

Supplementary Tables

Supplementary Table S1: EFA Factor Structure in ABCD

Cognitive Task	Factor Loading	u^2
Rey Auditory Verbal Learning	0.63	0.61
List Sorting Working Memory	0.62	0.61
Oral Reading Recognition	0.61	0.62
Picture Vocabulary	0.60	0.64
WISC-V Matrix Reasoning	0.57	0.67
Card Sorting	0.55	0.70
Picture Sequence Memory	0.49	0.76
Flanker Inhibitory Control	0.46	0.79
Little Man Task	0.45	0.80
Pattern Comparison Processing Speed	0.38	0.85
Eigenvalue (SS Loadings)	2.96	
Proportion of Variance Explained	0.30	

Supplementary Table S2: Life Outcomes Assessed in UK Biobank Within-Family Analysis.

Outcome Category	Variable Name	UKB Field	Measurement Details
Socioeconomic	Educational attainment	6138	Mapped categorically to approximate years of education completed (similar to Okbay et al., 2022)
	Occupational status	20277	Derived from occupational SOC2000 codes
	Family income	738	Derived from banded household income
Psychological	Neuroticism	20127	UKB Neuroticism scale
Health & Wellbeing	Self-rated health	2178	Self-reported general health status
	Happiness	4526	General happiness measure
Social Satisfaction	Friend satisfaction	4570	Satisfaction with friendships and social relationships
	Financial satisfaction	4581	Satisfaction with current financial situation
	Work satisfaction	4537	Satisfaction with current work or job

CAMSIS = Cambridge Social Interaction and Stratification scale; SOC2000 = Standard Occupational Classification 2000.

Disease Category	Disease Name	Disease Codes	Number of UKB sibling cases
Cardiometabolic	Coronary artery disease	ICD-10: I21, I22, I23, I24.1, I25.2 OPCS-4: K40, K41, K49, K50.2, K75 Self-report: "Heart attack/myocardial infarction" (1075)	2,623
	Gout	ICD-10: M10 Self-report: "Gout" (1466) Medication: allopurinol (1140875408) Surveys: UKB field 12001 ("yes")	1,101
	Hypertension	ICD-10: I10 Self-report: "Hypertension" (1065), "essential hypertension" (1072)	14,354
	Type 2 diabetes	ICD-10: E11 Self-report: "Type 2 diabetes" (1223)	2,903
	Venous thromboembolism	ICD-10: I26, I80, I82, O87.1, O88.2 Self-report: "Pulmonary embolism +/- dvt" (1093), "Deep venous thrombosis (dvt)" (1094), "Venous thromboembolic disease" (1068)	1,942
Immune/Inflammatory	Asthma	ICD-10: J45, J46 Self-report "Asthma" (1111) Surveys: UKB field 6152 ("Asthma"), UKB field 22167 ("Yes")	5,089
	Inflammatory bowel disease	ICD-10: K50, K51 Self-report: "Crohn's disease" (1462), "Ulcerative colitis" (1463), "Inflammatory bowel disease" (1461)	631
	Multiple sclerosis	ICD-10: G35 Self-report: "Multiple sclerosis" (1261)	206
	Psoriasis	ICD-10: L40 Self-report: "Psoriasis" (1453)	780
	Vitiligo	ICD-10: L80 Self-report "Vitiligo" (1661)	38
Cancer	Basal cell carcinoma	ICD-10: C44 Self-report: "Basal cell carcinoma" (1061)	2,301
	Breast cancer	ICD-10: C50 Self-report: "Breast cancer" (1002)	1,726
	Colorectal cancer	ICD-10: C18, C19, C20 Self-report: "Large bowel cancer/colorectal cancer" (1020), "Colon cancer/sigmoid cancer" (1022), "Rectal cancer" (1023)	794
	Melanoma	ICD-10: C43 Self-report: "Malignant melanoma" (1059)	348
	Prostate cancer	ICD-10: C61 Self-report: "Prostate cancer" (1044)	1,141
	Testicular cancer	ICD-10: C62 Self-report: "Testicular cancer" (1045)	60
	Other	Alzheimer's	ICD-10: G30 Self-report: "Dementia/alzheimers/cognitive impairment" (1263)
Glaucoma		ICD-10: H40, H40.1, H40.2, H40.8, H40.9 Self-report: "Glaucoma" (1277) Surveys: UKB field 6148 ("Glaucoma"), UKB field 6119 (any response)	1,222
Osteoporosis		ICD-10: M80, M81, M82	2,079

