

Supplementary materials for:

Ma, X. et al: Comparative analysis of cortical anatomy in male participants with internet gaming disorder or tobacco use disorder: insights from normative modeling.

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Table S1. Average group differences after Bonferroni correction

ROI	IGD - HC		TUD - HC		IGD - TUD	
	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>
lh_bankssts	-5.39	.000***	-3.80	.000***	-1.22	.681
rh_bankssts	-4.04	.000***	-2.92	.010*	-0.92	1.000
lh_caudalanteriorcingulate	-4.43	.000***	-3.69	.001**	-0.70	1.000
rh_caudalanteriorcingulate	-3.14	.006**	-5.48	.000***	1.48	.285
lh_caudalmiddlefrontal	-2.05	.123	-1.72	.259	-0.26	1.000
rh_caudalmiddlefrontal	-1.21	.693	-3.48	.001**	1.53	.309
lh_cuneus	-4.01	.000***	0.63	1.000	-2.35	.003**
rh_cuneus	-1.31	.600	-0.27	1.000	-0.57	1.000
lh_entorhinal	-6.96	.000***	-8.98	.000***	1.45	.522
rh_entorhinal	-10.72	.000***	-12.34	.000***	0.85	1.000
lh_fusiform	-3.13	.005**	-3.33	.003**	0.07	1.000
rh_fusiform	-3.38	.002**	-1.59	.344	-1.28	.534
lh_inferiorparietal	-1.80	.221	-2.60	.029*	0.51	1.000
rh_inferiorparietal	-1.11	.821	-3.10	.006**	1.34	.460
lh_inferiortemporal	-4.27	.000***	-6.69	.000***	1.60	.304
rh_inferiortemporal	-2.73	.020*	-3.05	.007**	0.18	1.000
lh_isthmuscingulate	-4.21	.000***	-3.80	.000***	-0.45	1.000
rh_isthmuscingulate	-6.86	.000***	-7.77	.000***	0.56	1.000
lh_lateraloccipital	2.19	.087	3.65	.001**	-0.90	.953
rh_lateraloccipital	1.11	.813	6.40	.000***	-3.46	.001**
lh_lateralorbitofrontal	-4.02	.000***	-6.64	.000***	1.99	.198
rh_lateralorbitofrontal	-1.65	.300	-4.08	.000***	1.59	.264
lh_lingual	-7.63	.000***	-0.05	1.000	-4.59	.000***
rh_lingual	-5.73	.000***	-2.34	.059	-2.09	.042*
lh_medialorbitofrontal	-2.58	.031*	-3.87	.000***	0.83	1.000
rh_medialorbitofrontal	-11.19	.000***	-14.52	.000***	2.38	.073
lh_middletemporal	-5.16	.000***	-7.44	.000***	1.36	.388
rh_middletemporal	-3.38	.002**	-5.54	.000***	1.51	.388
lh_parahippocampal	-3.72	.001**	-3.60	.001**	-0.09	1.000
rh_parahippocampal	-5.36	.000***	-3.26	.003**	-1.40	.367
lh_paracentral	0.38	1.000	2.67	.022*	-1.27	.297
rh_paracentral	-0.62	1.000	0.59	1.000	-0.66	1.000
lh_parsopercularis	-2.42	.047*	-7.05	.000***	3.24	.003**
rh_parsopercularis	-1.41	.476	-5.82	.000***	3.25	.005**

