

Supplementary Figures

Genetic and epigenetic correlates of co-occurring behavioral problems in early childhood

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Fig. S1. Levels of internalizing problems and aggression per profile at age three years.

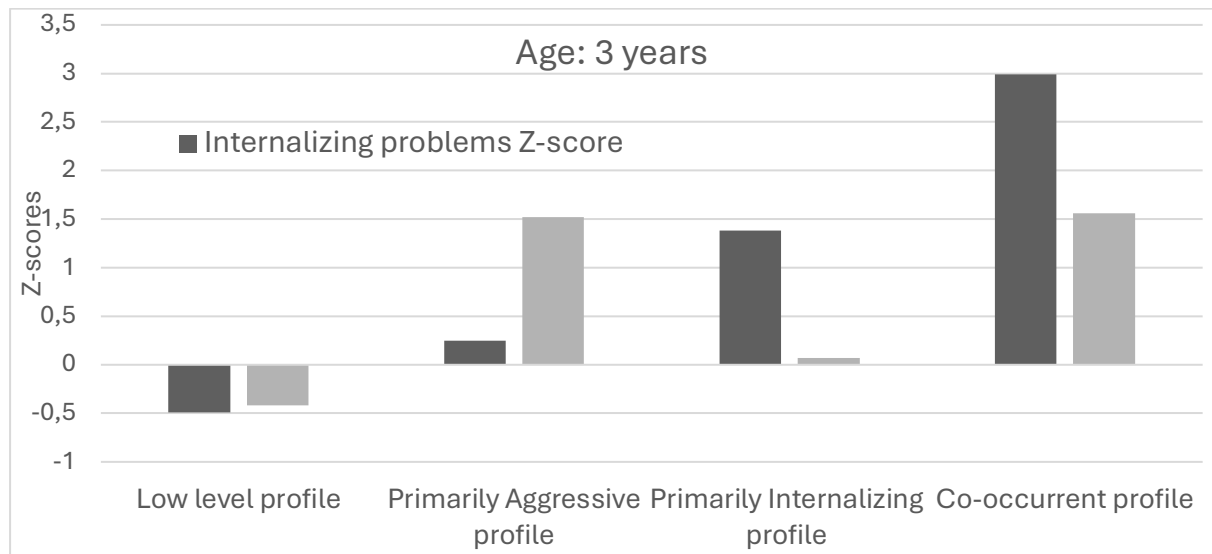


Fig. S2. Levels of internalizing problems and aggression per profile at age five years.

