Supplementary Materials for

Genome-wide association study of creativity reveals genetic overlap with psychiatric disorders, risk tolerance and risky behaviors

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The detailed questions in the TPT scale:

seizing keystone

I can quickly understand the author's main idea when reading.
I can easily grasp the key points of a lecture or class.
I can quickly grasp the main points of a conversation when discussing with others.
To me, there are very few things that can't be clarified in classes.
I can easily identify the key to solving problems.

synthesis

I use to comprehending the learned knowledge to remember or deepen my understanding
I often compare different points of what I've learnt so as to find out their differences and connections.
I can always figure out the links or relationships between different sections of a textbook.
I often sort questions encountered during learning into different types.

association

I can often find the link between things that seem to be irrelevant to each other.
During a class or lecture, I always come up with intriguing ideas and feel excited about them.
The surrounding things sometimes bring up my imagination.
I would like to make up some bizarre stories.

syraesthesia

I can't help singing songs or reciting poems in a beautiful place.
When reading a poem or prose, vivid images and melodies appear in my mind.
Seeing a beautiful picture often makes me feel immersive.
I can easily visualize a vivid description.

resolution–incongruity

I can easily deal with embarrassing situations.
I get along well with people having varied personalities.
I can understand others' unrealistic ideas and behaviors.
I often drift away into various ideas in classes, yet I can still keep up with the teacher.
I feel comfortable showing weaknesses and shortcomings in front of my friends.
When good things happen, I am very excited yet able to stay focus on my current tasks.

originality

I usually take perspectives different from others during a discussion.
When solving daily-life troubles, I can often find new uses of things around me.
I can always come up with solutions when others feel helpless.
I like to make productive use of wastes.
I always raise questions that others have never asked.
I can often come up with solutions different from others'.

insight

I can often understand others' real intensions.
I can go beyond the author's plain meaning and understand the real intension when reading.
I am good at foreseeing or identifying potential relationship between seemingly independent things.
I can always find the common causes behind multiple things, if any.

summarily explaining
I can precisely and concisely describe the appearance or personality of a person.
Others can easily understand me when I explain things to them.
I can clearly explain sophisticated things with a few sentences.
I like to express my opinions in short sentences during group discussions.

evaluation
I can choose wisely whom to be friend with.
I can accurately evaluate a product or invention.
I care about social events and usually develop my own opinions and judgments on them independently.
I tend to predict the various possible outcomes before action.
When performing an action, I can quickly select the best plan among multiple options.

pointing on future
I care about the future world and especially concern about issues related to the environment, energy, diseases etc.
I am very interested in the mysteries of life and the universe.
I often think about the relationship between my current status and future career development.
I have made plans for my future career and life, and actively prepare myself for these plans.

Figure S1. The Typical Performance Test (TPT, measures creative thinking abilities of subjects) score showed a significantly positive correlation with the Creative Achievement Questionnaire (CAQ [1]) score and the Pearson correlation coefficient was 0.35 ($p<2.2\times10^{-16}$).

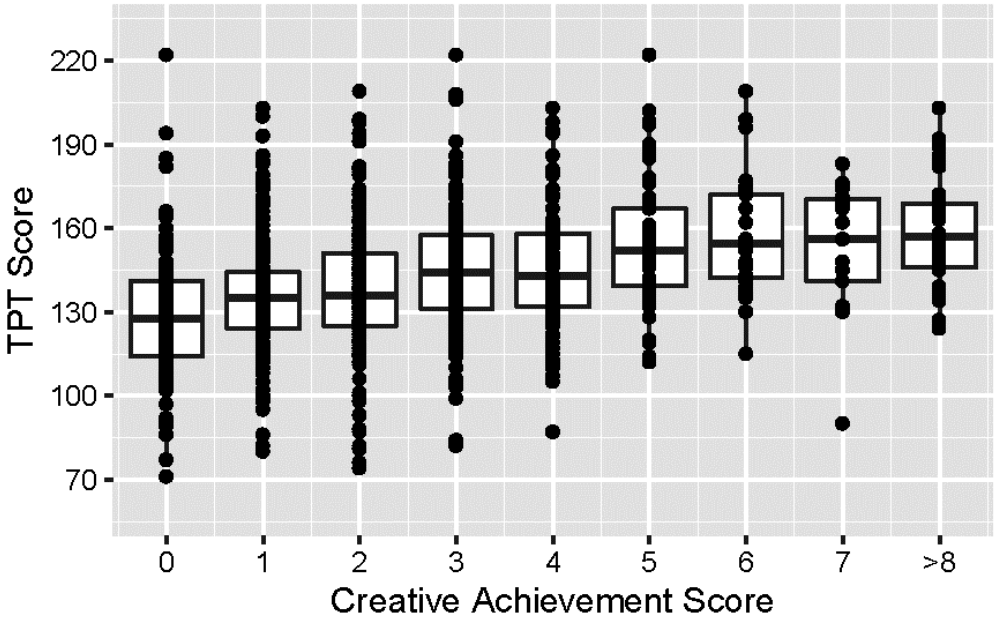

Figure S2. The distribution of creativity score among individuals who passed QC analyses (n=4,664).

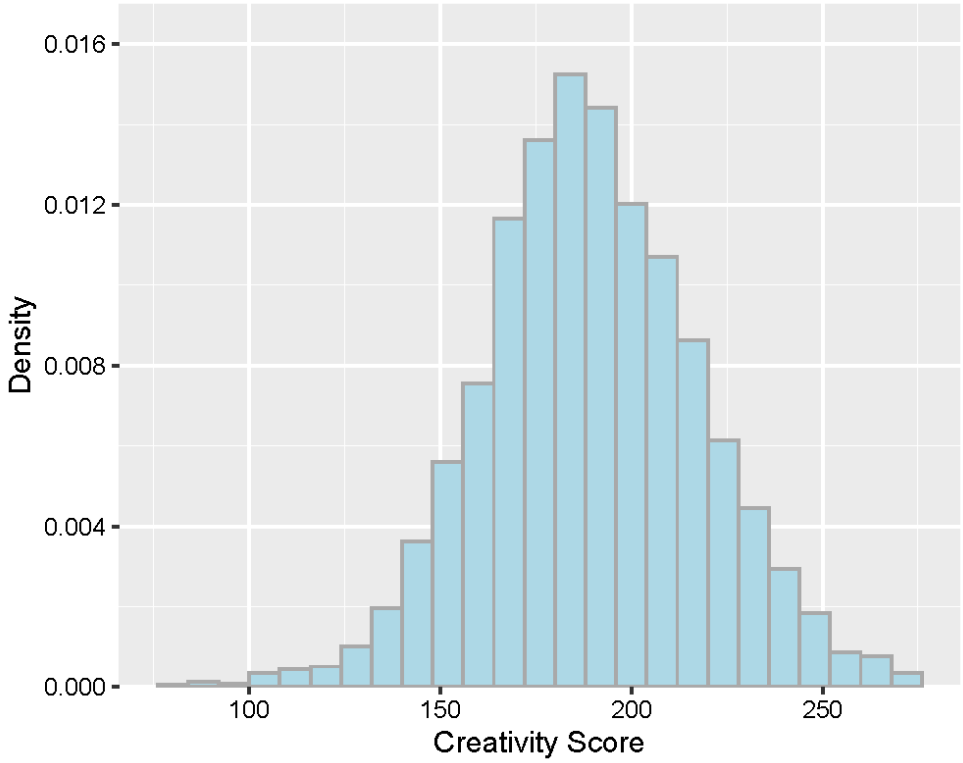

Figure S3. PCA analysis of all individuals (n=4,664) in our Han Chinese creativity samples and populations from 1000 Genomes Project.

