

Supplement

Table1. Characteristic of participants in two groups.

variable	group	mean	SD	min	max
Age at scan (month)	Early surge	229.43	9.02	216	250
	Late surge	229.87	8.85	216	252
APTC (month)	Early surge	153.47	2.95	133	159
	Late surge	173.66	2.16	170	182
pubertal-T (nmol/L)	Early surge	4.64	1.07	1.17	7.22
	Late surge	3.36	0.94	1.22	6.35

APTC, Age at Peak Testosterone Change; pubertal-T, plasma levels of bioavailable testosterone during puberty

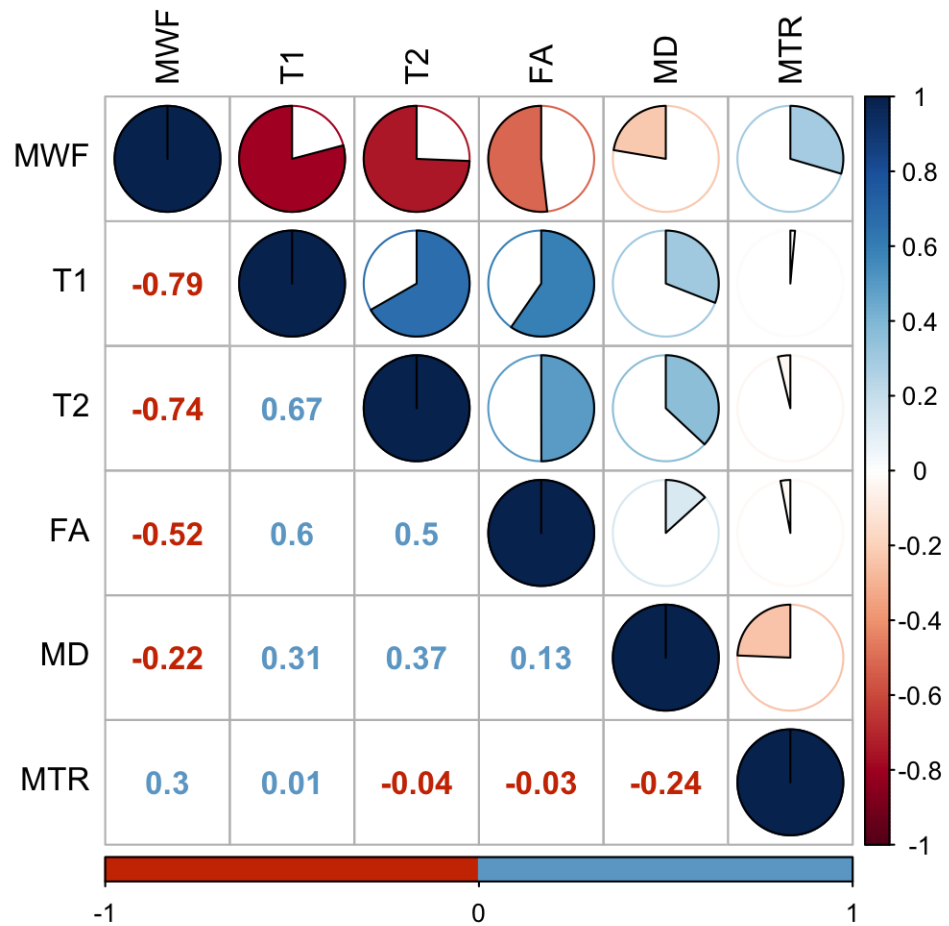


Figure 1. Pearson correlation matrix between MRI modalities across the 34 regions of the Desikan-Killiany atlas (left hemisphere only). Numbers and pies represent Pearson correlation coefficient (r).