Supplementary Table S3: Disease Outcomes Assessed in UK Biobank Within-Family Analysis.

Where UKB field not specified, disease codes drawn from the following: ICD-10 codes > UKB field 41,270; OPCS-4 > UKB field 41,272; medication > UKB field 20,003; self-report > UKB field 20,001 (non-cancers) and UKB field 20,002 (cancers). Values in parentheses indicate responses satisfying case definition.

Supplementary Table S4: **Psychological and Neurodevelopmental Outcomes Assessed in ABCD Pleiotropy Analysis.**

Category	Short Name (Plot Label)	Instrument	Full Description	Variable in ABCD	Valence
Neurodevelopmental traits	Autistic Traits	SSRS (Parent)	Short Social Responsiveness Scale — parent total (autistic traits)	<code>ssrs_p_ss_sum</code>	Neutral
Child symptoms & psychopathology	Internalizing Symptoms	CBCL (Parent)	CBCL Internalizing (T-score)	<code>cbcl_scr_syn_internal_t</code>	Negative
	Externalizing Symptoms	CBCL (Parent)	CBCL Externalizing (T-score)	<code>cbcl_scr_syn_external_t</code>	Negative
	ADHD Symptoms	CBCL (Parent)	CBCL ADHD (DSM-5 oriented, T-score)	<code>cbcl_scr_dsm5_adhd_t</code>	Negative
	General Problems	BPM (Youth)	Brief Problem Monitor — Youth Total Problems (T-score)	<code>bpm_y_scr_totalprob_t</code>	Negative
	Psychosis Risk	PQ-BC / PPS (Youth)	Prodromal Psychosis Questionnaire — severity/distress sum	<code>pps_y_ss_severity_score</code>	Negative
Sleep	Sleep Problems	SDSC (Parent)	Sleep Disturbance Scale for Children — total	<code>sds_p_ss_total</code>	Negative
Temperament & traits	Self-Regulation	EATQ-R (Parent)	EATQ-R — Effortful Control (super-scale)	<code>eatq_p_ss_effort_cont_ss</code>	Positive
	Negative Feelings	EATQ-R (Parent)	EATQ-R — Negative Affect (super-scale)	<code>eatq_p_ss_neg_affect_ss</code>	Negative
	Extraversion	EATQ-R (Parent)	EATQ-R — Surgency (super-scale)	<code>eatq_p_ss_surgency_ss</code>	Positive*
	Emotional Impulsivity	UPPS-P (Youth)	UPPS-P — Negative Urgency	<code>upps_y_ss_negative_urgency</code>	Negative
	Excited Impulsivity	UPPS-P (Youth)	UPPS-P — Positive Urgency	<code>upps_y_ss_positive_urgency</code>	Negative
	Poor Planning	UPPS-P (Youth)	UPPS-P — (Lack of) Planning	<code>upps_y_ss_lack_of_planning</code>	Negative
	Poor Perseverance	UPPS-P (Youth)	UPPS-P — (Lack of) Perseverance	<code>upps_y_ss_lack_of_perseverance</code>	Negative
	Sensation Seeking	UPPS-P (Youth)	UPPS-P — Sensation Seeking	<code>upps_y_ss_sensation_seeking</code>	Negative**
	Anxious Inhibition	BIS/BAS (Youth)	Behavioral Inhibition System — total	<code>bis_y_ss_bis_sum</code>	Negative
Reward Responsiveness	BIS/BAS (Youth)	Behavioral Activation System — Reward Responsiveness	<code>bis_y_ss_bas_rr</code>	Positive	
Affect / wellbeing	Positive Feelings	NIH Positive Affect (Youth)	NIH Toolbox Positive Affect — total	<code>poa_y_ss_sum</code>	Positive