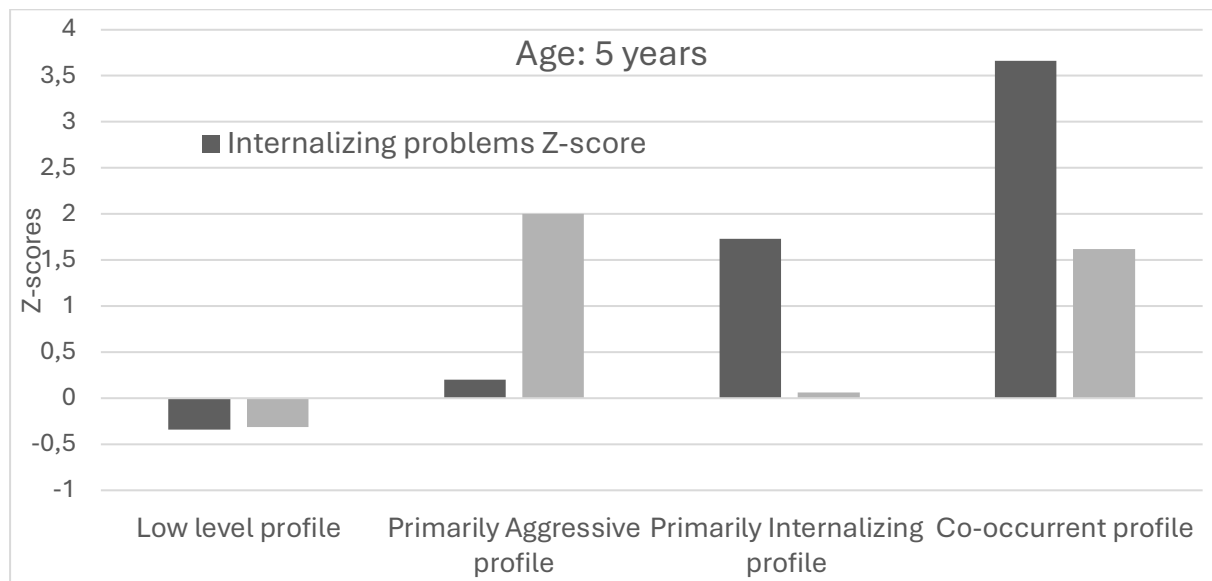
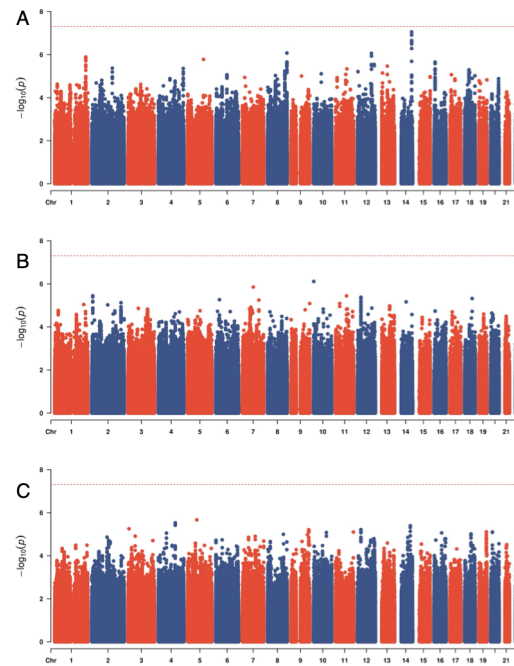


Fig. S3. The numbers of children in each behavioral group analyzed in different data modality.

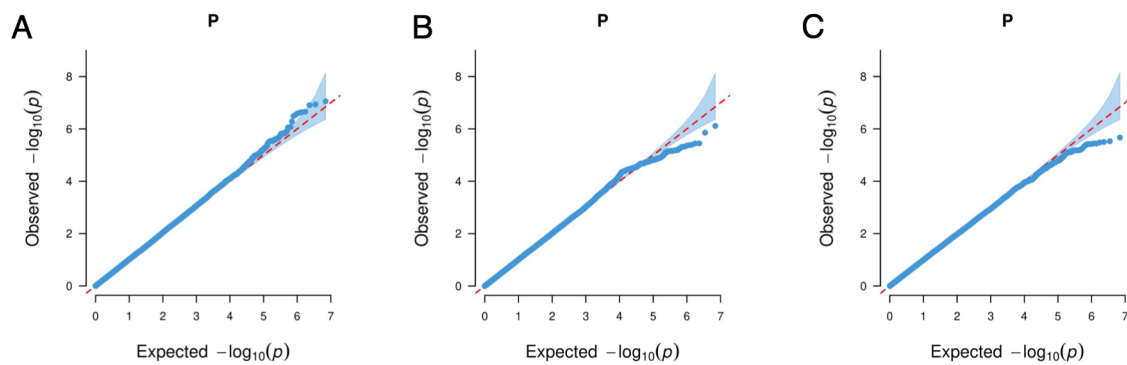
	3 years	5 years	
Norm	29,793	23,999	Behavior
Internal	6,712	3,080	
Aggression	6,558	2,840	
Cooccur	1,172	621	
Norm	27,165	21,956	GWAS
Internal	6,018	2,720	
Aggression	5,959	2,546	
Cooccur	1,007	543	
Norm	3,163	1,960	EWAS
Internal	749	297	
Aggression	795	242	
Cooccur	147	56	

Fig. S4. The Manhattan plots for GWAS of child behavioral problems measure at age three years.



