

Supplementary Table 11B: Top 50 SNPs in tests of $\mathcal{M}_0^{(g)}$. Tests of $\mathcal{J}_0^{(g)}$ and $\mathcal{M}_0^{(g)}$ were performed for G×R and Main effect models, respectively, for 488,200 SNPs of the learning performance scores over the PING sample (n=479). Both models included covariates for status of learning problem diagnosis and first two PCs of genotype data. Learning performance scores were, by construction, uncorrelated with age, sex, household income, and parental education. CHR, POS, MAF, and MA are chromosome, position, minor allele frequency (within PING sample), and minor allele, respectively, for given SNP. SNPs were genotyped with the Illumina Human660W-Quad Beadchip array and their positions correspond to HG build 19. F-tests of $\mathcal{J}_0^{(g)}$ were performed with statistic having 2 and 472 df. F-tests of $\mathcal{M}_0^{(g)}$ were performed with statistic having 1 and 474 df. F-tests of $\mathcal{M}_{0;PNC}^{(g)}$ were performed with statistic having 1 and 2,322 df. Information gain are for respective G×R and Main effect models over the PING sample (n=479). It represents in the increase in adjusted R² for respective model fit over that of the non-genetic base model including only the covariates.

$\mathcal{M}_0^{(g)}$ Rank	SNP	CHR	POS	MAF	MA	P-values		Information Gain		Estimates				Standard errors			
						$\mathcal{J}_0^{(g)}$	$\mathcal{M}_0^{(g)}$	G×R	Main	α_g	β_g	γ_g	θ_g	α_g	β_g	γ_g	θ_g
1	rs11633708	15	87050708	0.47	G	3.49E-08	2.28E-06	7.9	4.3	-0.807	-0.899	0.437	-0.198	0.179	0.219	0.135	0.041
2	rs1533046	2	22594727	0.45	A	1.20E-05	5.06E-06	5.7	4.0	-0.582	-0.241	0.272	0.194	0.188	0.214	0.135	0.042
3	rs2279604	5	34687911	0.35	G	5.29E-05	6.01E-06	5.1	3.9	-0.378	-0.312	0.073	-0.206	0.226	0.240	0.152	0.045
4	rs13142383	4	133561788	0.37	G	4.63E-05	6.63E-06	5.1	3.9	-0.250	0.245	-0.034	0.196	0.206	0.229	0.144	0.043
5	rs13134454	4	133530329	0.37	G	4.86E-05	6.93E-06	5.1	3.9	-0.204	0.297	-0.068	0.194	0.203	0.225	0.141	0.043
6	rs17260000	1	209057061	0.13	G	9.90E-06	9.36E-06	5.7	3.7	0.401	0.335	-0.401	-0.283	0.382	0.331	0.212	0.063
7	rs8042879	15	87093955	0.45	G	9.29E-06	1.03E-05	5.8	3.7	-0.604	-0.620	0.272	-0.191	0.185	0.223	0.138	0.043
8	rs9920533	15	60673192	0.10	A	5.71E-06	1.13E-05	6.0	3.7	-1.172	-0.429	0.477	0.319	0.437	0.378	0.235	0.072
9	rs1467219	2	106135724	0.27	G	1.12E-04	1.47E-05	4.8	3.6	-0.223	-0.135	-0.044	-0.208	0.269	0.269	0.169	0.048
10	rs11941362	4	133549165	0.39	C	9.86E-05	1.62E-05	4.8	3.5	-0.198	0.305	-0.078	0.185	0.201	0.231	0.145	0.043
11	rs16842162	1	223958272	0.08	A	2.32E-04	1.95E-05	4.5	3.5	-0.238	-0.290	-0.019	-0.335	0.503	0.420	0.268	0.078
12	rs6685557	1	223969513	0.08	C	2.32E-04	1.95E-05	4.5	3.5	-0.238	-0.290	-0.019	-0.335	0.503	0.420	0.268	0.078
13	rs4301242	5	162984955	0.13	A	2.53E-04	2.32E-05	4.5	3.4	-0.387	0.159	0.065	0.275	0.379	0.342	0.210	0.064
14	rs6536942	4	166986194	0.08	G	2.95E-05	2.51E-05	5.3	3.4	-0.925	-0.870	0.328	-0.338	0.486	0.419	0.260	0.079
15	rs3742709	14	93695018	0.09	A	3.83E-04	2.73E-05	4.3	3.3	-0.153	-0.211	-0.061	-0.321	0.542	0.437	0.286	0.076
16	rs10951991	7	6721661	0.07	A	1.12E-04	2.76E-05	4.8	3.3	0.009	-0.080	-0.167	-0.347	0.506	0.432	0.266	0.082
17	rs4668573	2	8609283	0.40	A	1.32E-04	2.95E-05	4.7	3.3	-0.441	-0.373	0.122	-0.183	0.195	0.224	0.139	0.043
18	rs12473672	2	106139293	0.27	A	1.97E-04	3.47E-05	4.6	3.2	-0.236	-0.134	-0.041	-0.201	0.273	0.272	0.170	0.048
19	rs17296443	10	33561574	0.15	A	1.42E-04	3.56E-05	4.7	3.2	-0.120	0.422	-0.110	0.247	0.326	0.300	0.186	0.059
20	rs2449512	8	98737909	0.10	G	1.03E-04	3.57E-05	4.8	3.2	-0.763	-0.096	0.261	0.315	0.424	0.370	0.232	0.075
21	rs1311	8	98738361	0.10	G	1.03E-04	3.57E-05	4.8	3.2	-0.763	-0.096	0.261	0.315	0.424	0.370	0.232	0.075
22	rs12146261	10	24299354	0.27	C	1.59E-04	3.85E-05	4.7	3.2	-0.572	-0.175	0.230	0.198	0.220	0.237	0.148	0.048
23	rs6482358	10	24322810	0.33	C	2.43E-04	3.99E-05	4.5	3.2	-0.452	-0.028	0.135	0.190	0.210	0.233	0.146	0.046
24	rs12419146	11	36353471	0.05	A	1.02E-04	4.10E-05	4.8	3.2	0.493	0.249	-0.417	-0.404	0.627	0.517	0.326	0.098
25	rs2339518	2	22598926	0.45	G	9.51E-05	4.15E-05	4.9	3.2	-0.579	-0.250	0.265	0.173	0.191	0.217	0.137	0.042