Category	Short Name (Plot Label)	Instrument	Full Description	Variable in ABCD	Valence
	Manic Moods	7-Up (Youth)	7-Up — total (mania-proneness)	sup_y_ss_sum	Negative
Mania / hypomania traits	Manic Traits	PGBI-10M (Parent)	Parent General Behavior Inventory 10-item Mania — total	pgbi_p_ss_score	Negative

Valence indicates the conventional clinical or developmental interpretation of higher scores: "Positive" = typically beneficial/adaptive; "Negative" = typically associated with impairment or distress in clinical contexts. These designations reflect standard measurement frameworks rather than claims about evolutionary fitness or individual well-being. Autistic traits are left unclassified given the heterogeneity of their functional significance. *Surgency/extraversion may relate to risk in some contexts. **Sensation seeking may be adaptive in some contexts. SSRS = Social Responsiveness Scale; CBCL = Child Behavior Checklist; BPM = Brief Problem Monitor; PQ-BC = Prodromal Questionnaire-Brief Child Version; PPS = Psychosis Prone-ness Scale; SDSC = Sleep Disturbance Scale for Children; EATQ-R = Early Adolescent Temperament Questionnaire-Revised; UPPS-P = Urgency, Premeditation, Perseverance, Sensation Seeking, Positive Urgency Scale; BIS/BAS = Behavioral Inhibition System/Behavioral Activation System; NIH = National Institutes of Health; PGBI = Parent General Behavior Inventory.

**Supplementary Table S5: UK Biobank:
standardized loadings for one-factor g with 8
indicators.**

Cognitive task	Factor Loading	u^2
Fluid intelligence/VNR	0.736	0.458
Digit span	0.510	0.740
Trail making	0.505	0.745
Symbol-digit	0.438	0.808
Vocabulary	0.660	0.564
Word pairs	0.483	0.766
Tower rearranging	0.429	0.816
Matrix completion	0.599	0.641

Supplementary Table S6: **ABCD: standardized indicator loadings on first-order domains in the second-order g model.**

Cognitive Task	Domain	Factor loading	u^2
Picture Vocabulary	Gc	0.589	0.653
Oral Reading Recognition	Gc	0.682	0.535
Flanker	EF-Gs	0.561	0.685
Pattern Comparison	EF-Gs	0.586	0.657
Card Sorting	EF-Gs	0.707	0.500
Little Man Test	EF-Gs	0.291	0.915
List Sorting (WM)	Gmem	0.540	0.707
Picture Sequence Memory	Gmem	0.452	0.796
Rey Auditory Verbal Learning	Gmem	0.672	0.548
WISC-V Matrix Reasoning	Gmem	0.510	0.740

Supplementary Table S7: **ABCD: standardized second-order loadings of g on first-order domains.**

First-order domain	Factor loading	u^2
Gc	0.800	0.360
EF-Gs	0.485	0.765
Gmem	0.842	0.290

Supplementary Table S8: **ABCD bifactor (orthogonal) model: standardized loadings on general g and specific factors**

Cognitive task	g -loading	Gc	EF-Gs	Gmem	u^2
Picture Vocabulary	0.478	0.607	0.000	0.000	0.403
Flanker	0.232	0.000	0.527	0.000	0.668
List Sorting (WM)	0.485	0.000	0.000	0.184	0.731
Card Sorting	0.329	0.000	0.609	0.000	0.521
Pattern Comparison	0.213	0.000	0.573	0.000	0.626
Picture Sequence Memory	0.265	0.000	0.000	0.598	0.572
Oral Reading Recognition	0.568	0.214	0.000	0.000	0.631
Matrix Reasoning (WISC-V)	0.517	0.000	0.000	0.086	0.725
Little Man Test	0.351	0.000	0.112	0.000	0.865
Rey Auditory Verbal Learning	0.537	0.000	0.000	0.423	0.532