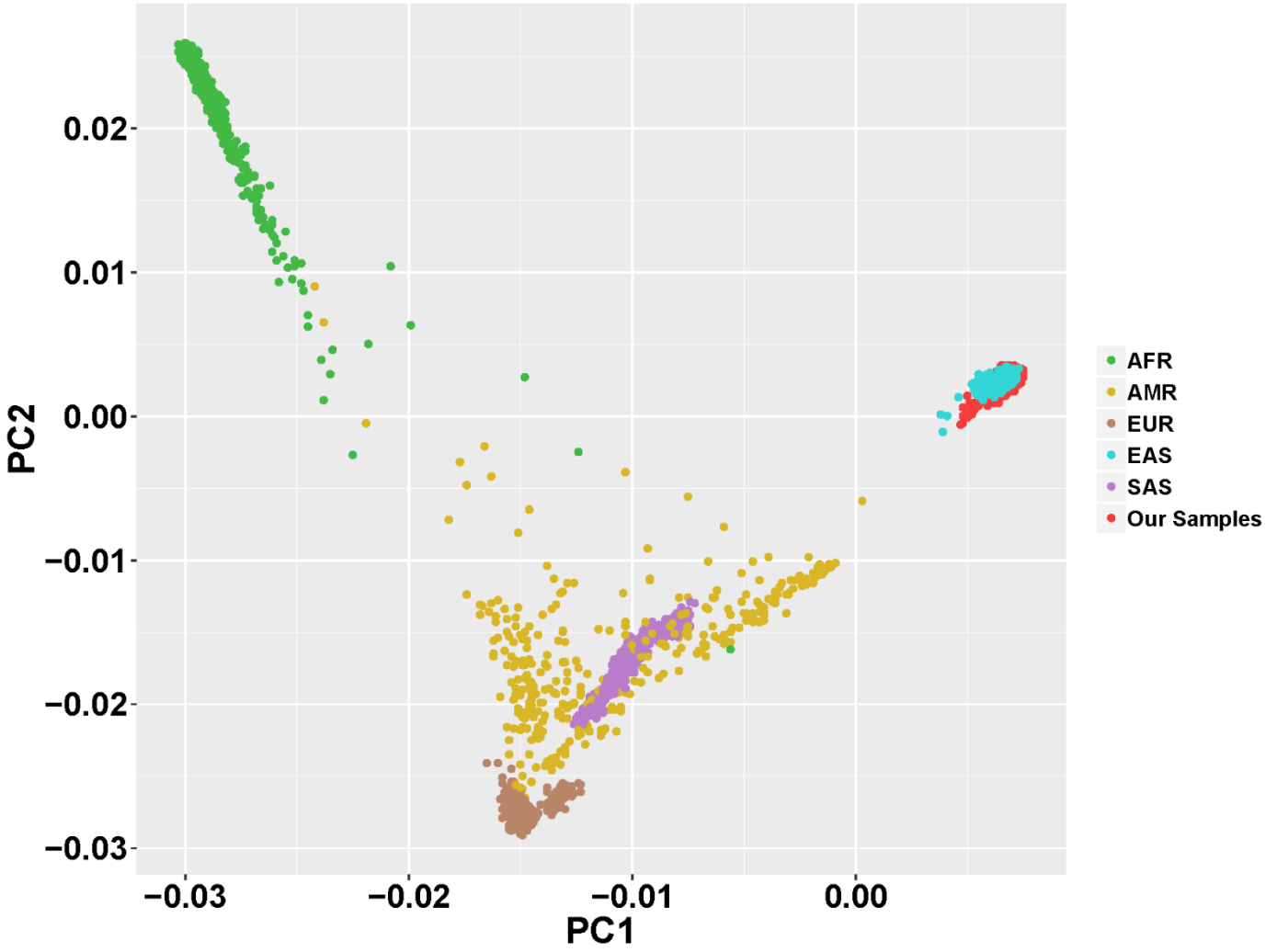

Figure S4. PCA analysis of all individuals in our Han Chinese creativity samples (n=4,664) according to the two cohorts.

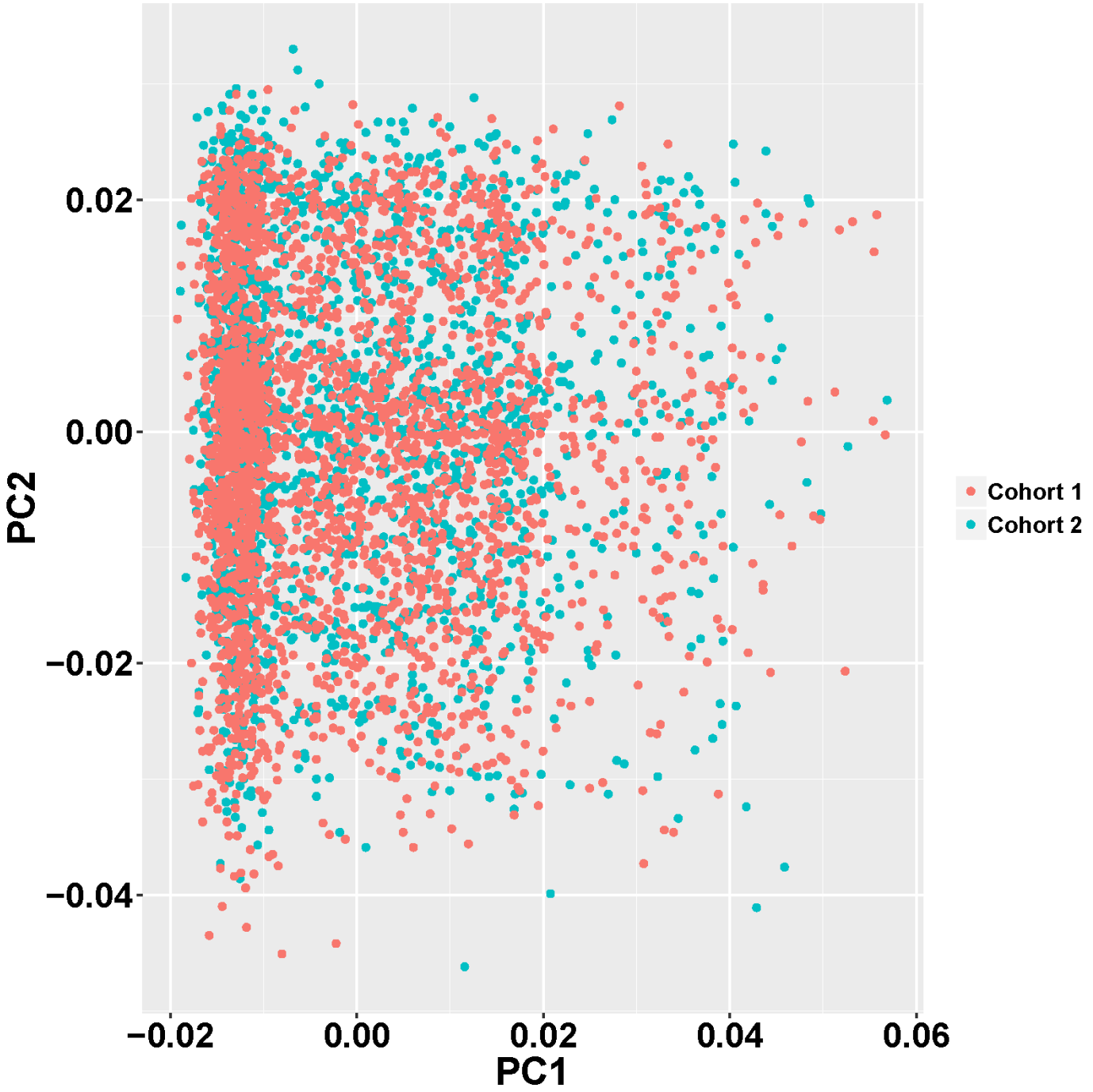

Figure S5. Q-Q plot for the linear regression of creativity among all individuals (n=4,664) in each cohort (cohort 1 is shown as the upper figure, cohort 2 is shown as the lower figure).

