

representing highly connected "hub" nodes. Eleven modules are shown, with nodes belonging to the same module marked in same color.

Supplementary Figure S1: Estimation of partial correlations using (A) pseudo inverse and (B) proposed sparse partial correlation using elastic net penalty (SPC-EN). Partial correlations were estimated using, time-series of 90 nodes extracted from a single subject's resting state fMRI data. Estimation of partial correlations using pseudo inverse shows that every node is connected to every other node while the proposed method SPC-EN identifies sparse interpretable network structure. Application of network analysis on these estimated partial correlations revealed six and eleven modules respectively for partial correlations and SPC-EN. Partial correlations estimated by SPC-EN resulted in a more modular network compared to that estimated by pseudo inverse.

Supplementary Figure S2: Graphical representation of whole-brain functional network derived using SPC-L1. Left and right sagittal, axial and coronal views are shown, with nodes representing cortical regions based on the AAL atlas and edges representing partial correlation between pairs of nodes. Nodes are plotted using the x, y and z coordinates of their centroids (in mm) in the MNI space and sized according to their connectivity profile, with larger nodes representing highly connected "hub" nodes. Fifteen modules are shown, with nodes belonging to the same module marked in same color.