Limits and reproducibility of resting-state functional MRI definition of DLPFC targets for neuromodulation

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Supplementary Materials

The main paper presented comparison results between the inter-scan and inter-day variability of brain targets determined by the SGC-DLPFC and NAc-DLPFC FC maps. In particular, the inter-scan distance was computed using the average distance between 6 pairs of FC maps from 4 rsfMRI datasets acquired on two different days. Then, the mean and the standard deviation of the inter-scan distance among 100 subjects were reported in Figs. 2, 5 and 6. Since the 4 rsfMRI datasets were acquired on different days, this inter-scan distance may be influenced by the inter-day variability. To this end, we applied an alternative method to compute the inter-scan distance by only comparing the rsfMRI datasets acquired on the same day. Specifically, we computed the inter-scan distance using only two pairs of FC maps from rsfMRI datasets acquired on the first and the second day, respectively. Then, we took the average of the two distances as the inter-scan variability of a subject. In a similar way, we also re-computed the inter-scan consistency by only comparing FC maps from rsfMRI datasets acquired on the same day.

Fig. 1 illustrates the comparison results between the new inter-scan variability and the inter-day variability between the SGC-DLPFC FC maps. In general, the results are similar to the plots in Fig. 2 of the main paper. The inter-scan distance is still much higher than the inter-day distance between brain targets. Fig. 2 illustrates the new inter-scan and inter-day variability between NAc-DLPFC FC maps using volume data. Fig. 3 shows the corresponding results using surface data. The results are also similar to those presented in Figs. 5 and 6, respectively. The new inter-scan distance and consistency have slightly higher standard deviations because they are computed using fewer pairs of rsfMRI datasets (2 vs. 6). The above results show that rsfMRI datasets acquired on the same day or on different days have similar inter-scan variability.

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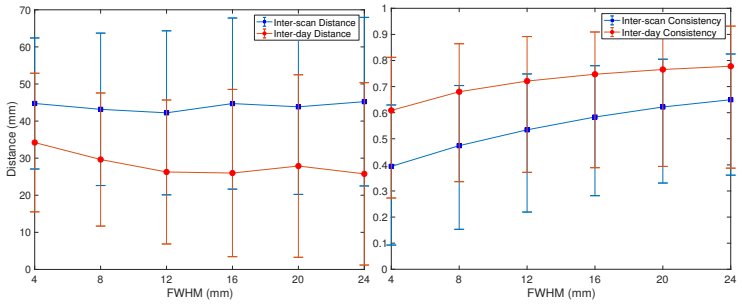
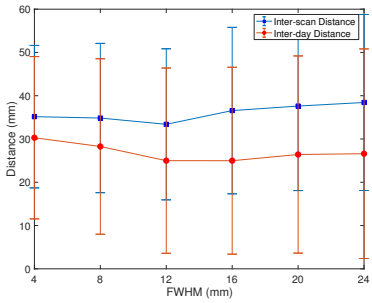
These results further support the conclusion that scan time is a major factor related to the reproducibility of brain targets determined by FC maps.

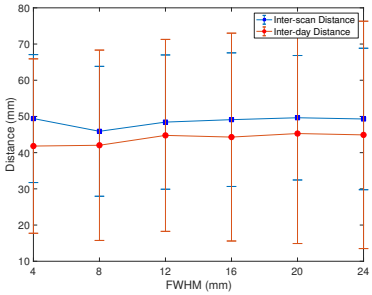


(a) Distance v.s. FWHM (b) Consistency v.s. FWHM

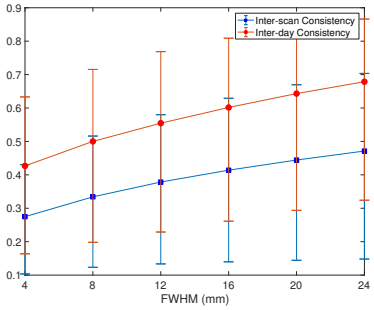
Figure 1: (a) The new inter-scan (15-min scans on the same day) and inter-day (30-min) distance measure between the most negative peaks of the SGC-DLPFC FC maps from the volume rsfMRI data of 100 HCP subjects, where the dashed lines are the corresponding $\pm$ standard deviation plots. (b) The consistency measure, which reflects the variability of SGC-DLPFC FC maps in the entire DLPFC region.



(a) Distance between positive peaks

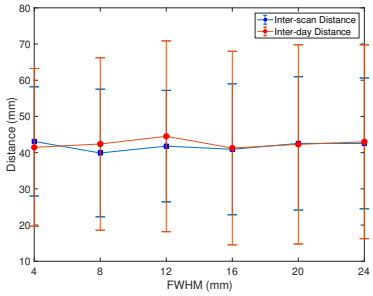


(b) Distance between negative peaks

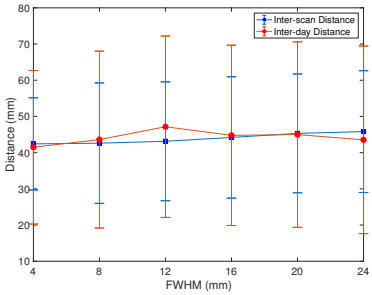


(c) Functional consistency of DLPFC

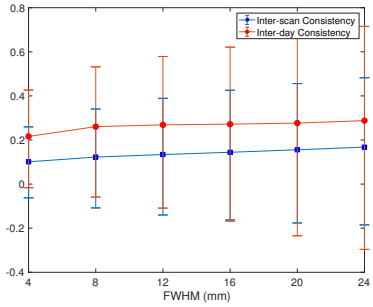
Figure 2: (a) and (b) show the new inter-scan (15-min scans on the same day) and inter-day (30-min) distance between the most positive and negative peaks of the NAc-DLPFC FC maps from the **volume** rsfMRI data, respectively. (c) shows the consistency measure, which reflects the variability of NAc-DLPFC FC maps in the entire DLPFC region.



(a) Distance between positive peaks



(b) Distance between negative peaks



(c) Functional consistency of DLPFC

Figure 3: (a) and (b) show the new inter-scan (15-min scans on the same day) and inter-day (30-min) distance between the most positive and negative peaks of the NAc-DLPFC FC maps from the **surface** rsfMRI data, respectively. (c) shows the consistency measure, which reflects the variability of NAc-DLPFC FC maps in the entire DLPFC region.