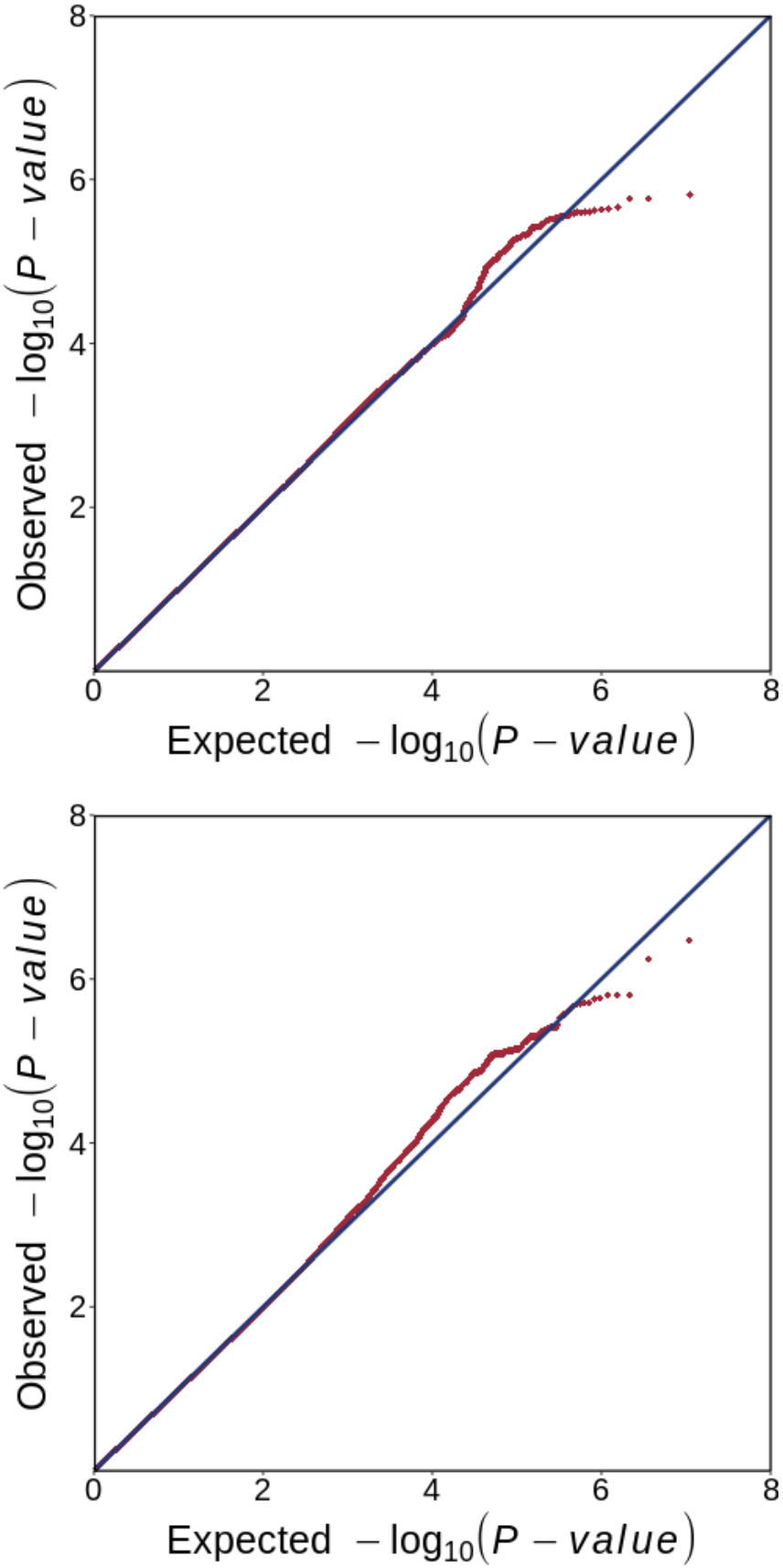

Figure S6. Manhattan plot for linear regression analysis of creativity among all individuals (n=4,664) in each cohort (cohort 1 is shown as the upper figure, cohort 2 is shown as the lower figure).

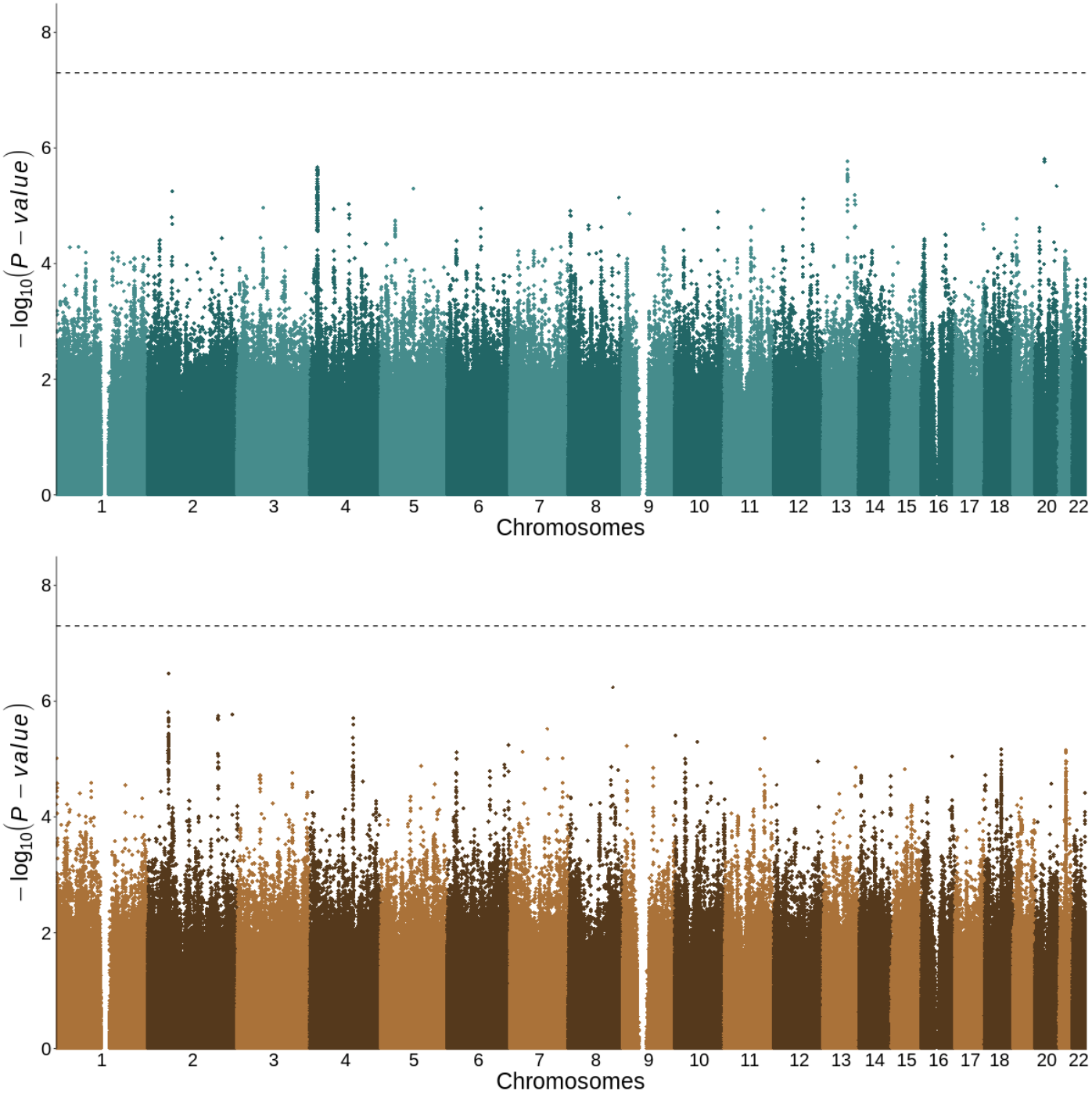

Table S1. Sample characteristics of cohort 1 and 2 and creativity score distribution.

	Sex		Age	TPT creativity score		
	Male	**Female**	**Mean (s.d.)**	**Min**	**Max**	**Mean (s.d.)**
Cohort 1	1,493 (55%)	1,214 (45%)	26.96 (5.33)	88	273	189.4 (28.19)
Cohort 2	1,081 (55%)	876 (45%)	27.90 (5.40)	78	272	190.6 (28.55)

Table S2. Top SNPs associated with creativity identified by GWAS meta-analysis of cohort 1 and 2.