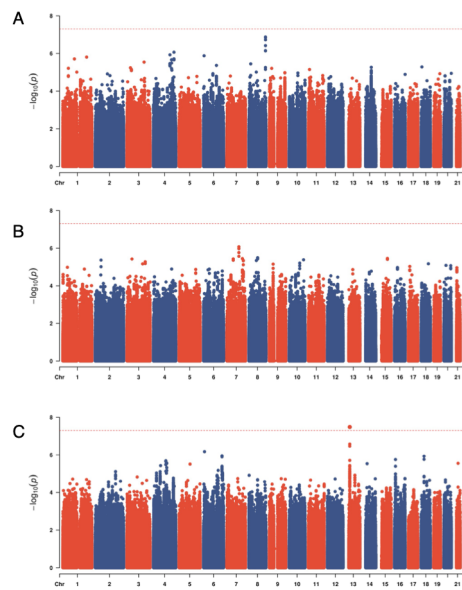
A. Aggression vs. normal behavior; B. Internalizing vs. normal behavior; C. Co-occurring vs. normal behavior. In each panel, association $-\log_{10} p$ values are shown on the y axes and genomic positions on the x axes; genome-wide significant threshold, 5×10^{-8} is draw by dotted horizontal line.

Fig. S5. The QQ plots for GWAS of child behavioural problems measure at age three years.



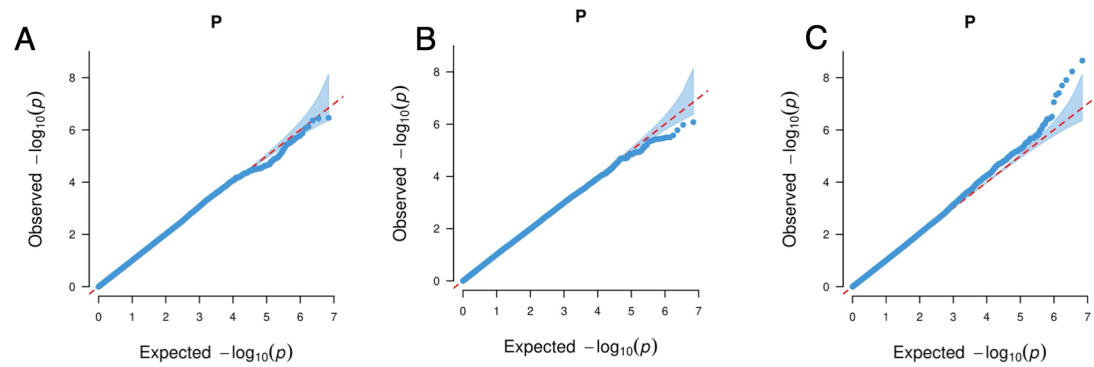
A. Aggression vs. normal behavior; B. Internalizing vs. normal behavior; C. Co-occurring vs. normal behavior. In each panel, observed and expected $-\log_{10} p$ values are shown on the y and x axes, respectively; the theoretical lines are indicated by dashed lines.

Fig. S6. The Manhattan plots for GWAS of child behavioral problems measure at age five years.



