

## Description of Additional Supplementary Files

File Name: Supplementary Data 1

Description: Meta-data and results PGS library. Information on the 937 GWAS summary statistics with LDpred2-auto PGS that were the input to the multiPGS models. GWAS\_trait: reported outcome of GWAS, id: unique identifier of GWAS, GWAS\_pubmedID: PubMed ID of GWAS, source: file downloaded from this resource, M\_or: original number of variants in GWAS summary statistics file, M\_m: number of variants that matches the iPSYCH HM3 subset, M\_ldpred: number of variants that matches the LDpred2 provided LD reference for European ancestry and passes QC (described in Supplementary Text), k: number of Gibbs sampler chains that passes the LDpred2 recommended filter (out of 30), h2\_est: LDpred2-auto estimated SNP-heritability parameter, p\_est: LDpred2-auto estimated proportion of causal variants parameter.

File Name: Supplementary Data 2

Description: Summary of main iPSYCH outcomes and compared PGS. Information on the 6 psychiatric disorders: attention-deficit/hyperactivity disorder (ADHD), affective disorder (AFF), anorexia nervosa (AN), autism spectrum disorder (ASD), bipolar disorder (BD) and schizophrenia (SCZ) in the main analysis. Tag: outcome label, p: ICD10 category, cv: 5-fold cross-validation subset, prev\_pop: population prevalence used for liability-scale transformation, prev\_gwas: individual-level data case-control ratio used for liability-scale transformation, n\_cases\_train: number of cases in training subset, n\_control\_train, number of controls in training subset, n\_cases\_test: number of cases in testing subset, n\_control\_test: number of controls in testing subset, comp: label for the GWAS summary statistics used to compute the PGS to compare against, GWAS\_trait, compared outcome, GWAS\_pubmedID: PubMed ID of GWAS, id: unique identifier of GWAS for meta-data PGS library, n\_cases\_GWAS: number of cases in GWAS, n\_control\_GWAS: number of controls in GWAS.

File Name: Supplementary Data 3

Description: List of all phenotypes and ICD10 codes. First cross-validation subset information for all used phenotypes and ICD10 codes in the analyses, including information on the sample overlap with the iPSYCH cohort and the main diagnosis. p: ICD10 category, diagnosis: description of the ICD10 category, cases: number of cases in first cross-validation subset, scz, adhd, asd, aff, bip, cohort: proportion of cases that overlap with the different groups.

File Name: Supplementary Data 4

Description: Information on the 15 traits selected for Figure 5. For ADHD/ASD, ASD was coded as 0 (controls) and ADHD was coded as 1 (cases). For BD/MDD, MDD was coded as 0 (controls) and BD was coded as 1 (cases). Tag: outcome label, p: ICD10 category, cv: 5-fold cross-validation subset, n\_cases\_train: number of cases in training subset, n\_control\_train, number of controls in training subset, n\_cases\_test: number of cases in testing subset, n\_control\_test: number of controls in testing subset, phen\_comp: phenotype ID from the top-weighted lasso PGS in the model, GWAS\_trait: label for the phen\_comp phenotype ID, PubMed ID: PubMed ID of GWAS, N\_GWAS: sample size for continuous phenotypes, n\_cases\_GWAS: number of cases in GWAS, n\_control\_GWAS: number of

controls in GWAS, `prev_gwas`: individual-level data case-control ratio used for liability-scale transformation.