Nearest gene	CHR	POS	SNP	A1	A2	Meta-analysis				Cohort 1			Cohort 2		
						Beta	p-value	Q	I^2	Beta	SE	p-value	Beta	SE	p-value
RP11-339A11.1	1	80482490	rs80083546	A	T	–3.78	3.87E–05	0.18	45.38	–4.85	1.21	6.40E–05	–2.33	1.41	9.85E–02
RP11-339A11.1	1	80548612	rs58834616	A	G	–3.61	3.90E–05	0.46	0.00	–4.15	1.14	2.86E–04	–2.83	1.37	3.90E–02
RP11-339A11.1	1	80578791	rs79576611	T	G	–3.70	2.63E–05	0.39	0.00	–4.36	1.16	1.76E–04	–2.81	1.35	3.79E–02
RP11-339A11.1	1	80619910	rs12145686	A	C	–3.58	4.46E–05	0.41	0.00	–4.20	1.16	2.95E–04	–2.75	1.34	4.03E–02
SNORD112	1	165054530	rs2088053	A	T	–10.50	2.02E–05	0.48	0.00	–11.97	3.23	2.13E–04	–8.45	3.81	2.67E–02
IGFN1	1	201164555	rs4915493	T	C	7.68	1.01E–05	0.42	0.00	8.84	2.26	9.43E–05	6.00	2.73	2.79E–02
PLXNA2	1	208380777	rs12142104	C	T	–3.37	2.52E–05	0.92	0.00	–3.29	1.07	2.08E–03	–3.46	1.20	4.10E–03
HEATR1	1	236777670	rs597220	G	T	7.04	4.19E–05	0.27	16.95	8.54	2.20	1.04E–04	4.67	2.76	9.02E–02
RYR2	1	237310477	rs75642694	C	T	–5.20	2.80E–05	0.66	0.00	–5.65	1.62	4.86E–04	–4.55	1.93	1.88E–02
RYR2	1	237310623	rs75324253	A	C	–5.23	3.09E–05	0.53	0.00	–5.88	1.63	3.07E–04	–4.28	1.97	3.05E–02
AC009411.1	2	21805769	rs141607671	A	G	–7.87	2.95E–05	0.91	0.00	–7.69	2.44	1.67E–03	–8.13	2.96	6.04E–03
AC009236.1	2	45441539	rs57075141	T	C	4.33	4.76E–05	0.26	21.42	3.22	1.45	2.63E–02	5.63	1.57	3.42E–04
AC009236.1	2	45442243	rs79838144	C	T	4.36	4.31E–05	0.23	30.36	3.16	1.46	3.10E–02	5.72	1.56	2.45E–04
AC009236.1	2	45442346	rs58519987	G	A	4.35	4.58E–05	0.23	31.66	3.14	1.47	3.26E–02	5.72	1.56	2.45E–04
AC009236.1	2	45442891	rs74451090	G	A	4.47	3.05E–05	0.26	22.58	3.32	1.47	2.44E–02	5.76	1.56	2.31E–04
AC009236.1	2	45444277	rs77014941	G	A	4.54	2.97E–05	0.37	0.00	3.60	1.51	1.69E–02	5.56	1.57	4.11E–04
U3	2	75830482	rs72816793	A	G	4.85	1.23E–05	0.98	0.00	4.83	1.47	1.00E–03	4.88	1.70	4.07E–03
U3	2	75834937	rs714938	T	C	4.95	1.17E–05	0.96	0.00	4.99	1.49	8.25E–04	4.88	1.73	4.72E–03
U3	2	75838384	rs72816802	T	C	4.76	1.14E–05	0.83	0.00	4.96	1.43	5.11E–04	4.49	1.67	7.36E–03
U3	2	75839230	rs17739982	A	G	4.67	1.61E–05	0.83	0.00	4.87	1.42	5.93E–04	4.39	1.68	9.06E–03
FHL2	2	106037635	rs11690543	G	A	2.41	4.08E–05	0.64	0.00	2.63	0.76	5.62E–04	2.08	0.92	2.37E–02
CNTNAP5	2	124974613	rs141282941	T	G	12.09	1.39E–05	0.86	0.00	11.66	3.71	1.67E–03	12.64	4.21	2.70E–03
FTCDNL1	2	200723672	rs140717179	A	G	–7.80	1.94E–05	0.48	0.00	–8.91	2.40	2.13E–04	–6.29	2.82	2.55E–02
C2orf47	2	200904058	rs17629496	C	A	–8.69	5.95E–06	0.23	29.83	–10.81	2.61	3.59E–05	–6.21	2.83	2.83E–02
LMCD1-AS1	3	8222479	rs199642488	A	G	–2.41	4.80E–05	0.67	0.00	–2.19	0.78	4.87E–03	–2.71	0.91	3.10E–03
LINC00499	4	139258352	rs1426526	G	C	2.68	4.54E–05	0.27	17.70	3.27	0.85	1.23E–04	1.80	1.03	8.07E–02

RP11-322J23.1	4	171691525	rs10004230	C	T	–6.68	2.33E–05	0.71	0.00	–6.16	2.10	3.38E–03	–7.35	2.39	2.16E–03
RP11-322J23.1	4	171707661	rs28886651	G	C	–5.92	3.52E–05	0.90	0.00	–5.78	1.87	2.05E–03	–6.13	2.22	5.90E–03
FAM170A	5	118999118	rs138401251	T	C	–7.56	1.49E–05	0.47	0.00	–8.55	2.23	1.27E–04	–5.98	2.81	3.32E–02
FAM170A	5	119030199	rs710327	G	T	–7.31	2.42E–05	0.54	0.00	–8.15	2.19	2.06E–04	–5.93	2.83	3.61E–02
GLP1R	6	39026464	rs9283905	G	A	2.59	1.39E–05	0.35	0.00	2.14	0.77	5.58E–03	3.27	0.94	5.27E–04
TRAM2	6	52366808	rs13192439	C	G	5.76	3.89E–05	0.79	0.00	5.45	1.82	2.73E–03	6.22	2.20	4.74E–03
EPB41L2	6	131394741	rs7756781	G	T	3.68	8.85E–06	0.14	54.38	2.70	1.06	1.11E–02	5.21	1.33	8.66E–05
RPS6KA2	6	167086799	rs1040444	C	T	3.93	2.03E–05	0.46	0.00	3.35	1.21	5.66E–03	4.73	1.42	9.06E–04
RPS6KA2	6	167087425	rs9347146	C	T	3.80	3.64E–05	0.40	0.00	3.14	1.21	9.58E–03	4.70	1.42	9.07E–04
C7orf73	7	135360106	rs3110778	G	A	2.41	4.87E–05	0.31	4.45	1.90	0.78	1.44E–02	3.14	0.92	6.90E–04
C7orf73	7	135361349	rs3112333	C	G	2.42	4.73E–05	0.29	11.80	1.88	0.78	1.55E–02	3.17	0.92	5.98E–04
C7orf73	7	135361514	rs3110782	A	G	2.42	4.65E–05	0.28	12.99	1.88	0.78	1.56E–02	3.18	0.92	5.81E–04
C7orf73	7	135362669	rs3112334	C	T	2.44	4.09E–05	0.29	10.95	1.90	0.78	1.46E–02	3.18	0.92	5.52E–04
C7orf73	7	135364526	rs3110789	G	A	2.52	1.94E–05	0.29	10.14	1.99	0.77	1.03E–02	3.25	0.91	3.61E–04
NRG1-IT3	8	32396498	rs4733127	A	T	–4.91	8.45E–06	0.77	0.00	–4.62	1.47	1.69E–03	–5.28	1.67	1.56E–03
NRG1-IT3	8	32396761	rs4733352	T	C	–4.91	8.45E–06	0.77	0.00	–4.62	1.47	1.69E–03	–5.28	1.67	1.56E–03
NRG1-IT3	8	32396945	rs4733353	T	C	–4.88	1.02E–05	0.75	0.00	–4.56	1.48	2.04E–03	–5.28	1.67	1.56E–03
NRG1-IT3	8	32397189	rs12546350	A	G	–5.02	5.45E–06	0.77	0.00	–4.73	1.48	1.37E–03	–5.39	1.66	1.22E–03
NRG1-IT3	8	32397933	rs7820676	G	C	–5.00	6.03E–06	0.83	0.00	–4.78	1.48	1.22E–03	–5.28	1.67	1.56E–03
NRG1-IT3	8	32402241	rs73234132	T	A	–4.99	1.99E–06	0.88	0.00	–5.14	1.41	2.65E–04	–4.81	1.58	2.35E–03
NRG1-IT3	8	32437994	rs2466067	A	G	–2.95	2.88E–05	0.83	0.00	–3.08	0.92	8.76E–04	–2.78	1.09	1.12E–02
NRG1-IT3	8	32441203	rs2466064	G	A	–2.89	4.03E–05	0.87	0.00	–2.99	0.92	1.18E–03	–2.75	1.09	1.18E–02
TRPS1	8	116114984	rs1494751	A	G	–2.75	4.04E–05	0.65	0.00	–2.51	0.85	3.24E–03	–3.13	1.08	3.86E–03
FAM225A	9	115895855	rs200595979	T	C	–5.99	2.34E–05	0.40	0.00	–7.04	1.89	1.96E–04	–4.64	2.14	3.05E–02
DRGX	10	50598420	rs56114955	C	T	–3.85	3.69E–05	0.67	0.00	–4.19	1.23	6.40E–04	–3.38	1.44	1.89E–02
RP11-135D11.2	10	61327370	rs7916265	A	G	–5.56	1.80E–05	0.73	0.00	–5.95	1.72	5.68E–04	–5.06	1.97	1.03E–02
RP11-135D11.2	10	61329237	rs4424624	C	T	–5.72	6.66E–06	0.97	0.00	–5.77	1.69	6.74E–04	–5.67	1.92	3.21E–03
RP11-135D11.2	10	61332661	rs7901109	A	G	–5.58	1.58E–05	0.81	0.00	–5.85	1.71	6.39E–04	–5.22	1.97	8.16E–03
RP11-135D11.2	10	61334392	rs1909641	T	C	–5.64	1.29E–05	0.78	0.00	–5.95	1.71	5.13E–04	–5.22	1.97	8.16E–03
RP11-135D11.2	10	61334461	rs1909640	T	C	–5.52	1.41E–05	0.85	0.00	–5.32	1.68	1.53E–03	–5.81	1.95	3.01E–03