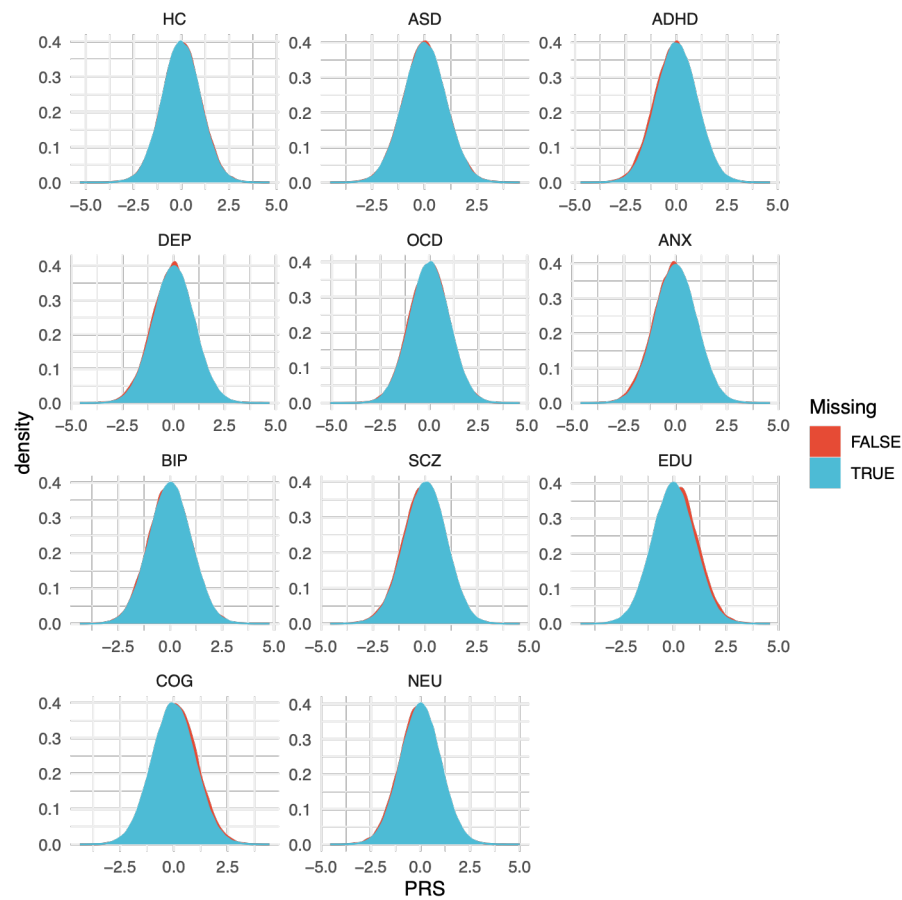
A. Aggression vs. normal behavior; B. Internalizing vs. normal behavior; C. Co-occurring vs. normal behavior. In each panel, association $-\log_{10} p$ values are shown on the y axes and genomic positions on the x axes; genome-wide significant threshold, 5×10^{-8} is drawn by dotted horizontal line.

Fig. S7. The QQ plots for GWAS of child behavioural problems measure at age five years.



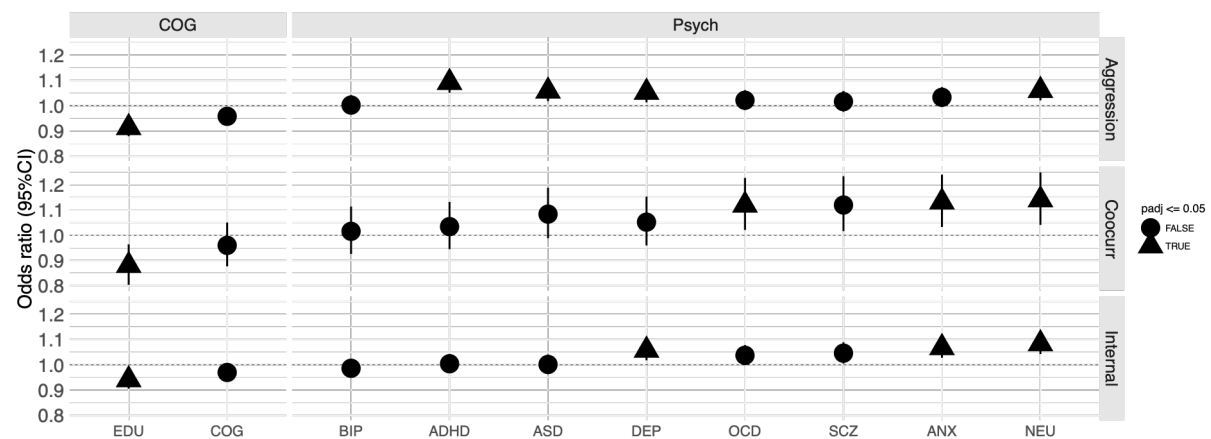
A. Aggression vs. normal behavior; B. Internalizing vs. normal behavior; C. Co-occurring vs. normal behavior. In each panel, observed and expected $-\log_{10} p$ values are shown on the y and x axes, respectively; the theoretical lines are indicated by dashed lines.

