upon elements (nodes) and the connections between nodes (edges). |
| Hubs | Highly centralized regions that link distinct nodes or modules facilitating a high degree of functional connectivity over a network.  |
| Modules | Clusters of nodes with high a density of nearest neighbors and high degree hubs, also referred to as neighborhoods and communities. |
| Phase | Refers to the time-varying characteristics (e.g. phase angle, amplitude) and the position within a given rhythmic cycle of an oscillating wave pattern, frequently measured in degrees (0-360°).  |
| Phase difference | Describes the time delay or advancement components or offset between two or more signals. When the phase differences are significant, they imply significant changes within a network are not due to physiological artifact (e.g., volume conduction). |
| Small-world network | A term used to describe the optimal balance between differentiation and integration, local and global connectivity, in complex real-life networks including central nervous systems. The topology of small-world networks is characterized by high clustering (segregation) and short path lengths (integration), representing a trade-off in local and global processing in order to satisfy opposing demands which maximize processing speed at minimal neurobiological energy cost. |