RP11-135D11.2	10	61335875	rs7900692	G	A	–5.50	2.12E–05	0.76	0.00	–5.85	1.71	6.39E–04	–5.04	1.98	1.10E–02
RP11-135D11.2	10	61339719	rs10733987	G	A	–5.42	1.94E–05	0.90	0.00	–5.29	1.67	1.59E–03	–5.60	1.95	4.08E–03
RP11-135D11.2	10	61339980	rs4948335	C	T	–5.59	1.13E–05	1.00	0.00	–5.58	1.67	8.58E–04	–5.60	1.96	4.37E–03
RP11-135D11.2	10	61339984	rs4948336	A	G	–5.65	1.24E–05	0.67	0.00	–6.13	1.71	3.41E–04	–5.01	1.98	1.14E–02
RP11-135D11.2	10	61340114	rs4948337	T	C	–5.17	4.53E–05	0.96	0.00	–5.12	1.67	2.17E–03	–5.24	1.95	7.29E–03
RP11-135D11.2	10	61340782	rs1875150	T	C	–5.59	1.12E–05	0.99	0.00	–5.58	1.67	8.58E–04	–5.61	1.96	4.32E–03
RP11-135D11.2	10	61341991	rs1875148	T	C	–5.71	1.02E–05	0.64	0.00	–6.24	1.71	2.73E–04	–5.01	1.98	1.14E–02
RP11-135D11.2	10	61346502	rs7908064	A	T	–5.57	1.24E–05	0.92	0.00	–5.68	1.68	7.17E–04	–5.43	1.97	5.77E–03
RP11-135D11.2	10	61346794	rs7911814	T	C	–5.74	1.06E–05	0.66	0.00	–6.23	1.71	2.79E–04	–5.06	2.01	1.18E–02
RP11-135D11.2	10	61346942	rs1909637	T	C	–5.74	1.06E–05	0.66	0.00	–6.23	1.71	2.79E–04	–5.06	2.01	1.18E–02
RP11-135D11.2	10	61348257	rs1909636	A	G	–5.72	8.09E–06	0.96	0.00	–5.68	1.68	7.17E–04	–5.79	1.99	3.70E–03
RP11-135D11.2	10	61348695	rs10763611	C	G	–5.72	8.34E–06	0.97	0.00	–5.68	1.68	7.17E–04	–5.78	1.99	3.81E–03
RP11-135D11.2	10	61349935	rs1909634	C	T	–5.72	8.34E–06	0.97	0.00	–5.68	1.68	7.17E–04	–5.78	1.99	3.81E–03
RP11-135D11.2	10	61351196	rs1909631	T	C	–5.72	8.34E–06	0.97	0.00	–5.68	1.68	7.17E–04	–5.78	1.99	3.81E–03
RP11-135D11.2	10	61351597	rs1909629	A	G	–5.79	8.94E–06	0.68	0.00	–6.24	1.71	2.71E–04	–5.17	2.01	1.03E–02
RP11-135D11.2	10	61352800	rs1909627	A	G	–5.74	1.01E–05	0.71	0.00	–6.15	1.70	3.09E–04	–5.17	2.01	1.03E–02
RP11-135D11.2	10	61352984	rs1909626	A	G	–5.48	2.53E–05	0.63	0.00	–6.01	1.70	4.26E–04	–4.73	2.02	1.89E–02
RP11-135D11.2	10	61355845	rs4948340	T	C	–5.56	1.36E–05	0.96	0.00	–5.61	1.67	7.81E–04	–5.49	1.99	5.83E–03
RP11-135D11.2	10	61356013	rs7909725	T	C	–5.62	1.51E–05	0.63	0.00	–6.15	1.70	3.09E–04	–4.88	2.01	1.52E–02
RP11-135D11.2	10	61357236	rs1909624	G	A	–5.62	1.51E–05	0.63	0.00	–6.15	1.70	3.09E–04	–4.88	2.01	1.52E–02
RP11-135D11.2	10	61361711	rs7905991	A	G	–5.54	2.07E–05	0.61	0.00	–6.11	1.71	3.59E–04	–4.76	2.01	1.79E–02
RP11-135D11.2	10	61366305	rs2126775	A	G	–5.59	1.71E–05	0.63	0.00	–6.12	1.71	3.45E–04	–4.85	2.00	1.55E–02
RP11-135D11.2	10	61366844	rs2169686	A	C	–5.32	3.74E–05	0.51	0.00	–6.06	1.70	3.77E–04	–4.33	1.98	2.91E–02
RP11-135D11.2	10	61369156	rs4948341	T	C	–5.55	1.89E–05	0.64	0.00	–6.06	1.70	3.77E–04	–4.84	2.00	1.58E–02
RP11-136F16.1	12	78498792	rs2694676	G	T	–2.56	4.24E–05	0.45	0.00	–2.97	0.82	3.10E–04	–2.00	0.97	3.87E–02
RP11-136F16.1	12	78504518	rs1375281	C	T	–2.57	3.74E–05	0.28	15.58	–3.13	0.81	1.13E–04	–1.75	0.98	7.21E–02
RP11-136F16.1	12	78504639	rs2853472	G	C	–2.60	3.04E–05	0.25	25.78	–3.20	0.81	8.00E–05	–1.73	0.98	7.70E–02
RP11-136F16.1	12	78512741	rs2694682	C	T	–2.53	4.59E–05	0.33	0.00	–3.04	0.81	1.71E–04	–1.80	0.97	6.51E–02
HS6ST3	13	97387496	rs1924584	T	C	2.66	9.62E–06	0.62	0.00	2.42	0.77	1.82E–03	3.02	0.95	1.52E–03
HS6ST3	13	97395301	rs9584408	G	A	2.69	7.95E–06	0.62	0.00	2.45	0.78	1.69E–03	3.05	0.95	1.35E–03

HS6ST3	13	97395859	rs1924586	T	C	2.69	8.05E–06	0.63	0.00	2.45	0.78	1.69E–03	3.04	0.95	1.37E–03
GPHB5	14	63788492	rs78302654	C	T	7.38	4.60E–05	0.23	31.21	5.18	2.57	4.37E–02	9.55	2.55	1.90E–04
NOX5	15	69285357	rs35978490	T	A	6.84	4.25E–05	0.55	0.00	6.11	2.07	3.14E–03	8.19	2.83	3.87E–03
RP11-592N21.2	15	71645334	rs10459646	C	G	–3.17	4.00E–05	0.90	0.00	–3.25	1.00	1.22E–03	–3.05	1.21	1.15E–02
SOX8	16	1072889	rs399288	C	T	–2.43	3.77E–05	0.82	0.00	–2.32	0.77	2.54E–03	–2.60	0.92	4.97E–03
SOX8	16	1073028	rs2432301	T	C	–2.50	2.40E–05	0.69	0.00	–2.30	0.77	2.74E–03	–2.78	0.92	2.71E–03
SOX8	16	1073782	rs372196	G	A	–2.46	3.07E–05	0.71	0.00	–2.28	0.77	3.09E–03	–2.73	0.92	3.14E–03
GEMIN8P2	16	58837497	rs148623684	C	T	–6.60	3.60E–05	0.72	0.00	–7.11	2.12	8.32E–04	–5.94	2.42	1.43E–02
GEMIN8P2	16	58842104	rs576861819	T	C	–6.67	3.27E–05	0.68	0.00	–7.25	2.14	7.07E–04	–5.91	2.43	1.51E–02
GEMIN8P2	16	58864583	rs139289190	T	G	–6.60	4.41E–05	0.64	0.00	–7.26	2.14	7.07E–04	–5.73	2.47	2.02E–02
RN7SL236P	17	76360050	rs9891614	A	G	–4.77	8.58E–06	0.34	0.00	–3.90	1.41	5.87E–03	–5.96	1.65	3.02E–04
RN7SL236P	17	76360538	rs4969170	G	A	–4.81	7.10E–06	0.27	16.55	–3.80	1.41	7.14E–03	–6.18	1.64	1.76E–04
RN7SL236P	17	76365791	rs4969172	C	T	–4.28	2.94E–05	0.63	0.00	–3.87	1.34	4.00E–03	–4.86	1.59	2.23E–03
INO80C	18	33109807	rs12605216	A	G	7.50	3.38E–05	0.12	59.25	4.79	2.51	5.65E–02	10.46	2.62	6.58E–05
INO80C	18	33110308	rs62100528	G	A	7.50	3.43E–05	0.12	59.41	4.77	2.51	5.70E–02	10.46	2.62	6.58E–05
INO80C	18	33110435	rs62100529	T	C	7.50	3.43E–05	0.12	59.41	4.77	2.51	5.70E–02	10.46	2.62	6.58E–05
INO80C	18	33110531	rs62100530	A	C	7.50	3.43E–05	0.12	59.41	4.77	2.51	5.70E–02	10.46	2.62	6.58E–05
INO80C	18	33111598	rs8085546	A	G	7.40	4.48E–05	0.10	62.51	4.55	2.52	7.07E–02	10.47	2.61	6.36E–05
SAFB2	19	5612370	rs12610010	C	A	6.32	3.41E–06	0.43	0.00	7.19	1.75	4.22E–05	5.01	2.16	2.06E–02
RAVER1	19	10437297	19:10437297:G:T	G	T	5.53	3.55E–05	0.36	0.00	4.55	1.71	7.89E–03	7.07	2.14	9.94E–04

Abbreviation: CHR, chromosome; POS, position; A1, effect allele; A2, non-effect allele; SE, standard error.