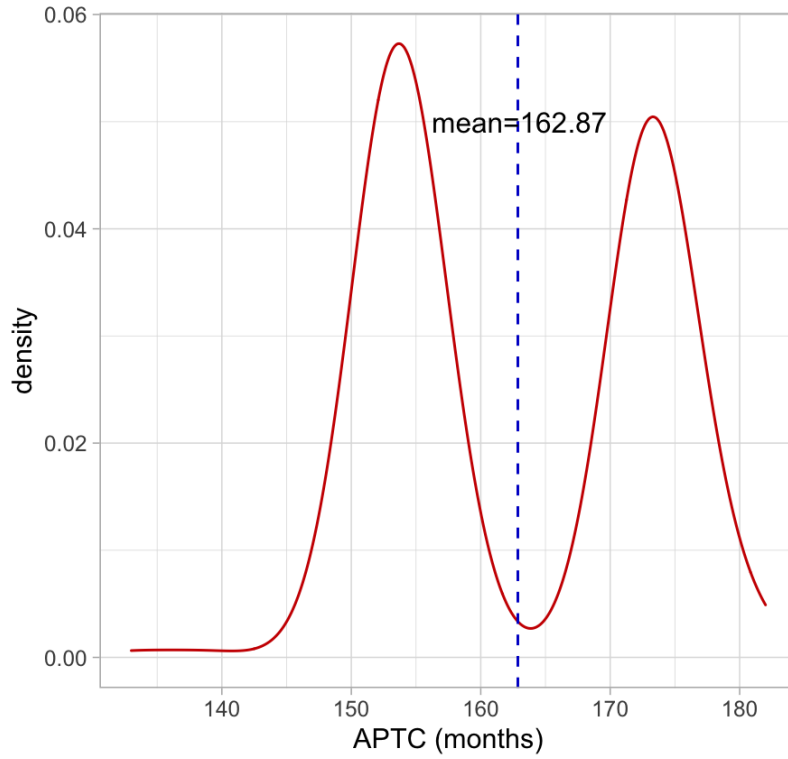


Figure 2. Distribution of Age at Peak Testosterone Change (APTC). The mean of APTC (162.87 months) was used to divide the participants into Early and Late surge groups.