lh_parsorbitalis	0.86	1.000	-3.81	.000***	3.09	.003**
rh_parsorbitalis	1.72	.262	-1.92	.164	2.52	.026*
lh_parstriangularis	1.16	.759	-4.97	.000***	4.05	.000***
rh_parstriangularis	2.50	.041*	-4.40	.000***	4.50	.000***
lh_pericalcarine	-7.82	.000***	3.35	.003**	-5.44	.000***
rh_pericalcarine	-6.48	.000***	0.97	1.000	-3.45	.000***
lh_postcentral	-6.39	.000***	-8.19	.000***	0.91	.666
rh_postcentral	-5.64	.000***	-8.66	.000***	1.63	.109
lh_posteriorcingulate	-3.54	.001**	-2.81	.016*	-0.54	1.000
rh_posteriorcingulate	-6.19	.000***	-1.97	.147	-3.00	.006**
lh_precentral	-0.42	1.000	0.18	1.000	-0.30	1.000
rh_precentral	0.72	1.000	3.06	.008**	-1.10	.302
lh_precuneus	-4.25	.000***	-4.43	.000***	0.03	1.000
rh_precuneus	-5.52	.000***	-3.71	.001**	-1.07	.521
lh_rostralanteriorcingulate	-6.41	.000***	-5.76	.000***	-0.64	1.000
rh_rostralanteriorcingulate	-7.54	.000***	-9.42	.000***	1.15	.716
lh_rostralmiddlefrontal	0.12	1.000	-3.58	.001**	2.54	.024*
rh_rostralmiddlefrontal	1.49	.441	-4.78	.000***	3.58	.000***
lh_superiorfrontal	-0.89	1.000	-2.31	.062	0.97	.938
rh_superiorfrontal	-1.29	.613	-3.57	.001**	1.38	.316
lh_superiorparietal	1.43	.491	-0.55	1.000	1.02	.484
rh_superiorparietal	3.34	.004**	-0.05	1.000	1.79	.049*
lh_superiortemporal	-11.47	.000***	-13.47	.000***	1.06	.688
rh_superiortemporal	-7.17	.000***	-10.04	.000***	1.52	.143
lh_supramarginal	-3.20	.005**	-5.21	.000***	1.32	.474
rh_supramarginal	-2.33	.065	-6.97	.000***	2.97	.003**
lh_frontalpole	10.31	.000***	4.11	.000***	3.36	.000***
rh_frontalpole	10.35	.000***	6.11	.000***	2.61	.005**
lh_temporalpole	-14.41	.000***	-16.24	.000***	0.80	.904
rh_temporalpole	-12.69	.000***	-17.93	.000***	2.87	.001**
lh_transversetemporal	0.10	1.000	-0.61	1.000	0.50	1.000
rh_transversetemporal	0.49	1.000	0.77	1.000	-0.19	1.000
lh_insula	-12.27	.000***	-12.88	.000***	0.25	1.000
rh_insula	-9.76	.000***	-7.74	.000***	-1.90	.300

Abbreviations: ROI, Region of Interest; HC, Healthy Control; IGD, Internet Gaming Disorder; TUD, Tobacco Use Disorder. * $p < 0.05$; ** $p < 0.01$;

*** $p < 0.001$

Table S2. Average deviation of each brain region (Z-score)