Table S3. Based on the (P+T) method [2,3], polygenic risk score (PRS) analysis of creativity using GWAS of psychiatric disorders, cognitive functions, personality traits and subcortical structures.

Training datasets	P threshold	Beta	SE	R^2	p-value
Bipolar disorder	0.000001	–0.011	0.015	0.00012	0.45876
Bipolar disorder	0.0001	0.002	0.015	1.00E–05	0.87437
Bipolar disorder	0.0005	–0.014	0.015	0.00018	0.3536
Bipolar disorder	0.001	–0.007	0.015	5.00E–05	0.61685
Bipolar disorder	0.01	0.008	0.015	7.00E–05	0.57061
Bipolar disorder	0.05	0	0.015	0	0.98758
Bipolar disorder	0.1	0.01	0.015	9.00E–05	0.51708
Bipolar disorder	0.2	0.001	0.015	0	0.95379
Autism spectrum disorder	0.000001	0.038	0.015	0.00144	0.00959
Autism spectrum disorder	0.0001	0.018	0.015	0.00034	0.21094
Autism spectrum disorder	0.0005	0.004	0.015	2.00E–05	0.77797
Autism spectrum disorder	0.001	0.008	0.015	7.00E–05	0.5684
Autism spectrum disorder	0.01	0.019	0.015	0.00036	0.19587
Autism spectrum disorder	0.05	0.024	0.015	0.00056	0.10551
Autism spectrum disorder	0.1	0.016	0.015	0.00027	0.26348
Autism spectrum disorder	0.2	0.015	0.015	0.00024	0.29107
Attention deficit hyperactivity disorder	0.000001	–0.011	0.015	0.00012	0.45846
Attention deficit hyperactivity disorder	0.0001	0.017	0.015	0.00027	0.25914
Attention deficit hyperactivity disorder	0.0005	0.037	0.015	0.00138	0.01116
Attention deficit hyperactivity disorder	0.001	0.028	0.015	0.00077	0.05765
Attention deficit hyperactivity disorder	0.01	0.006	0.015	4.00E–05	0.65865
Attention deficit hyperactivity disorder	0.05	0.005	0.015	3.00E–05	0.72561
Attention deficit hyperactivity disorder	0.1	0.01	0.015	1.00E–04	0.48497
Attention deficit hyperactivity disorder	0.2	0.006	0.015	3.00E–05	0.69993
Obsessive-compulsive disorder	0.0001	0.005	0.015	2.00E–05	0.73588
Obsessive-compulsive disorder	0.0005	–0.004	0.015	1.00E–05	0.80422
Obsessive-compulsive disorder	0.001	0.011	0.015	0.00012	0.44753
Obsessive-compulsive disorder	0.01	0.005	0.015	3.00E–05	0.71047
Obsessive-compulsive disorder	0.05	0.018	0.015	0.00031	0.23096
Obsessive-compulsive disorder	0.1	0.004	0.015	1.00E–05	0.81
Obsessive-compulsive disorder	0.2	0.002	0.015	0	0.89958
Alzheimer’s disease	0.000001	0.013	0.015	0.00017	0.36681
Alzheimer’s disease	0.0001	0.015	0.015	0.00023	0.3
Alzheimer’s disease	0.0005	0.02	0.015	4.00E–04	0.17237
Alzheimer’s disease	0.001	0.027	0.015	0.00075	0.06188
Alzheimer’s disease	0.01	0.012	0.015	0.00014	0.42271
Alzheimer’s disease	0.05	0.016	0.015	0.00026	0.26832
Alzheimer’s disease	0.1	0.008	0.015	7.00E–05	0.56578
Alzheimer’s disease	0.2	0.002	0.015	1.00E–05	0.8743
Parkinson’s disease	0.000001	0	0.015	0	0.99463
Parkinson’s disease	0.0001	–0.012	0.015	0.00014	0.41442
Parkinson’s disease	0.0005	0.006	0.015	3.00E–05	0.70258

Parkinson’s disease	0.001	–0.003	0.015	1.00E–05	0.84017
Parkinson’s disease	0.01	–0.004	0.015	2.00E–05	0.78023
Parkinson’s disease	0.05	–0.01	0.015	1.00E–04	0.48515
Parkinson’s disease	0.1	0.013	0.015	0.00016	0.39013
Parkinson’s disease	0.2	0.019	0.015	0.00035	0.20073
Cognitive performance	0.000001	0.017	0.015	0.00029	0.24294
Cognitive performance	0.0001	0.012	0.015	0.00015	0.39869
Cognitive performance	0.0005	0.009	0.015	9.00E–05	0.52215
Cognitive performance	0.001	0.007	0.015	5.00E–05	0.62518
Cognitive performance	0.01	–0.006	0.015	3.00E–05	0.70128
Cognitive performance	0.05	–0.011	0.015	0.00011	0.4662
Cognitive performance	0.1	0.002	0.015	1.00E–05	0.87587
Cognitive performance	0.2	–0.011	0.015	0.00013	0.44091
Intelligence	0.000001	0.004	0.015	2.00E–05	0.77059
Intelligence	0.0001	0.001	0.015	0	0.97024
Intelligence	0.0005	–0.011	0.015	0.00012	0.45371
Intelligence	0.001	–0.011	0.015	0.00013	0.44107
Intelligence	0.01	–0.014	0.015	2.00E–04	0.33069
Intelligence	0.05	–0.015	0.015	0.00022	0.31248
Intelligence	0.1	–0.024	0.015	6.00E–04	0.09509
Intelligence	0.2	–0.024	0.015	6.00E–04	0.09499
Neuroticism	0.000001	0.002	0.015	1.00E–05	0.87146
Neuroticism	0.0001	–0.025	0.015	0.00064	0.08418
Neuroticism	0.0005	–0.029	0.015	0.00085	0.04631
Neuroticism	0.001	–0.001	0.015	0	0.97266
Neuroticism	0.01	–0.004	0.015	2.00E–05	0.78863
Neuroticism	0.05	0.002	0.015	0	0.89164
Neuroticism	0.1	0.002	0.015	0	0.88349
Neuroticism	0.2	0.002	0.015	0	0.88813
Extraversion	0.000001	0	0.015	0	0.98637
Extraversion	0.0001	0.005	0.015	3.00E–05	0.72147
Extraversion	0.0005	0.012	0.015	0.00013	0.43162
Extraversion	0.001	0.018	0.015	0.00034	0.20714
Extraversion	0.01	0.008	0.015	7.00E–05	0.56812
Extraversion	0.05	0.019	0.015	0.00035	0.20182
Extraversion	0.1	0.014	0.015	2.00E–04	0.3372
Extraversion	0.2	0.012	0.015	0.00014	0.41274
Openness	0.000001	–0.001	0.015	0	0.91863
Openness	0.0001	–0.031	0.015	0.00094	0.03645
Openness	0.0005	0.008	0.015	6.00E–05	0.58876
Openness	0.001	0.009	0.015	8.00E–05	0.53279
Openness	0.01	0.002	0.015	1.00E–05	0.875
Openness	0.05	–0.007	0.015	4.00E–05	0.65027
Openness	0.1	–0.01	0.015	0.00011	0.48097
Openness	0.2	–0.011	0.015	0.00011	0.46651