Supplementary Table S9: **ABCD model comparison: fit and latent g slopes**

Model	$\delta_{g_{SEM}}$	$\beta_{g_{SEM}}$	CFI	TLI	RMSEA	SRMR
One-factor g	0.397 (0.048)	0.452 (0.028)	0.858	0.836	0.055	0.039
Second-order g	0.435 (0.053)	0.509 (0.031)	0.955	0.947	0.031	0.029
Bifactor (orthogonal)	0.428 (0.053)	0.506 (0.029)	0.983	0.980	0.020	0.022

Supplementary Table S10: **Measurement invariance by PGS strata**

Cohort	Level	CFI	RMSEA	Δ CFI (vs. config.)	Conclusion
UKB (deciles)	Configural	0.924	0.036	—	Acceptable fit
	Metric	0.919	0.032	-0.005	Holds ($ \Delta$ CFI < 0.01)
ABCD (quintiles)	Configural	0.933	0.050	—	Acceptable fit
	Metric	0.935	0.045	0.002	Holds ($ \Delta$ CFI < 0.01)

Supplementary Table S11: **Differential item functioning (DIF) using multiple indicator multiple cause (MIMIC) in UKB**

Cognitive task	Est.	SE	p_{BH}
Trail making	0.078	0.033	0.150
Symbol-digit	-0.058	0.030	0.192
Word pairs	0.050	0.029	0.225
Fluid intelligence/VNR	0.032	0.021	0.263
Tower rearranging	0.016	0.035	0.662
Vocabulary	-0.016	0.026	0.662
Digit span	0.015	0.024	0.662
Matrix completion	-0.012	0.027	0.662

Notes: Est. = standardized direct effect (γ) of the within-family PGS on each cognitive indicator, estimated from a MIMIC model that simultaneously regresses latent g on PGS. A significant direct effect would indicate that the PGS predicts the indicator beyond its association with g (differential item functioning). SE = standard error; p_{BH} = Benjamini-Hochberg adjusted p -value.

Supplementary Table S12: **Differential item functioning (DIF) using multiple indicator multiple cause (MIMIC) in ABCD**

Cognitive task	Est.	SE	p_{BH}
List Sorting (WM)	-0.118	0.050	0.190
Oral Reading Recognition	0.085	0.048	0.397
Little Man Test	0.042	0.055	0.716
WISC-V Matrix Reasoning	0.037	0.050	0.716
Pattern Comparison	-0.034	0.049	0.716
Flanker	0.031	0.051	0.716
Picture Sequence Memory	-0.030	0.055	0.716
Rey Auditory Verbal Learning	-0.024	0.049	0.716
Picture Vocabulary	0.021	0.045	0.716
Card Sorting	0.006	0.053	0.907

Notes: Est. = standardized direct effect (γ) of the within-family PGS on each cognitive indicator, estimated from a MIMIC model that simultaneously regresses latent g on PGS. A significant direct effect would indicate that the PGS predicts the indicator beyond its association with g (differential item functioning). SE = standard error; p_{BH} = Benjamini-Hochberg adjusted p -value.