ROI	HC		IGD		TUD	
	left	right	left	right	left	right
bankssts	0.00	0.00	-0.67	-0.50	-0.46	-0.35
caudalanteriorcingulate	0.00	0.00	-0.55	-0.39	-0.45	-0.67
caudalmiddlefrontal	0.00	0.00	-0.25	-0.15	-0.21	-0.43
cuneus	0.00	0.00	-0.51	-0.16	0.08	-0.03
entorhinal	0.00	0.00	-0.86	-1.34	-1.09	-1.50
fusiform	0.00	0.00	-0.39	-0.42	-0.40	-0.19
inferiorparietal	0.00	0.00	-0.22	-0.14	-0.32	-0.38
inferiortemporal	0.00	0.00	-0.53	-0.34	-0.81	-0.37
isthmuscingulate	0.00	0.00	-0.52	-0.85	-0.46	-0.95
lateraloccipital	0.00	0.00	0.27	0.14	0.45	0.78
lateralorbitofrontal	0.00	0.00	-0.50	-0.20	-0.81	-0.50
lingual	0.00	0.00	-0.95	-0.71	-0.01	-0.29
medialorbitofrontal	0.00	0.00	-0.32	-1.38	-0.47	-1.76*
middletemporal	0.00	0.00	-0.64	-0.42	-0.90	-0.68
parahippocampal	0.00	0.00	-0.46	-0.67	-0.44	-0.40
paracentral	0.00	0.00	0.05	-0.08	0.34	0.07
parsopercularis	0.00	0.00	-0.30	-0.17	-0.86	-0.71
parsorbitalis	0.00	0.00	0.11	0.21	-0.47	-0.23
parstriangularis	0.00	0.00	0.14	0.31	-0.61	-0.54
pericalcarine	0.00	0.00	-0.99	-0.82	0.42	0.12
postcentral	0.00	0.00	-0.80	-0.71	-1.02	-1.07
posteriorcingulate	0.00	0.00	-0.44	-0.77	-0.34	-0.24
precentral	0.00	0.00	-0.05	0.09	0.02	0.39
precuneus	0.00	0.00	-0.54	-0.69	-0.55	-0.46
rostralanteriorcingulate	0.00	0.00	-0.79	-0.94	-0.70	-1.14
rostralmiddlefrontal	0.00	0.00	0.01	0.18	-0.44	-0.60
superiorfrontal	0.00	0.00	-0.11	-0.16	-0.28	-0.44
superiorparietal	0.00	0.00	0.18	0.42	-0.07	-0.01
superiortemporal	0.00	0.00	-1.44	-0.90	-1.64	-1.25
supramarginal	0.00	0.00	-0.40	-0.29	-0.64	-0.86
frontalpole	0.00	0.00	1.29	1.30	0.51	0.75
temporalpole	0.00	0.00	-1.82*	-1.59	-2.00**	-2.22**
transversetemporal	0.00	0.00	0.01	0.06	-0.07	0.09
insula	0.00	0.00	-1.52	-1.21	-1.57	-0.93

Abbreviations: ROI, Region of Interest; HC, Healthy Control; IGD, Internet Gaming Disorder; TUD, Tobacco Use Disorder.

Table S3. Proportion of extreme deviations in each brain region

ROI	HC		IGD		TUD	
	pos (NO.%)	neg (NO.%)	pos (NO.%)	neg (NO.%)	pos (NO.%)	neg (NO.%)
lh_bankssts	0.25	0.25	0.00	1.47	0.00	2.82
rh_bankssts	0.19	0.45	0.00	0.00	0.00	1.41
lh_caudalanteriorcingulate	0.32	0.32	0.00	0.00	0.00	0.00
rh_caudalanteriorcingulate	0.57	0.51	0.00	1.47	0.00	5.63
lh_caudalmiddlefrontal	1.02	0.13	0.00	0.00	0.00	2.82
rh_caudalmiddlefrontal	0.45	0.13	0.00	0.00	0.00	5.63
lh_cuneus	0.64	0.38	0.00	4.41	2.82	1.41
rh_cuneus	0.89	0.32	0.00	5.88	2.82	1.41
lh_entorhinal	0.19	0.96	0.00	0.00	0.00	7.04
rh_entorhinal	0.06	1.21	0.00	14.71	0.00	14.08
lh_fusiform	0.45	0.38	0.00	2.94	0.00	0.00
rh_fusiform	0.70	0.64	0.00	2.94	0.00	0.00
lh_inferiorparietal	0.76	0.45	0.00	2.94	0.00	1.41
rh_inferiorparietal	0.76	0.32	0.00	0.00	0.00	2.82
lh_inferiortemporal	0.89	0.38	0.00	2.94	0.00	2.82
rh_inferiortemporal	0.76	0.25	1.47	0.00	0.00	4.23
lh_isthmuscingulate	0.57	0.96	0.00	0.00	0.00	0.00
rh_isthmuscingulate	0.45	0.83	0.00	1.47	0.00	2.82
lh_lateraloccipital	0.51	0.25	0.00	0.00	4.23	0.00
rh_lateraloccipital	0.51	0.25	1.47	0.00	2.82	0.00
lh_lateralorbitofrontal	0.89	0.45	0.00	0.00	0.00	2.82
rh_lateralorbitofrontal	0.45	0.45	0.00	2.94	0.00	4.23
lh_lingual	0.76	0.32	1.47	7.35	0.00	4.23
rh_lingual	0.45	0.32	1.47	0.00	1.41	2.82
lh_medialorbitofrontal	0.51	0.38	0.00	0.00	0.00	2.82
rh_medialorbitofrontal	0.51	0.32	0.00	7.35	0.00	19.72
lh_middletemporal	0.45	0.64	0.00	2.94	0.00	5.63
rh_middletemporal	0.57	0.38	0.00	0.00	0.00	4.23
lh_parahippocampal	0.19	1.97	0.00	1.47	0.00	9.86
rh_parahippocampal	0.13	1.40	0.00	4.41	0.00	5.63
lh_paracentral	0.64	0.45	0.00	0.00	9.86	5.63
rh_paracentral	0.70	0.19	0.00	1.47	4.23	2.82
lh_parsopercularis	0.83	0.25	0.00	0.00	0.00	7.04
rh_parsopercularis	0.83	0.25	0.00	0.00	0.00	2.82
lh_parsorbitalis	0.64	0.19	1.47	0.00	0.00	5.63
rh_parsorbitalis	0.45	0.32	0.00	0.00	0.00	4.23
lh_parstriangularis	0.89	0.38	0.00	0.00	0.00	2.82
rh_parstriangularis	0.64	0.25	0.00	0.00	0.00	5.63
lh_pericalcarine	0.83	0.51	0.00	10.29	11.27	2.82

