

Supplemental Material. Supplementary Details of Structural Magnetic Resonance

Imaging Data Acquisition and Analysis

A. Detailed Image-Acquisition Variables

The following acquisition variables of T1-weighted 3-dimensional anatomic images sequence were used in the study: 3.0-T Siemens Prisma scanner, acquisition matrix size = 208 x 300 mm, isotropic voxels = 0.8 mm³, slice gap = 0 mm, repetition time = 2500 milliseconds, echo time = 2.22 milliseconds, flip angle = 8°.

B. Detailed Introduction of the Motor-Related Tasks in Human Connectome Project

Atlas

Seven functional magnetic resonance imaging tasks were acquired for 449 young adults (age range, 22–35 years) on the 3.0-T Siemens Prisma scanner to produce the Human Connectome Project atlas, covering a variety of cortical and subcortical networks: working memory; gambling; language; social cognition; relational processing; emotion processing; and most importantly for our research, motor tasks.^{1,2}

Acquisition variables: Gradient-echo echo planar imaging sequence: acquisition matrix size = 208 x 180 mm, isotropic voxels = 2.0 mm³, slice gap = 0 mm, repetition time = 720 milliseconds, echo time = 33.1 ms, flip angle = 52°, multiband factor = 8, echo spacing = 0.58 milliseconds. Two runs would be performed for each task; one run was acquired with right-to-left phase encoding, and the other was acquired with left-to-right phase encoding. A total of 284 frames were collected within the duration of 3 minutes 34 seconds per run.^{1,2}

Task contents: Three-second visual cues were presented for the participants to either tap their left or right fingers, squeeze their left or right toes, or move their tongue to map motor areas. Each block of a movement type lasted 12 s (10 movements, 1.2 Hz). In each run, 13 blocks (ie, 2 blocks each of tongue movements, right-hand movements, left-hand movements, right-foot movements, and left-foot movements and three 15-s rests) were performed. Each contrast of the task-related activation were computed against the rest as the baseline activity.^{3,4}

REFERENCES

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Supplemental Table. Univariable and Multivariable Linear Regression of the Volume- and Surface-Based Morphometric Outcomes

Morphologic Outcomes	Supplementary Motor Area Subregion	Univariable Regression		Multivariable Regression	
		β Value	95% CI	β Value	95% CI
Volume ^a	6 mp	-0.002	-0.035, 0.031	-0.016	-0.044, 0.012
	6 ma	-0.004	-0.032, 0.023	-0.011	-0.035, 0.013
	SCEF	0.014	-0.015, 0.043	-0.002	-0.027, 0.022
Thickness ^b	6 mp	-0.104	-0.185, -0.022	-0.092	-0.173, -0.011
	6 ma	-0.056	-0.130, 0.017	-0.036	-0.107, 0.036
	SCEF	-0.108	-0.200, -0.016	-0.092	-0.185, 0.000
Complexity ^b	6 mp	-0.019	-0.070, 0.032	-0.023	-0.075, 0.030
	6 ma	-0.075	-0.133, -0.017	-0.075	-0.132, -0.017
	SCEF	-0.026	-0.085, 0.032	-0.037	-0.095, 0.021

Abbreviations: 6 mp, posterior subdivision of the medial portion of Brodmann area 6; 6 ma, anterior subdivision of the medial portion of Brodmann area 6; SCEF, supplementary and cingulate eye fields.

^a Age, sex, body mass index, and total intracranial volume as covariates. Results with 95% CIs that do not encompass zero indicate a group-morphology relationship. Positive β value indicates higher morphologic outcomes in the chronic ankle instability than control group.

^b Age, sex, and body mass index as covariates. Results with 95% CIs that do not encompass zero indicate a group-morphology relationship. Positive β value indicates higher morphologic outcomes in the chronic ankle instability than control group.

Supplemental Figure. Scatter plots of the simple and partial correlations between the cortical complexity of 6 ma and, A and B, the FAAM-ADL score, C and D, FAAM-Sports, E and F, the CAIT score, and, G and H, the duration of ankle instability. A, C, E, and G, Simple correlations, accounting for covariates including sex, age, and body mass index. B, D, F, and H, Partial correlations without adjusting for these covariates. Abbreviations: ADL, Activities of Daily Living; CAIT, Cumberland Ankle Instability Tool; FAAM, Foot and Ankle Ability Measure; 6 ma, anterior subdivision of the medial portion of Brodmann area 6. ^a Measure is unitless.



