

Supplementary materials for the “Neural Correlates of Social Touch Processing: An fMRI Study on Brain Functional Connectivity”.

Node strength metric quantifies the direct connectivity between a given node and its neighbors within a network. It is calculated by summing the absolute edge weights of the edges connected to the node in question. A higher node strength value indicates a more central position within the network, suggesting a greater importance or influence of that node on the overall network structure and dynamics [Rubinov M, Sporns O (2011) Weight-conserving characterization of complex functional brain networks. *Neuroimage* 56(4):2068–2079].

Betweenness centrality metric measures the importance of a particular node by quantifying the percentage of shortest network paths that pass through it. Nodes with higher betweenness centrality values have a high degree of importance because they are often found on the shortest paths connecting other nodes in the network. Such nodes occupy strategic positions in the network structure, acting as connectors or bridges that facilitate efficient information flow between distant parts of the network [Brandes U (2001) A faster algorithm for betweenness centrality. *Journal of mathematical sociology* 25(2):163–177; Makarov VV, Zhuravlev MO, Runnova AE, Protasov P, Maksimenko VA, Frolov NS, et al (2018) Betweenness centrality in multiplex brain network during mental task evaluation. *Physical Review E* 98(6):062413].

Eigenvector centrality is a metric that quantifies the self-referential importance of nodes within a network. Nodes that are connected to other important nodes have a high eigenvector centrality value. Mathematically, the eigenvector centrality of a node i corresponds to the i -th element of the eigenvector associated with the largest eigenvalue of the adjacency matrix, which encapsulates the connectivity patterns within the network [Newman ME (2008) *The mathematics of networks*. The new palgrave encyclopedia of economics 2(2008):1–12]

Clustering coefficient measures the degree of connectivity between adjacent nodes within a network. Specifically, the weighted clustering coefficient evaluates the average intensity of all triangles associated with each node. In essence, this metric quantifies the density of connections between a node's immediate neighbors, providing a measure of how closely these nodes are connected to each other. This metric can provide insight into the tendency of nodes to cluster or form tightly connected groups within the network [Costantini G, Perugini M (2014) Generalization of clustering coefficients to signed correlation networks. *PloS one* 9(2):e88669]

Path length metric provides information about the average length of the shortest paths in the network. The global efficiency metric builds on this concept by calculating the average of the inverse of the shortest path, providing a measure of the overall efficiency of the network in terms of how quickly and easily information can be transmitted between nodes. High values of the global efficiency metric indicate that the network structure is highly efficient, allowing for rapid communication and synchronization among its components.

In the context of neuroscience, the local efficiency metric serves as a measure of the efficiency of data transfer through a neural network, evaluated by focusing on the specific neighbors of a given node. This metric allows researchers to examine how efficiently information is transmitted within a localized subset of the network by looking at the immediate neighboring nodes. The global efficiency metric, on the other hand, quantifies the overall efficiency of the entire network without considering the specific local neighborhoods of individual nodes.

Node	MNI coordinates
Cingulate Mid R	8.000 -10.000 39.000
Caudate L	-12.000 10.000 12.000
Supp Motor Area L	-5.000 4.000 61.000
Temporal Sup R	58.000 -23.000 6.000
Occipital Mid L	-32.000 -81.000 15.000
Occipital Inf L	-36.000 -79.000 -9.000
Frontal Inf Tri L	-45.000 29.000 13.000
Frontal Sup Medial L	-5.000 48.000 30.000
Frontal Sup Medial R	9.000 50.000 29.000
Insula R	39.000 6.000 2.000
Putamen R	28.000 4.000 2.000
Precuneus R	10.000 -57.000 43.000
Thal VL R	13.000 -10.000 7.000
Thal VA L	-11.000 -4.000 5.000
Thal MDm L	-5.000 -15.000 5.000
Thal MDm R	4.000 -14.000 5.000
Thal LGN L	-23.000 -24.000 -5.000
Thal PuA L	-12.000 -22.000 8.000
Thal PuL R	11.000 -21.000 8.000
ACC sub R	6.000 32.000 -4.000
ACC pre L	-4.000 44.000 8.000
ACC pre R	9.000 44.000 13.000