Data for manuscript: Probabilistic thresholding of functional connectomes: application to schizophrenia by František Váša et al.

**Data**

*Participants*

Raw anatomical and functional MRI scans of 72 patients with schizophrenia and 75 healthy controls were made available by the Mind Research Network and University of New Mexico (<http://fcon_1000.projects.nitrc.org/indi/retro/cobre.html>). Informed consent was obtained from all subjects according to institutional guidelines required by the Institutional Review Board at the University New Mexico (UNM).

Following data processing, 16 patients with schizophrenia and 4 healthy controls were excluded from further analysis, due to excessive motion (15 patients with schizophrenia, 3 healthy controls), a truncated run during acquisition (one patient) and reconstruction errors (one healthy control). Thus, 56 patients with schizophrenia and 71 healthy controls were included in the study.

*MRI acquisition and processing*

All participants were scanned on a 3 Tesla SIEMENS TIM scanner. Structural data was collected using a multi-echo MPRAGE (MEMPR) sequence with the following parameters: TR = 2.53 s, TE = [1.64, 3.5, 5.36, 7.22, 9.08] ms, TI = 900 ms, matrix size 256 x 256, 176 slices, voxel size = 1 x 1 x 1 mm3. Resting-state data was collected with echo-planar imaging (EPI) TR = 2 s, TE = 29 ms, matrix size 64 x 64, 32 slices, voxel size = 3 x 3 x 4 mm3, scan duration = 304 s (152 volumes). Subjects were instructed to keep their eyes open during the scan. Subject ages ranged from 18 to 65 years old. Diagnostic information was collected using the Structured Clinical Interview used for DSM Disorders (SCID).

Functional and structural images were processed as described in Patel & Bullmore (2016) using AFNI (Cox, 1996) and FSL (Smith et al., 2004) software, and the BrainWavelet Toolbox for wavelet despiking and probabilistic inference (Patel et al., 2014; Patel & Bullmore, 2016). Functional image processing steps included: (i) slice acquisition correction; (ii) rigid-body head movement correction to the first frame of data; (iii) obliquity transform to the structural image; (iv) affine co-registration to the skull-stripped structural image using a grey matter mask; (v) non-linear standard space transform to the MNI152 template in MNI space; (v) spatial smoothing (6 mm full width at half maximum); (vi) a within-run intensity normalization to a whole-brain median of 1000. Linear spatial transforms were performed in one step to prevent incremental spatial blurring. Subsequent denoising steps included: (vii) wavelet despiking (performed voxel-wise with the BrainWavelet Toolbox); (viii) confound signal regression of the 6 motion parameters, their first order temporal derivatives, and ventricular cerebrospinal fluid (CSF) signal. Step (vii) additionally generates a voxel-wise map of degrees of freedom at each wavelet scale for each subject, as described in Patel & Bullmore (2016).

Individual networks were constructed using a parcellation of cortex into 470 nodes Patel & Bullmore (2016). 50 nodes were excluded due to incomplete coverage between subjects and dropout, defined as regions with insufficient signal coverage across the full cohort of 147 subjects. Subject-specific df images were parcellated using the same template to yield regional df estimates. Edge weights were calculated as Pearson correlations in the wavelet domain between the remaining 420 nodes, separately for each wavelet scale.

For details regarding data processing, see main manuscript (Váša et al.).

**Dataset description**

A set of .mat files:

**COBRE\_scale[*n*].mat**, where *n* = [1,2,3,4], containing the following variables:

sc wavelet scale identifier

ctrl structure containing healthy control data, including:

 r correlation matrices [420 cortical regions x 420 cortical regions x 71 controls]

fdr FDR-adjusted P value matrices [420 regions x 420 regions x 71 controls]

edof nodal effective degrees of freedom [420 cortical regions x 71 controls]

schz structure containing schizophrenia patient data, including:

 r correlation matrices [420 cortical regions x 420 cortical regions x 56 patients]

fdr FDR-adjusted P value matrices [420 regions x 420 regions x 56 patients]

edof nodal effective degrees of freedom [420 cortical regions x 56 patients]

**COBRE\_demog.mat**, containing the following variables:

ctrl\_age healthy control ages [71 controls]

ctrl\_gender healthy control genders [71 controls]

schz\_age schizophrenia patient ages [56 patients]

schz\_gender schizophrenia patient genders [56 patients]

**COBRE\_coords\_420.mat**, containing the following variable:

coords region coordinates: x,y,z [420 cortical regions x 3 dimensions]

**References**

Cox, R. W. (1996). AFNI: software for analysis and visualization of functional magnetic resonance neuroimages. *Comput. Biomed. Res.*, *29*, 162–73.

Patel, A. X., & Bullmore, E. T. (2016). A wavelet-based estimator of the degrees of freedom in denoised fMRI time series for probabilistic testing of functional connectivity and brain graphs. *Neuroimage*, *142*, 14–26.

Patel, A. X., Kundu, P., Rubinov, M., Jones, P. S., Vértes, P. E., Ersche, K. D., … Bullmore, E. T. (2014). A wavelet method for modeling and despiking motion artifacts from resting-state fMRI time series. *Neuroimage*, *95*, 287–304.

Smith, S. M., Jenkinson, M., Woolrich, M. W., Beckmann, C. F., Behrens, T. E. J., Johansen-Berg, H., … Matthews, P. M. (2004). Advances in functional and structural MR image analysis and implementation as FSL. *Neuroimage*, *23 Suppl 1*, S208-19.