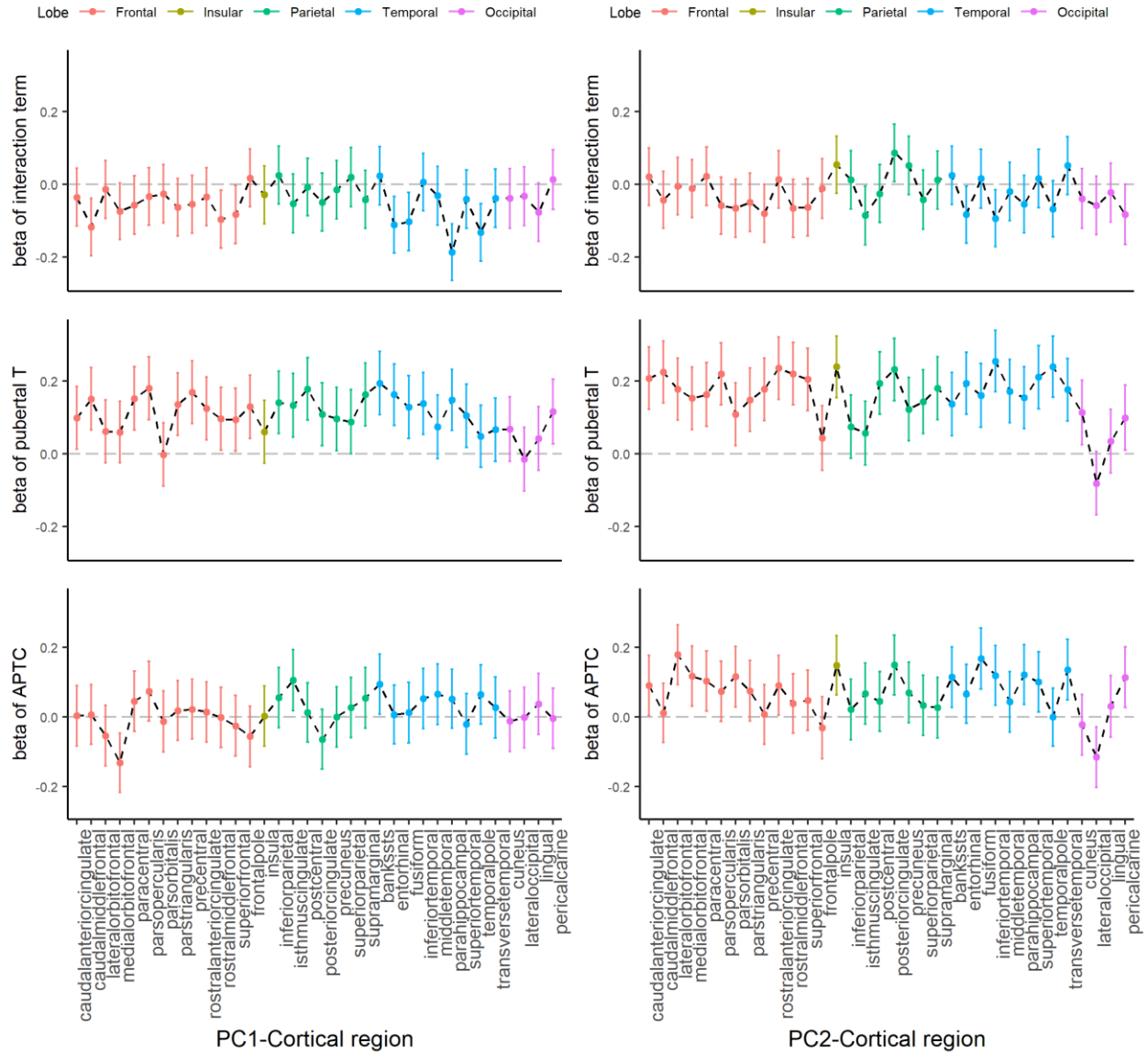
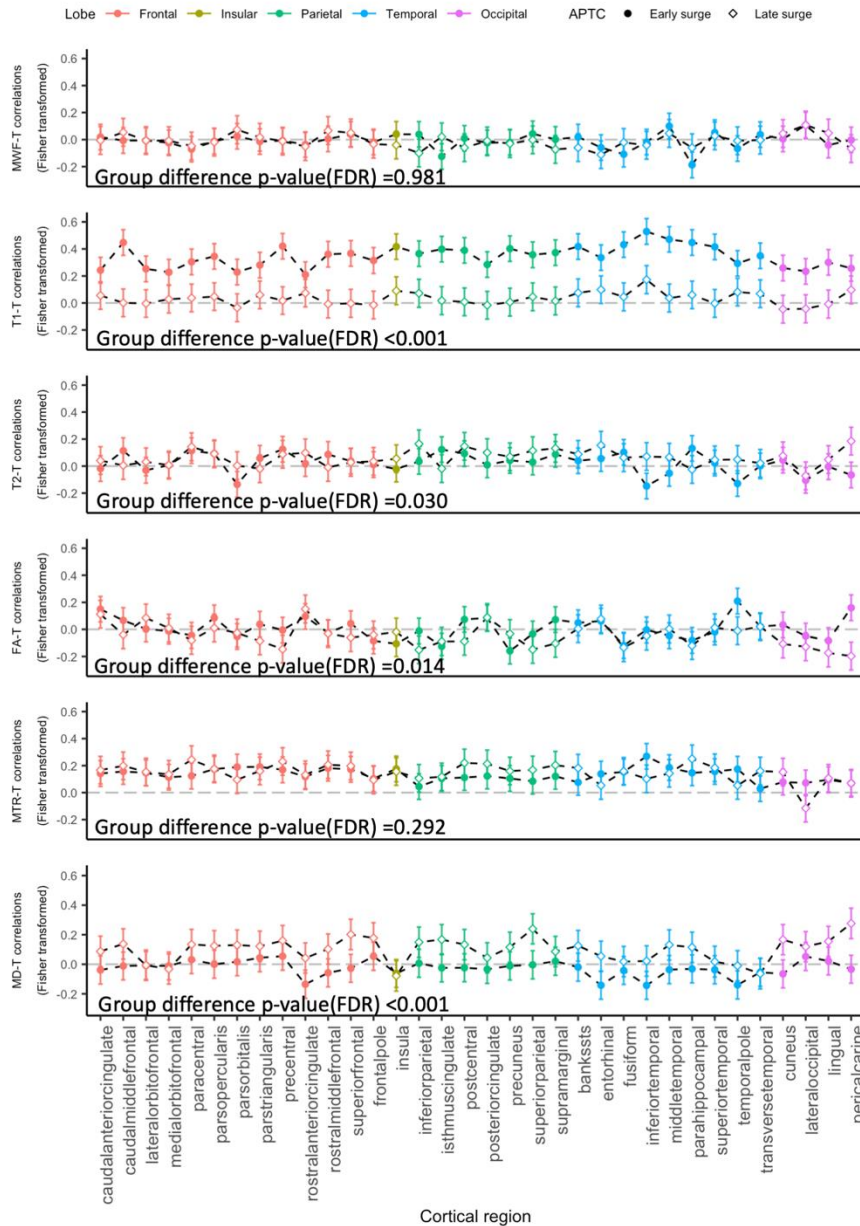
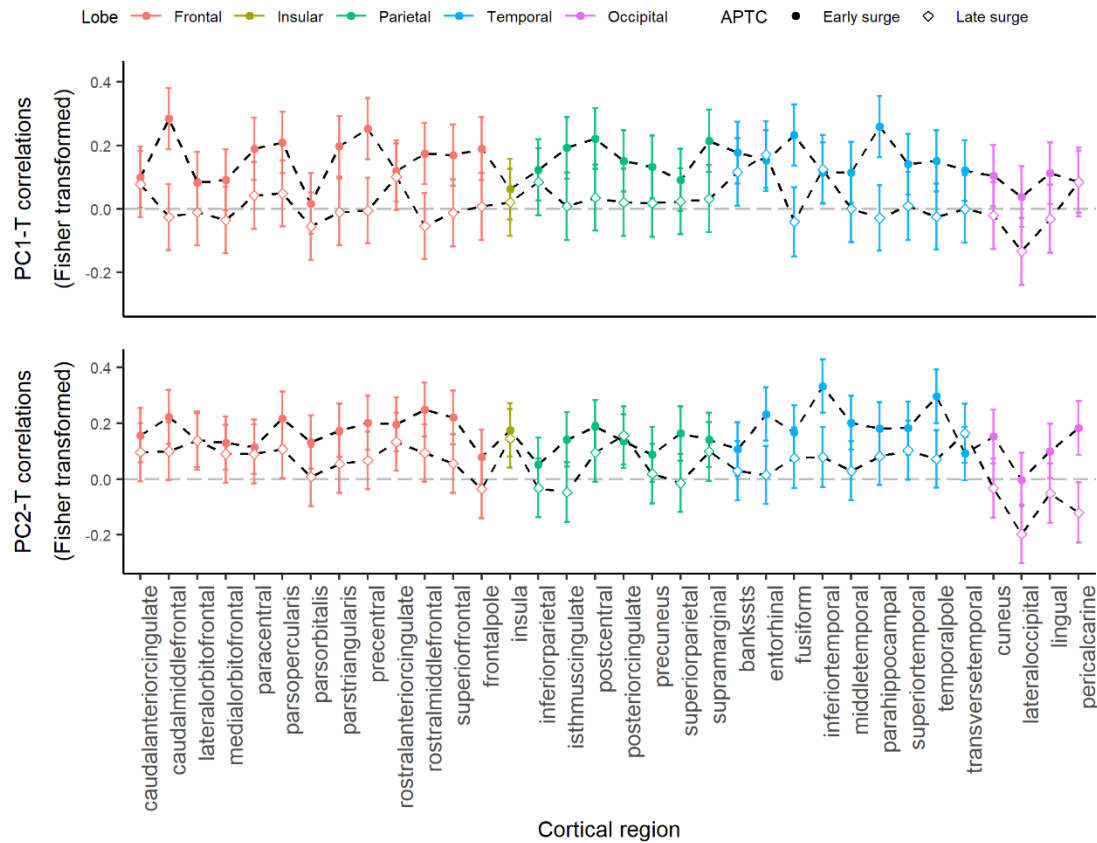