Putamen	0.000001	0.023	0.015	0.00052	0.11949
Putamen	**0.0001**	**0.049**	**0.015**	**0.00237**	**0.00088**
Putamen	0.0005	0.029	0.015	0.00086	0.04505
Putamen	0.001	0.034	0.015	0.00117	0.01929
Putamen	0.01	0.031	0.015	0.00098	0.03264
Putamen	0.05	0.041	0.015	0.00171	0.00471
Putamen	0.1	0.035	0.015	0.00125	0.01586
Putamen	0.2	0.033	0.015	0.00111	0.02277
Nucleus accumbens	0.000001	0.017	0.015	0.00028	0.25367
Nucleus accumbens	0.0001	0.039	0.015	0.00153	0.00753
Nucleus accumbens	0.0005	0.03	0.015	0.00089	0.04131
Nucleus accumbens	0.001	0.028	0.015	0.00081	0.05224
Nucleus accumbens	**0.01**	**0.041**	**0.015**	**0.00171**	**0.00464**
Nucleus accumbens	0.05	0.032	0.015	0.00102	0.02867
Nucleus accumbens	0.1	0.025	0.015	0.00061	0.0907
Nucleus accumbens	0.2	0.019	0.015	0.00036	0.19606
Intracranial volume	0.000001	–0.031	0.015	0.00099	0.03185
Intracranial volume	0.0001	–0.029	0.015	0.00082	0.05007
Intracranial volume	0.0005	–0.02	0.015	0.00041	0.16404
Intracranial volume	0.001	–0.006	0.015	3.00E–05	0.69247
Intracranial volume	0.01	–0.012	0.015	0.00013	0.43065
Intracranial volume	0.05	–0.003	0.015	1.00E–05	0.85346
Intracranial volume	0.1	–0.003	0.015	1.00E–05	0.8263
Intracranial volume	0.2	–0.006	0.015	4.00E–05	0.6605
Amygdala	0.000001	0.011	0.015	0.00012	0.45111
Amygdala	0.0001	–0.011	0.015	0.00012	0.45396
Amygdala	0.0005	–0.004	0.015	1.00E–05	0.79593
Amygdala	0.001	0.007	0.015	5.00E–05	0.63874
Amygdala	0.01	0.012	0.015	0.00015	0.4105
Amygdala	0.05	0.01	0.015	1.00E–04	0.48982
Amygdala	0.1	–0.001	0.015	0	0.96915
Amygdala	0.2	–0.006	0.015	4.00E–05	0.66429
Caudate	0.000001	0.003	0.015	1.00E–05	0.85449
Caudate	0.0001	–0.002	0.015	1.00E–05	0.87606
Caudate	0.0005	–0.004	0.015	1.00E–05	0.79662
Caudate	0.001	0.003	0.015	1.00E–05	0.81326
Caudate	0.01	0.015	0.015	0.00023	0.29902
Caudate	0.05	0.013	0.015	0.00016	0.38611
Caudate	0.1	0.015	0.015	0.00022	0.30561
Caudate	0.2	0.018	0.015	0.00032	0.22486
Pallidum	0.000001	0.009	0.015	8.00E–05	0.55395
Pallidum	0.0001	0.007	0.015	4.00E–05	0.65052
Pallidum	0.0005	0.004	0.015	2.00E–05	0.78649
Pallidum	0.001	0.002	0.015	1.00E–05	0.86534
Pallidum	0.01	0.01	0.015	1.00E–04	0.50363

Pallidum	0.05	0.022	0.015	0.00048	0.13413
Pallidum	0.1	0.015	0.015	0.00021	0.32209
Pallidum	0.2	0.014	0.015	0.00019	0.34338
Thalamus	0.000001	0.014	0.015	2.00E–04	0.33659
Thalamus	0.0001	0.009	0.015	8.00E–05	0.53324
Thalamus	0.0005	0.009	0.015	8.00E–05	0.53257
Thalamus	0.001	0.011	0.015	0.00011	0.46907
Thalamus	0.01	–0.02	0.015	0.00038	0.18006
Thalamus	0.05	–0.019	0.015	0.00038	0.18502
Thalamus	0.1	–0.023	0.015	0.00053	0.11671
Thalamus	0.2	–0.025	0.015	6.00E–04	0.09335
Hippocampus	0.000001	0.002	0.015	0	0.90637
Hippocampus	0.0001	0.002	0.015	1.00E–05	0.87036
Hippocampus	0.0005	0.009	0.015	8.00E–05	0.54075
Hippocampus	0.001	0.027	0.015	0.00071	0.06899
Hippocampus	0.01	0.002	0.015	1.00E–05	0.87463
Hippocampus	0.05	0.012	0.015	0.00013	0.42986
Hippocampus	0.1	0.017	0.015	0.00028	0.25201
Hippocampus	0.2	0.017	0.015	0.00028	0.25012

Abbreviation: SE, standard error.

Sample size and references for each GWAS dataset:

Bipolar disorder (20,352 cases and 31,358 controls) [4]; Autism spectrum disorder (18,382 cases and 27,969 controls) [5]; Attention deficit hyperactivity disorder (20,183 cases and 35,191 controls) [6]; Obsessive-compulsive disorder (2,688 cases and 7,037 controls) [7]; Alzheimer's disease (71,880 cases and 383,378 controls) [8]; Parkinson's disease (33,674 cases and 449,056 controls) [9]; Cognitive performance (257,828 individuals) [10]; Intelligence (269,867 individuals) [11]; Neuroticism (390,278 individuals) [12]; Extraversion (63,030 individuals) [13]; Openness (17,375 individuals) [14]; Putamen (37,571 individuals) [15]; Nucleus accumbens (32,562 individuals) [15]; Intracranial volume (26,577 individuals) [16]; Amygdala (34,431 individuals) [15]; Caudate (37,741 individuals) [15]; Pallidum (34,413 individuals) [15]; Thalamus (34,464 individuals) [15]; Hippocampus (26,814 individuals) [17].

Table S4. Based on the LDpred method [18], polygenic risk score (PRS) analysis of creativity using GWAS of psychiatric disorders, cognitive functions, personality traits and subcortical structures.

Training datasets	Prior	Beta	SE	R^2	p-value
Bipolar disorder	0.001	–0.008	0.015	6.00E–05	0.60748
Bipolar disorder	0.003	–0.014	0.015	0.00018	0.35644
Bipolar disorder	0.01	–0.015	0.015	0.00022	0.30718
Bipolar disorder	0.03	–0.026	0.015	0.00065	0.08137
Bipolar disorder	0.1	0.016	0.015	0.00025	0.28291
Bipolar disorder	0.3	0.01	0.015	9.00E–05	0.5165
Bipolar disorder	1	0.011	0.015	0.00012	0.45543
Bipolar disorder	Infinitesimal	0.009	0.015	8.00E–05	0.5427
Autism spectrum disorder	0.001	–0.001	0.015	0	0.94193
Autism spectrum disorder	0.003	0.01	0.015	9.00E–05	0.51324
Autism spectrum disorder	0.01	0.004	0.015	2.00E–05	0.77638
Autism spectrum disorder	0.03	–0.007	0.015	5.00E–05	0.64012
Autism spectrum disorder	0.1	–0.011	0.015	0.00011	0.46795
Autism spectrum disorder	0.3	–0.011	0.015	0.00012	0.45605
Autism spectrum disorder	1	–0.012	0.015	0.00014	0.42248
Autism spectrum disorder	Infinitesimal	–0.012	0.015	0.00016	0.39423
Attention deficit hyperactivity disorder	0.001	0.004	0.015	2.00E–05	0.77762
Attention deficit hyperactivity disorder	0.003	–0.002	0.015	0	0.88979
Attention deficit hyperactivity disorder	0.01	–0.013	0.015	0.00016	0.38986
Attention deficit hyperactivity disorder	0.03	0.007	0.015	5.00E–05	0.61467
Attention deficit hyperactivity disorder	0.1	0.016	0.015	0.00025	0.27981
Attention deficit hyperactivity disorder	0.3	0.013	0.015	0.00018	0.36088
Attention deficit hyperactivity disorder	1	0.012	0.015	0.00014	0.42407
Attention deficit hyperactivity disorder	Infinitesimal	0.014	0.015	0.00018	0.35633
Obsessive-compulsive disorder	0.001	0.008	0.015	5.00E–05	0.61292
Obsessive-compulsive disorder	0.003	0.012	0.015	0.00013	0.43033
Obsessive-compulsive disorder	0.01	0.004	0.015	1.00E–05	0.79437
Obsessive-compulsive disorder	0.03	0.005	0.015	3.00E–05	0.71858
Obsessive-compulsive disorder	0.1	0.005	0.015	3.00E–05	0.71829
Obsessive-compulsive disorder	0.3	0.004	0.015	2.00E–05	0.77174
Obsessive-compulsive disorder	1	0.006	0.015	3.00E–05	0.70229
Obsessive-compulsive disorder	Infinitesimal	0.005	0.015	3.00E–05	0.73136
Alzheimer’s disease	0.001	0	0.015	0	0.97414
Alzheimer’s disease	0.003	0.005	0.015	2.00E–05	0.75271
Alzheimer’s disease	0.01	0	0.015	0	0.99979
Alzheimer’s disease	0.03	0.01	0.015	0.00011	0.47848
Alzheimer’s disease	0.1	0.015	0.015	0.00022	0.31637
Alzheimer’s disease	0.3	0.018	0.015	0.00033	0.2143
Alzheimer’s disease	1	0.02	0.015	4.00E–04	0.16951
Alzheimer’s disease	Infinitesimal	0.018	0.015	0.00034	0.20961
Parkinson’s disease	0.001	–0.012	0.015	0.00013	0.4294
Parkinson’s disease	0.003	0.001	0.015	0	0.9428