Fig. S8. Distribution of PGS for psychiatric, behavioral and socioeconomic traits for MoBa participants analyzed versus not (missing) at ages three or five.



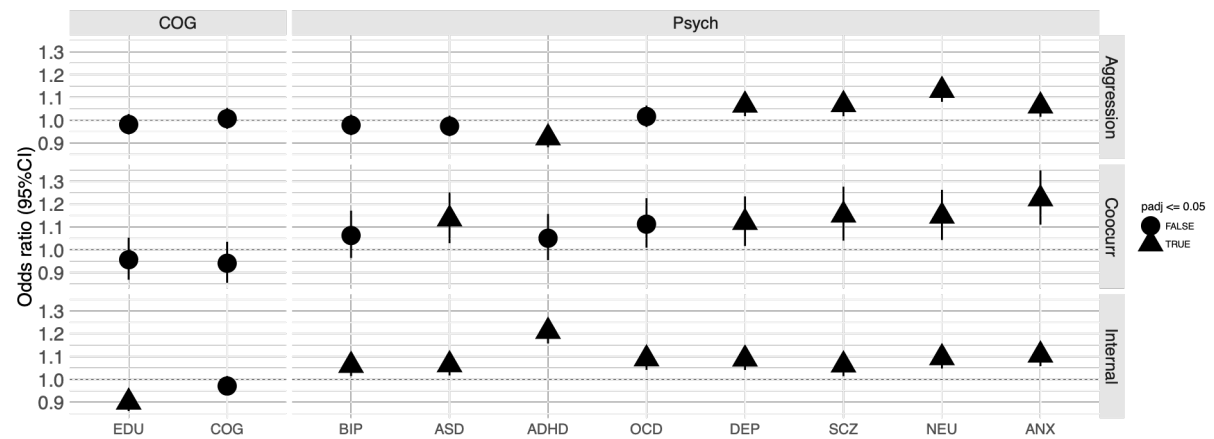
Schizophrenia (SCZ), bipolar disorder (BIP), depression (DEP), autism spectral disorder (ASD), attention deficit /hyperactivity disorder (ADHD), post-traumatic stress disorder (PTSD), general anxiety (ANX), intelligence (COG), education attainments (EDU), neuroticism (NEU), Obsessive Compulsive disorder (OCD), and hair color (HC).

Fig. S9. The effects of PGS for psychiatric, behavioral and socioeconomic traits on child behavioral problems at age three years.



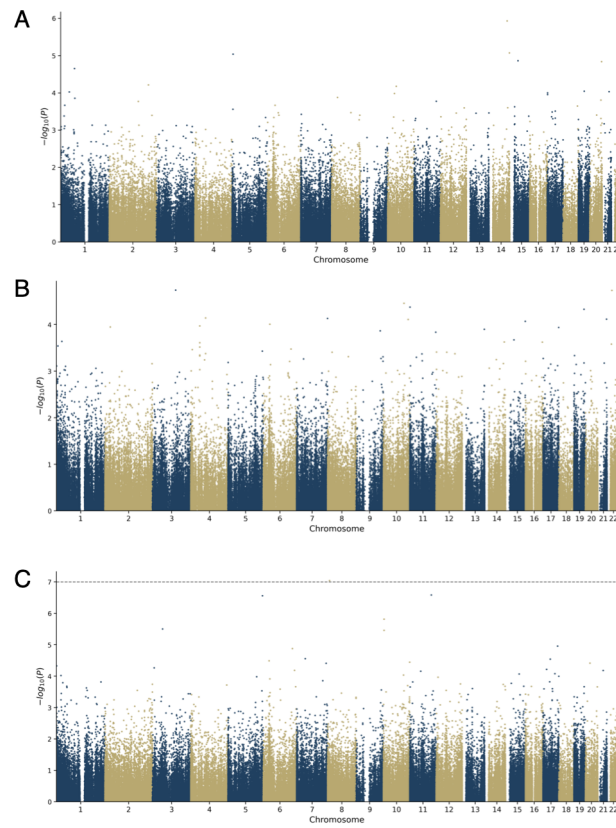
Schizophrenia (SCZ), bipolar disorder (BIP), depression (DEP), autism spectral disorder (ASD), attention deficit /hyperactivity disorder (ADHD), general anxiety (ANX), general intelligence (COG), education attainments (EDU), neuroticism (NEU), obsessive compulsive disorder (OCD). Statistically significant effects ($FDR < 0.05$) are shown by triangle; 95% confidence interval are also shown.

