**Unilayer network construction and analysis**

1. First, we constructed minimum spanning trees (MST) for the 5 frequency-band-specific EEG networks by applying Kruskal’s algorithm to the functional connectivity matrices. The MST is a binarized sub-graph of the original graph that connects all the nodes in the network without forming loops. This represents the backbone of the network and, importantly, is not hindered by common methodological issues such as the effects of connection strength or link density on the estimated topological characteristics of networks. Edge weights were defined as the inverted PLI values (1/PLI) when constructing the *minimum* spanning tree, since we were interested in the strongest connections.
2. Then calculated nodal eigenvector centrality (EC) individually for each of the 5 EEG MSTs and for each fNIRS MST using the brain connectivity toolbox (<https://sites.google.com/site/bctnet/>). EC is a measure of nodal centrality that assumes that a node is more influential if it is connected to nodes that are highly central themselves, and thus considers both the connections of a node itself as well as the connections of its neighbors.

<https://github.com/multinetlab-amsterdam/projects/tree/master/mumo_paper_2021/script>

**Multilayer network construction and analysis**

A multiplex network is a multilayer network used to describe different interactions between the same set of nodes. We integrate the 7 MSTs to obtain an interconnected multiplex network for every participant. Each participant’s multiplex thus consisted of L = 7 layers (TWO for fNIRS, and 5 for each of the EEG frequency bands), with each layer containing the same set of N = 44 nodes (atlas regions), and each spanning tree and thus layer having M = N – 1 = 43 intralayer links. The weights of the interlayer connections are set to 1, identical to the intralayer connections. The resulting multilayer network is represented as an LxN by LxN supra-adjacency matrix with diagonal blocks encoding intralayer connectivity for each modality and off-diagonal blocks encoding interlayer connectivity. Supra-adjacency matrices are then exported to Python and multilayer nodal EC is calculated.

<https://github.com/multinetlab-amsterdam/data_analysis/tree/Multilayer/Multilayer>

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defining a subnetwork: FPN

L\_IPL/R\_IPL, left/right inferior parietal lobule; L\_MidFG/R\_MidFG, left/right middle frontal gyrus: preC, postC, paraC.