Supplementary Table S13: **Cognitive validation (matched sample): population and within-family effects on the latent scale.**

Cohort	Outcome	N sib- ling pairs	PGS	β_g (SE)	δ_g (SE)	δ/β (SE)
UKB	Fluid Intelligence/VNR	4,642	Primary PGS	0.521 (0.011)	0.456 (0.024)	0.876 (0.05)
UKB	Fluid Intelligence/VNR	4,642	Savage-LDpred2	0.431 (0.013)	0.354 (0.023)	0.822 (0.050)
ABCD	GCA Factor Score	736	Primary PGS	0.425 (0.026)	0.408 (0.062)	0.959 (0.134)
ABCD	GCA Factor Score	736	Savage-LDpred2	0.313 (0.029)	0.243 (0.045)	0.776 (0.136)

Notes: Effects are standardized associations on the latent scale, with reliability correction $\beta_g = \beta/\sqrt{\rho}$ and $\delta_g = \delta/\sqrt{\rho}$. Reliabilities are $\rho = 0.607$ (UKB Fluid Intelligence/VNR) and $\rho = 0.803$ (ABCD GCA factor score). Attenuation ratios δ/β use a family-cluster bootstrap SE (resampling sibling-pairs by family).

Supplementary Table S14: **Latent SEM slopes (UKB and ABCD): population and within-family effects.**

Cohort	PGS	Model	N	β_{gSEM} (SE)	δ_{gSEM} (SE)	CFI	TLI	RMSEA
UKB	Primary PGS	One-factor g	36,126	0.525 (0.008)	0.439 (0.018)	0.969	0.927	0.022
UKB	Savage-LDpred2	One-factor g	36,126	0.459 (0.012)	0.365 (0.020)	0.941	0.924	0.021
ABCD	Primary PGS	Second-order g	1,560	0.509 (0.031)	0.435 (0.053)	0.955	0.947	0.031
ABCD	Savage-LDpred2	Second-order g	1,560	0.393 (0.047)	0.298 (0.055)	0.956	0.948	0.031

Supplementary Table S15: **UKB life outcomes (within-family sibling-pair models).**

Outcome	N sibling pairs	Primary PGS	Savage-LDpred2
Education	16,358	0.154 (0.010) ^{***}	0.100 (0.010) ^{***}
Emotional Stability	11,364	0.049 (0.014) ^{***}	0.042 (0.013) ^{***}
Family Income	12,960	0.104 (0.012) ^{***}	0.067 (0.011) ^{***}
Financial Satisfaction	4,922	0.035 (0.021)	-0.004 (0.020)
Friend Satisfaction	4,860	0.102 (0.021) ^{***}	0.064 (0.020) ^{***}
Happiness	4,916	0.099 (2.467)	0.028 (0.020)
Health	16,466	0.069 (0.011) ^{***}	0.036 (0.011) ^{***}
Occupational Status	8,551	0.157 (0.014) ^{***}	0.101 (0.013) ^{***}
Work Satisfaction	2,377	0.096 (2.763)	0.038 (0.029)

*** $p < 0.0056$ (Bonferroni corrected); * $p < 0.05$.

Supplementary Table S16: **ABCD ancestry portability: retention of the European-ancestry effect.**

Ancestry group	N	Primary PGS retention (%; 95% CI)	Savage-LDpred2 retention (%; 95% CI)
African American	1,491	66.1 [52.2, 80.2]	51.2 [32.6, 70.5]
Hispanic Latino American	1,985	88.6 [76.1, 101.6]	88.8 [72.3, 106.7]
Asian American	136	57.8 [12.8, 102.9]	66.0 [6.1, 126.9]
South Asian American	42	85.6 [7.8, 163.3]	93.1 [-13.2, 198.5]

Supplementary Table S17: **ABCD PGS × Environment interaction coefficients.**

Environment	Primary β_{int} (SE)	Alt. PGS β_{int} (SE)
Family Conflict	0.012 (0.012)	0.009 (0.013)
Family Income (log)	-0.014 (0.012)	-0.018 (0.013)
Parental Education	-0.002 (0.012)	0.006 (0.013)

Supplementary Table S18: ABCD pleiotropy scan (20 outcomes): standardized partial correlations.

