PARCELLATING AN INDIVIDUAL SUBJECT’S CORTICAL AND SUBCORTICAL BRAIN STRUCTURES USING SNOWBALL SAMPLING OF RESTING-STATE CORRELATIONS

Gagan S Wig¹, Timothy O Laumann¹, Alexander L Cohen¹, Jonathan D Power¹, Steven M Nelson², Matthew F Glasser⁵, Francis M Miezin¹,³, Abraham Z Snyder¹,³, Bradley L Schlaggar¹,³,⁴, Steven E Petersen¹,²,³,⁵

Departments of ¹Neurology, ²Psychology, ³Radiology, ⁴Pediatrics, and ⁵Anatomy and Neurobiology, Washington University, St. Louis, Missouri

SUPPLEMENTAL FIGURES

Supplemental Figure 1. RSFC-Snowballing a single subject’s resting-state data reveals the locations of area centers across cortical structures. Each subject’s RSFC-Snowballing aggregate peak density map is normalized and thresholded (1%) relative to his or her maximum peak value to facilitate viewing. RSFC-Snowballing aggregate peak density maps are displayed on subjects’ inflated cortical surfaces.
Supplemental Figure 2. RSFC-Snowballing a single subject’s resting-state data reveals the locations of area centers across cortical and subcortical structures. (a) An unthresholded aggregate peak density map reveals that the distribution of peak counts identified by RSFC-Snowballing is non-uniform across the cortical surface. (b) Local-maxima were identified on this unthresholded aggregate peak density map to highlight the inner points of the areas. The subject’s aggregate peak density map and locations of the local maxima are displayed on the subject’s inflated cortical surfaces.
Supplemental Figure 3. RSFC-Boundary Mapping reveals the locations of area boundaries in individual subjects. Each subject’s RSFC-Boundary Mapping average gradient map is displayed on the subjects’ inflated cortical surfaces.
Supplemental Figure 4. RSFC-Boundary Mapping average gradient maps are more similar across independent scans of the same individual than across individuals. (a) An illustrative subject demonstrates higher spatial similarity between their day 1 / day 2 RSFC-Boundary Mapping average gradient maps (mean spatial correlation between each subject’s day 1 and day 2 RSFC-Boundary Mapping average gradient maps $r = 0.68$, range of all subjects: $r = 0.56$-0.77) relative to the spatial similarity between their day 1 average gradient map and the day 1 average gradient map of another subject (mean similarity between each subject’s day 1 RSFC-Boundary Mapping average gradient map and all other subject’s day 1 RSFC-Boundary Mapping average gradient maps: $r = 0.18$, range: $r = 0.14$-0.21). (b) Spatial similarity for each subject’s day 1 RSFC-Boundary Mapping average gradient map relative to their day 2 average gradient map is higher than the average of the similarity between each subject’s day 1 average gradient map relative to all other subject’s day 1 average gradient maps ($t(6) = 21.1$, $p = 0.000001$; error bars denote standard error of the mean).