Parkinson’s disease	0.01	0.003	0.015	1.00E–05	0.85663
Parkinson’s disease	0.03	0.005	0.015	2.00E–05	0.74409
Parkinson’s disease	0.1	0.007	0.015	5.00E–05	0.63467
Parkinson’s disease	0.3	0.007	0.015	5.00E–05	0.61713
Parkinson’s disease	1	0.007	0.015	5.00E–05	0.62754
Parkinson’s disease	Infinitesimal	0.007	0.015	5.00E–05	0.61692
Cognitive performance	0.001	0.01	0.015	1.00E–04	0.48726
Cognitive performance	0.003	0.008	0.015	6.00E–05	0.58221
Cognitive performance	0.01	0.008	0.015	6.00E–05	0.6086
Cognitive performance	0.03	–0.004	0.015	1.00E–05	0.79388
Cognitive performance	0.1	–0.003	0.015	1.00E–05	0.85419
Cognitive performance	0.3	0.002	0.015	0	0.91874
Cognitive performance	1	–0.004	0.015	2.00E–05	0.78705
Cognitive performance	Infinitesimal	–0.013	0.015	0.00016	0.39119
Intelligence	0.001	0.001	0.015	0	0.94199
Intelligence	0.003	0	0.015	0	0.99145
Intelligence	0.01	–0.012	0.015	0.00013	0.42811
Intelligence	0.03	–0.016	0.015	0.00026	0.27314
Intelligence	0.1	–0.021	0.015	0.00043	0.15811
Intelligence	**0.3**	**–0.035**	**0.015**	**0.0012**	**0.01802**
Intelligence	1	–0.011	0.015	0.00012	0.45177
Intelligence	Infinitesimal	–0.013	0.015	0.00016	0.39315
Neuroticism	0.001	–0.006	0.015	4.00E–05	0.66059
Neuroticism	0.003	–0.009	0.015	7.00E–05	0.5575
Neuroticism	0.01	0.003	0.015	1.00E–05	0.83718
Neuroticism	0.03	0.021	0.015	0.00042	0.15954
Neuroticism	0.1	0.015	0.015	0.00021	0.32061
Neuroticism	0.3	0.009	0.015	8.00E–05	0.55305
Neuroticism	1	–0.009	0.022	3.00E–05	0.7008
Neuroticism	Infinitesimal	–0.028	0.015	8.00E–04	0.0539
Extraversion	0.001	–0.002	0.015	0	0.90756
Extraversion	0.003	0.001	0.015	0	0.96466
Extraversion	0.01	0.014	0.015	0.00019	0.34835
Extraversion	0.03	0.012	0.015	0.00014	0.41736
Extraversion	0.1	0.01	0.015	0.00011	0.47747
Extraversion	0.3	0.009	0.015	9.00E–05	0.51784
Extraversion	1	0.009	0.015	8.00E–05	0.55237
Extraversion	Infinitesimal	0.008	0.015	7.00E–05	0.56258
Openness	0.001	0.012	0.015	0.00015	0.40562
Openness	0.003	–0.001	0.015	0	0.96861
Openness	0.01	–0.001	0.015	0	0.94209
Openness	0.03	–0.002	0.015	0	0.88316
Openness	0.1	–0.003	0.015	1.00E–05	0.85466
Openness	0.3	–0.002	0.015	1.00E–05	0.87482
Openness	1	–0.002	0.015	1.00E–05	0.87309

Openness	Infinitesimal	–0.002	0.015	0	0.91219
Putamen	0.001	0.003	0.015	1.00E–05	0.83238
Putamen	0.003	–0.007	0.015	4.00E–05	0.67204
Putamen	0.01	–0.011	0.015	0.00012	0.45303
Putamen	0.03	0.011	0.015	0.00013	0.44307
Putamen	0.1	0.026	0.015	0.00068	0.07523
Putamen	0.3	0.023	0.015	0.00053	0.11618
Putamen	1	0.021	0.015	0.00042	0.16025
Putamen	Infinitesimal	0.019	0.015	0.00035	0.2008
Nucleus accumbens	0.001	0.013	0.016	0.00016	0.39417
Nucleus accumbens	0.003	–0.007	0.015	5.00E–05	0.64314
Nucleus accumbens	0.01	0.013	0.017	0.00012	0.45708
Nucleus accumbens	0.03	0.008	0.015	6.00E–05	0.59004
Nucleus accumbens	0.1	0	0.015	0	0.98685
Nucleus accumbens	0.3	–0.002	0.015	0	0.90494
Nucleus accumbens	1	–0.002	0.015	0	0.87864
Nucleus accumbens	Infinitesimal	–0.003	0.015	1.00E–05	0.81446
Intracranial volume	0.001	0.023	0.015	0.00047	0.13941
Intracranial volume	0.003	0.029	0.015	0.00073	0.06434
Intracranial volume	0.01	0.011	0.016	1.00E–04	0.49354
Intracranial volume	0.03	–0.013	0.015	0.00017	0.36799
Intracranial volume	0.1	–0.013	0.015	0.00018	0.36428
Intracranial volume	0.3	–0.013	0.015	0.00016	0.3871
Intracranial volume	1	–0.014	0.015	0.00018	0.35675
Intracranial volume	Infinitesimal	–0.011	0.015	0.00013	0.43693
Amygdala	0.001	–0.015	0.015	0.00023	0.2973
Amygdala	0.003	0.019	0.015	0.00037	0.18804
Amygdala	0.01	0.017	0.015	0.00028	0.25609
Amygdala	0.03	0.015	0.015	0.00023	0.3023
Amygdala	0.1	0.014	0.015	2.00E–04	0.3387
Amygdala	0.3	0.013	0.015	0.00018	0.36228
Amygdala	1	0.014	0.015	0.00019	0.34628
Amygdala	Infinitesimal	0.013	0.015	0.00018	0.35869
Caudate	0.001	0.026	0.015	0.00066	0.08025
Caudate	0.003	–0.003	0.015	1.00E–05	0.84406
Caudate	0.01	0.01	0.016	8.00E–05	0.53917
Caudate	0.03	0.013	0.015	0.00017	0.36847
Caudate	0.1	0.012	0.015	0.00015	0.40161
Caudate	0.3	0.013	0.015	0.00016	0.38332
Caudate	1	0.013	0.015	0.00018	0.36118
Caudate	Infinitesimal	0.013	0.015	0.00016	0.39207
Pallidum	0.001	0.019	0.015	0.00032	0.21819
Pallidum	0.003	0.003	0.016	1.00E–05	0.86954
Pallidum	0.01	0.016	0.015	0.00024	0.28725
Pallidum	0.03	0.018	0.015	0.00032	0.21935

Pallidum	0.1	0.019	0.015	0.00036	0.19486
Pallidum	0.3	0.021	0.015	0.00043	0.15861
Pallidum	1	0.021	0.015	0.00043	0.15649
Pallidum	Infinitesimal	0.021	0.015	0.00042	0.16068
Thalamus	0.001	0.008	0.015	7.00E–05	0.56534
Thalamus	0.003	0.001	0.015	0	0.92319
Thalamus	0.01	–0.008	0.015	7.00E–05	0.56887
Thalamus	0.03	–0.007	0.015	5.00E–05	0.6219
Thalamus	0.1	–0.011	0.015	0.00013	0.43479
Thalamus	0.3	–0.012	0.015	0.00014	0.41742
Thalamus	1	–0.012	0.015	0.00013	0.42839
Thalamus	Infinitesimal	–0.011	0.015	0.00012	0.45365
Hippocampus	0.001	–0.013	0.015	0.00018	0.35975
Hippocampus	0.003	–0.013	0.015	0.00017	0.37407
Hippocampus	0.01	0.007	0.015	5.00E–05	0.6141
Hippocampus	0.03	0.009	0.015	8.00E–05	0.54809
Hippocampus	0.1	0.01	0.015	1.00E–04	0.48942
Hippocampus	0.3	0.012	0.015	0.00014	0.42572
Hippocampus	1	0.013	0.015	0.00016	0.3923
Hippocampus	Infinitesimal	0.012	0.015	0.00014	0.41192

Abbreviation: SE, standard error.

Sample size and references for each GWAS dataset:

Bipolar disorder (20,352 cases and 31,358 controls) [4]; Autism spectrum disorder (18,382 cases and 27,969 controls) [5]; Attention deficit hyperactivity disorder (20,183 cases and 35,191 controls) [6]; Obsessive-compulsive disorder (2,688 cases and 7,037 controls) [7]; Alzheimer's disease (71,880 cases and 383,378 controls) [8]; Parkinson's disease (33,674 cases and 449,056 controls) [9]; Cognitive performance (257,828 individuals) [10]; Intelligence (269,867 individuals) [11]; Neuroticism (390,278 individuals) [12]; Extraversion (63,030 individuals) [13]; Openness (17,375 individuals) [14]; Putamen (37,571 individuals) [15]; Nucleus accumbens (32,562 individuals) [15]; Intracranial volume (26,577 individuals) [16]; Amygdala (34,431 individuals) [15]; Caudate (37,741 individuals) [15]; Pallidum (34,413 individuals) [15]; Thalamus (34,464 individuals) [15]; Hippocampus (26,814 individuals) [17].

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