Outcome	Primary β (SE)	Savage-LDpred2 β (SE)
<i>Externalizing</i>		
ADHD Symptoms	-0.116 (0.012)***	-0.080 (0.013)***
Behavioral Problems	-0.095 (0.014)***	-0.063 (0.013)***
Poor Perseverance	-0.073 (0.014)***	-0.049 (0.013)***
Poor Planning	0.009 (0.014)	0.011 (0.013)
Total Problems	-0.057 (0.012)***	-0.020 (0.013)
<i>Impulsivity</i>		
Emotional Impulsivity	-0.042 (0.015)*	-0.027 (0.013)*
Excited Impulsivity	-0.115 (0.014)***	-0.065 (0.013)***
Sensation Seeking	0.015 (0.015)	0.007 (0.013)
<i>Internalizing</i>		
Anxious Inhibition	0.016 (0.015)	0.010 (0.013)
Emotional Problems	-0.035 (0.015)*	-0.020 (0.013)
Negative Feelings	-0.046 (0.016)*	-0.022 (0.013)
Sleep Problems	-0.053 (0.015)***	-0.016 (0.013)
<i>Neurodevelopmental</i>		
Autistic Traits	-0.039 (0.014)*	-0.011 (0.013)
<i>Positive</i>		
Extraversion	0.069 (0.015)***	0.028 (0.013)*
Positive Feelings	0.103 (0.014)***	0.055 (0.013)***
Reward Responsiveness	-0.059 (0.014)***	-0.044 (0.013)***
Self-Regulation	0.166 (0.015)***	0.094 (0.013)***
<i>Psychopathology</i>		
Manic Moods	-0.101 (0.013)***	-0.073 (0.013)***
Manic Traits	-0.069 (0.012)***	-0.039 (0.013)***
Psychosis Risk	-0.126 (0.013)***	-0.075 (0.013)***

*** $p < .05/20$ (Bonferroni; i.e., $p < .0025$), * $p < .05$ (two-sided).

Supplementary Table S19: UKB disease prediction (SNIPAR): population and within-family direct effects.

Disease	Cases / Ctrl	Primary		Savage-LDpred2	
		Pop β (SE)	Dir δ (SE)	Pop β (SE)	Dir δ (SE)
<i>Cardiometabolic</i>					
Coronary Artery Dis.	2,623 / 33,242	-0.062 (0.011)***	-0.040 (0.020)*	-0.041 (0.011)***	-0.026 (0.020)
Gout	1,101 / 34,707	-0.036 (0.015)*	-0.017 (0.027)	-0.027 (0.015)	-0.008 (0.027)
Hypertension	14,354 / 21,511	-0.096 (0.007)***	-0.069 (0.013)***	-0.072 (0.007)***	-0.041 (0.013)**
Type 2 Diabetes	2,903 / 32,962	-0.077 (0.011)***	-0.050 (0.019)**	-0.059 (0.010)***	-0.031 (0.019)
Venous Thrombo.	1,942 / 33,923	-0.052 (0.011)***	-0.063 (0.021)**	-0.039 (0.011)***	-0.041 (0.021)*
<i>Immune/Inflammatory</i>					
Asthma	5,089 / 29,307	-0.040 (0.009)***	-0.030 (0.016)	-0.029 (0.009)**	-0.014 (0.016)
Inflamm. Bowel Dis.	631 / 35,234	-0.011 (0.016)	-0.043 (0.031)	0.010 (0.016)	0.003 (0.030)
Multiple Sclerosis	206 / 35,659	0.013 (0.025)	-0.062 (0.047)	0.004 (0.025)	-0.046 (0.046)
Psoriasis	780 / 35,085	-0.018 (0.016)	-0.047 (0.029)	-0.012 (0.016)	-0.017 (0.028)
Vitiligo	38 / 35,827	-0.015 (0.049)	-0.073 (0.093)	-0.023 (0.049)	-0.131 (0.091)
<i>Cancer</i>					
Basal Cell Carcinoma	2,301 / 33,564	0.002 (0.011)	0.017 (0.020)	-0.015 (0.011)	-0.006 (0.020)
Breast Cancer	1,726 / 18,955	-0.004 (0.013)	-0.023 (0.024)	-0.001 (0.013)	-0.031 (0.023)
Colorectal Cancer	794 / 35,071	0.001 (0.015)	-0.024 (0.029)	0.006 (0.015)	0.018 (0.028)
Melanoma	348 / 35,517	0.035 (0.020)	0.021 (0.038)	0.075 (0.020)***	0.081 (0.037)*
Prostate Cancer	1,141 / 14,043	0.025 (0.016)	-0.011 (0.030)	0.031 (0.016)*	0.010 (0.030)
Testicular Cancer	60 / 15,124	-0.008 (0.044)	-0.026 (0.082)	0.003 (0.044)	-0.018 (0.080)
<i>Other</i>					
Alzheimer's	461 / 35,404	-0.019 (0.020)	0.036 (0.038)	0.001 (0.020)	0.057 (0.037)
Glaucoma	1,222 / 32,933	-0.004 (0.014)	0.009 (0.026)	-0.007 (0.014)	-0.006 (0.025)
Osteoporosis	2,079 / 33,786	-0.027 (0.012)*	-0.033 (0.022)	-0.015 (0.012)	-0.003 (0.021)