Fig. S10. The effects of PGS for psychiatric, behavioral and socioeconomic traits on child behavioral problems at age five years.



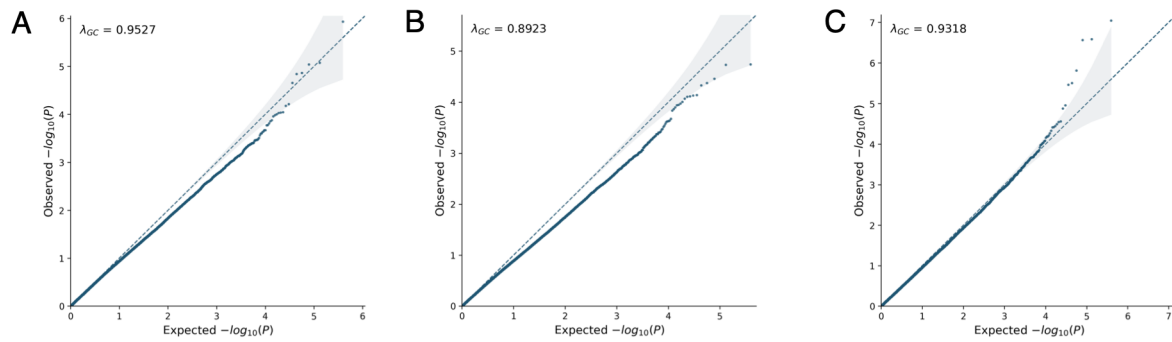
Schizophrenia (SCZ), bipolar disorder (BIP), depression (DEP), autism spectral disorder (ASD), attention deficit /hyperactivity disorder (ADHD), general anxiety (ANX), general intelligence (COG), education attainments (EDU), neuroticism (NEU), obsessive compulsive disorder (OCD). Statistically significant effects (FDR<0.05) are shown by triangle; 95% confidence interval are also shown.

Fig. S11. The Manhattan plots for EWAS of child behavioral problems measure at age three years.



A. Aggression vs. normal behavior; B. Internalizing vs. normal behavior; C. Co-occurring vs. normal behavior. In each panel, association $-\log_{10} p$ values are shown on the y axes and genomic positions on the x axes; genome-wide significant threshold, 5×10^{-8} is draw by dotted horizontal line.

Fig. S12. The QQ plots for GWAS of child behavioural problems measure at age three years.



A. Aggression vs. normal behavior; B. Internalizing vs. normal behavior; C. Co-occurring vs. normal behavior. In each panel, observed and expected $-\log_{10} p$ values are shown on the y and x axes, respectively; the theoretical lines are indicated by dashed lines.

Fig. S13. The volcano plots for EWAS of child behavioral problems measure at age three years.