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$\mathcal{M}_0^{(g)}$ Rank	SNP	CHR	POS	MAF	MA	P-values		Information Gain		Estimates				Standard errors			
						$\mathcal{J}_0^{(g)}$	$\mathcal{M}_0^{(g)}$	G×R	Main	α_g	β_g	γ_g	θ_g	α_g	β_g	γ_g	θ_g
26	rs4609816	15	87102625	0.47	A	8.20E-05	4.25E-05	4.9	3.2	-0.534	-0.519	0.219	-0.174	0.181	0.220	0.136	0.042
27	rs1734540	21	37018453	0.21	A	2.68E-04	4.29E-05	4.5	3.2	-0.478	0.003	0.124	0.207	0.271	0.262	0.161	0.050
28	rs4851787	2	106131851	0.25	A	2.20E-04	4.31E-05	4.5	3.2	-0.266	-0.166	-0.023	-0.203	0.281	0.278	0.174	0.049
29	rs12421046	11	36354576	0.06	C	9.68E-05	4.38E-05	4.9	3.2	0.631	0.366	-0.487	-0.396	0.592	0.487	0.309	0.096
30	rs9406769	9	19995895	0.16	A	4.37E-05	4.75E-05	5.2	3.1	0.379	0.850	-0.398	0.230	0.316	0.292	0.181	0.056
31	rs17484454	4	149209008	0.27	G	8.72E-05	4.96E-05	4.9	3.1	-0.721	-0.646	0.305	-0.192	0.258	0.253	0.165	0.047
32	rs6944332	7	6758018	0.13	A	4.62E-04	5.00E-05	4.2	3.1	-0.149	-0.142	-0.073	-0.267	0.402	0.346	0.219	0.065
33	rs16967366	13	106452651	0.07	A	3.57E-04	5.19E-05	4.3	3.1	-0.628	0.025	0.187	0.334	0.509	0.438	0.271	0.082
34	rs1429036	5	15571736	0.35	A	7.76E-04	5.70E-05	4.0	3.1	-0.184	-0.081	-0.060	-0.188	0.237	0.254	0.159	0.046
35	rs890032	8	6024175	0.22	A	3.03E-04	5.94E-05	4.4	3.0	-0.102	0.404	-0.124	0.213	0.297	0.290	0.181	0.053
36	rs7209400	17	47450057	0.49	A	4.58E-04	6.15E-05	4.2	3.0	-0.274	0.197	-0.015	0.180	0.175	0.236	0.149	0.044
37	rs11726117	4	113353285	0.35	A	7.12E-05	6.52E-05	5.0	3.0	-0.545	-0.060	0.157	0.176	0.222	0.234	0.147	0.044
38	rs4243100	15	87037559	0.45	A	4.01E-08	6.54E-05	7.8	3.0	0.244	1.025	-0.534	0.168	0.173	0.214	0.132	0.042
39	rs723036	12	28951138	0.42	G	4.04E-04	6.59E-05	4.3	3.0	-0.258	0.213	-0.032	0.166	0.179	0.211	0.131	0.041
40	rs11253578	10	6639501	0.24	A	2.37E-04	6.71E-05	4.5	3.0	-0.014	0.084	-0.181	-0.202	0.284	0.272	0.171	0.050
41	rs10764760	10	129977477	0.26	A	4.58E-04	6.77E-05	4.2	3.0	-0.243	0.254	-0.033	0.208	0.263	0.269	0.168	0.052
42	rs9293713	5	76705255	0.08	A	2.99E-04	6.82E-05	4.4	3.0	-0.920	-0.275	0.363	0.329	0.451	0.402	0.245	0.082
43	rs4354903	15	27339361	0.26	C	2.88E-04	7.11E-05	4.4	3.0	-0.442	-0.334	0.089	-0.195	0.286	0.274	0.173	0.049
44	rs11693395	2	8605103	0.28	G	5.13E-04	7.27E-05	4.2	3.0	-0.288	-0.183	-0.001	-0.190	0.244	0.244	0.153	0.047
45	rs1478690	11	27295878	0.37	G	1.51E-04	7.50E-05	4.7	3.0	0.046	0.229	-0.254	-0.176	0.211	0.231	0.145	0.044
46	rs7481109	11	27298062	0.37	A	1.51E-04	7.50E-05	4.7	3.0	0.046	0.229	-0.254	-0.176	0.211	0.231	0.145	0.044
47	rs11140350	9	86676854	0.48	A	4.34E-04	1.56E-04	4.3	2.7	-0.497	-0.169	0.207	0.158	0.179	0.229	0.145	0.041
48	rs11853362	15	87057124	0.44	A	1.70E-07	7.66E-05	7.3	2.9	-0.898	-1.001	0.514	-0.172	0.182	0.223	0.137	0.043
49	rs11804015	1	230704291	0.33	A	3.16E-04	7.72E-05	4.4	2.9	-0.266	0.230	-0.033	0.177	0.202	0.227	0.142	0.044
50	rs10509399	10	80312035	0.06	G	2.00E-04	7.80E-05	4.6	2.9	0.209	0.780	-0.277	0.345	0.580	0.482	0.305	0.086