Figure 3. Inter-regional profiles of beta coefficient of interaction term (pubertal-T \times APTC) for PC1 and PC2. Error bars represent one standard error of beta coefficients.



profiles	p.adj(FDR)
early MWF-T	0.464
late MWF-T	0.407
early T1-T	<0.001
late T1-T	<0.001
early T2-T	0.116
late T2-T	<0.001
early FA-T	0.752
late FA-T	0.008
early MTR-T	<0.001
late MTR-T	<0.001
early MD-T	0.015
late MD-T	<0.001

Figure 4. Inter-regional profiles of Fisher-transformed correlation coefficient between pubertal testosterone and six MRI cortex variables in early and late group. Dashed lines with solid circles represent profiles of Early surge group, dashed lines with empty square are profiles of Late surge group. Error bar represent ± 1 SD of correlation coefficients. Table on the right represents significance levels of each correlation coefficient profile (FDR for six MRI modalities and two groups). P-values of group differences are adjusted for six MRI modalities with FDR.



Supplementary Figure 5. With current testosterone controlled, the inter-regional profiles of correlation coefficients quantifying the relationship between pubertal-T and PC1/PC2 are positive in both early and late testosterone-surge groups ($p < 0.001$ for all correlation-coefficient profiles). Group comparison with paired t-test showed that the Early surge group has stronger correlations between pubertal-T and cortical structure than Late surge group for both PCs (PC1-T: $p < 0.001$, $df = 33$, $t = 9.06$; PC2-T: $p < 0.001$, $df = 33$, $t = 8.28$).