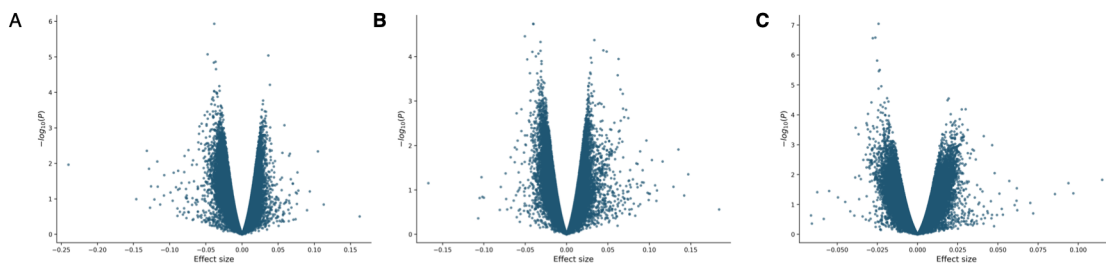
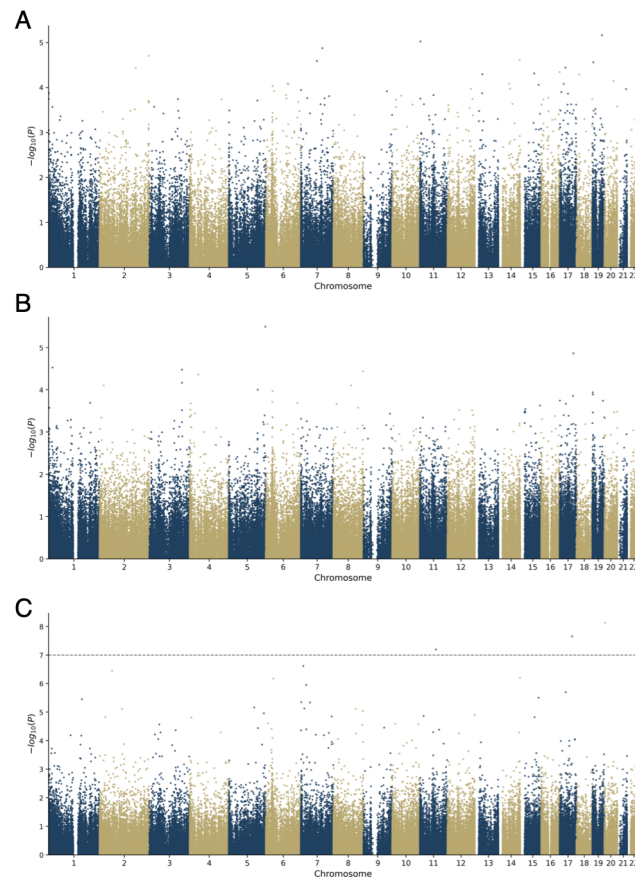
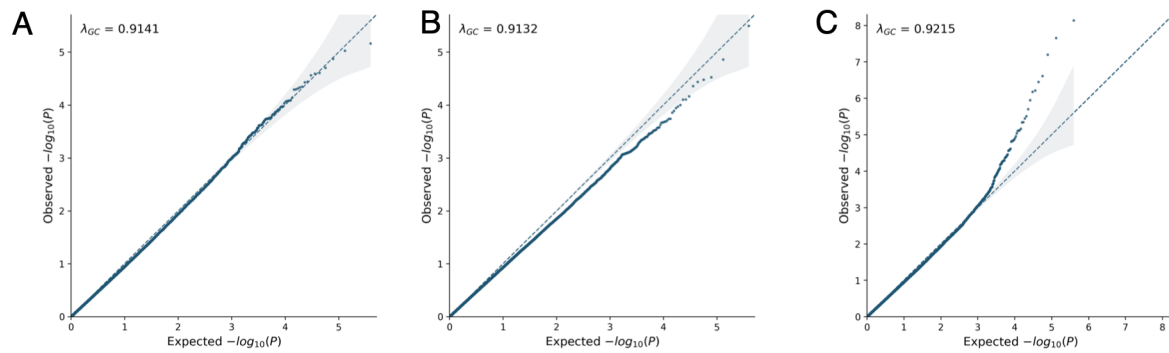


Fig. S14. The Manhattan plots for EWAS of child behavioral problems measure at age five years.



A. Aggression vs. normal behavior; B. Internalizing vs. normal behavior; C. Co-occurring vs. normal behavior. In each panel, association $-\log_{10} p$ values are shown on the y axes and genomic positions on the x axes; genome-wide significant threshold, 5×10^{-8} is draw by dotted horizontal line.

Fig. S15. The QQ plots for GWAS of child behavioral problems measure at age five years.



A. Aggression vs. normal behavior; B. Internalizing vs. normal behavior; C. Co-occurring vs. normal behavior. In each panel, observed and expected $-\log_{10} p$ values are shown on the y and x axes, respectively; the theoretical lines are indicated by dashed lines.

Fig. S16. The volcano plots for EWAS of child behavioral problems measure at age five years.