Nominal significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Supplementary Table S20: ABCD measurement model comparison (Savage-LDpred2): one-factor, second-order, and bifactor models.

Model	δ_{gSEM}	β_{gSEM}	CFI	TLI	RMSEA	SRMR
One factor g	0.255 (0.047)	0.344 (0.035)	0.856	0.834	0.055	0.039
Second order g	0.298 (0.055)	0.393 (0.047)	0.956	0.948	0.031	0.028
Bifactor $g +$ domains	0.293 (0.054)	0.389 (0.040)	0.982	0.978	0.020	0.021

Supplementary Table S21: Measurement invariance across Savage-LDpred2 strata

Cohort	Level	CFI	RMSEA	ΔCFI (vs. config.)	Conclusion
UKB (deciles)	Configural	0.927	0.038	—	Acceptable fit
	Metric	0.923	0.034	-0.003	Holds ($ \Delta CFI < 0.01$)
ABCD (quintiles)	Configural	0.923	0.057	—	Acceptable fit
	Metric	0.923	0.051	0.000	Holds ($ \Delta CFI < 0.01$)

Notes: Configural and metric invariance are evaluated across PGS strata (UKB deciles; ABCD quintiles). "Holds" indicates $|\Delta CFI| < 0.01$.

Supplementary Table S22: **Differential item functioning (DIF) using multiple indicator multiple cause (MIMIC) in UKB (Savage-LDpred2)**

Cognitive task	Est.	SE	p_{BH}
Fluid intelligence/VNR	0.050	0.020	0.081
Trail making	0.071	0.031	0.081
Symbol digit substitution	-0.055	0.027	0.115
Puzzles solved	-0.039	0.026	0.272
Vocabulary	0.029	0.025	0.390
Puzzles correct	-0.028	0.034	0.532
Paired associates	0.014	0.026	0.697
Digit span	-0.004	0.022	0.866

Supplementary Table S23: **Differential item functioning (DIF) using multiple indicator multiple cause (MIMIC) in ABCD (Savage-LDpred2)**

Cognitive task	Est.	SE	p_{BH}
Oral reading	0.099	0.041	0.140
Card sorting	-0.090	0.041	0.140
List sorting	-0.075	0.048	0.381
Flanker	0.056	0.041	0.409
Little man	0.048	0.048	0.630
Picture sequence memory	-0.029	0.044	0.765
Matrix reasoning	0.028	0.045	0.765
Picture vocabulary	-0.004	0.040	0.985
Pattern comparison	-0.011	0.041	0.985
Rey	0.001	0.044	0.985