rh_pericalcarine	0.38	0.38	0.00	11.76	8.45	7.04
lh_postcentral	0.64	0.19	0.00	7.35	0.00	14.08
rh_postcentral	0.45	0.19	1.47	5.88	0.00	9.86
lh_posteriorcingulate	0.25	0.51	1.47	4.41	0.00	0.00
rh_posteriorcingulate	0.25	1.02	0.00	2.94	0.00	0.00
lh_precentral	0.64	0.13	2.94	1.47	4.23	5.63
rh_precentral	0.64	0.38	5.88	1.47	9.86	4.23
lh_precuneus	0.38	0.51	0.00	5.88	1.41	2.82
rh_precuneus	0.51	0.89	0.00	7.35	0.00	2.82
lh_rostralanteriorcingulate	0.64	0.45	0.00	2.94	0.00	1.41
rh_rostralanteriorcingulate	0.51	0.45	1.47	11.76	0.00	5.63
lh_rostralmiddlefrontal	0.89	0.51	0.00	0.00	0.00	7.04
rh_rostralmiddlefrontal	0.64	0.76	0.00	0.00	0.00	8.45
lh_superiorfrontal	0.51	0.32	0.00	0.00	0.00	1.41
rh_superiorfrontal	0.64	0.45	0.00	0.00	0.00	7.04
lh_superiorparietal	0.89	0.45	1.47	4.41	4.23	5.63
rh_superiorparietal	0.70	0.76	2.94	0.00	2.82	8.45
lh_superiortemporal	0.51	0.76	0.00	14.71	0.00	25.35
rh_superiortemporal	0.32	0.57	0.00	8.82	0.00	15.49
lh_supramarginal	0.76	0.38	0.00	1.47	0.00	7.04
rh_supramarginal	0.51	0.25	0.00	1.47	0.00	7.04
lh_frontalpole	0.64	0.51	10.29	0.00	7.04	2.82
rh_frontalpole	0.76	0.38	17.65	0.00	4.23	1.41
lh_temporalpole	0.06	0.76	0.00	23.53	0.00	30.99
rh_temporalpole	0.06	1.15	0.00	19.12	0.00	39.44
lh_transversetemporal	0.83	0.25	0.00	0.00	0.00	0.00
rh_transversetemporal	0.70	0.13	2.94	1.47	0.00	0.00
lh_insula	0.13	0.96	0.00	11.76	0.00	14.08
rh_insula	0.19	0.64	0.00	10.29	0.00	1.41

Abbreviations: ROI, Region of Interest; HC, Healthy Control; IGD, Internet Gaming Disorder; TUD, Tobacco Use Disorder. Data exceeding 2% are bolded.