**Combined ADHD and ASD GWAS meta-analysis results (Europeans only), April 2022 Release (iPSYCH+PGC data)**

The file “adhdORasdWOid50\_filtered\_clean.gz” contains results from the combined GWAS meta-analysis of attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD).

**Citation for studies using these data:**

Manuel Mattheisen, Jakob Grove, Thomas D Als, Joanna Martin, Georgios Voloudakis, Sandra Meier, Ditte Demontis, Jaroslav Bendl, Raymond Walters, Caitlin E Carey, Anders Rosengren, Nora I Strom, Mads Engel Hauberg, Biao Zeng, Gabriel Hoffman, Wen Zhang, Jonas Bybjerg-Grauholm, Marie Bækvad-Hansen, Esben Agerbo, Bru Cormand, Merete Nordentoft, Thomas Werge, Ole Mors, David M Hougaard, Joseph D Buxbaum, Stephen V Faraone, Barbara Franke, Søren Dalsgaard, Preben B Mortensen, Elise B Robinson, Panos Roussos, Benjamin M Neale, Mark J Daly, Anders D Børglum ***Identification of shared and differentiating genetic risk for autism spectrum disorder, attention deficit hyperactivity disorder and case subgroups.*** <https://doi.org/10.1101/2021.05.20.21257484>

**Disclaimer**

These data are provided "as is", and without warranty, for scientific and educational use only. If you download these data, you acknowledge that these data will be used only for non-commercial research purposes; that the investigator is in compliance with all applicable state, local, and federal laws or regulations and institutional policies regarding human subjects and genetics research; that secondary distribution of the data without registration by secondary parties is prohibited; and that the investigator will cite the publication in any communications or publications arising directly or indirectly from these data.

**Methods**

See the article for full details. Briefly:

Details about study specific case and control selection criteria and how individuals were drawn from the overall iPSYCH case-cohort sample can be found in the respective publications (see below). Here we focus on differences in selection criteria in the iPSYCH cohort and additional quality control (QC) procedures.

The majority of inclusion and exclusion criteria for the original studies were also used in this study. The only difference compared to the original studies was an additional exclusion criterion that removed individuals with a moderate to severe mental retardation (ICD10: F71-F79) from both the case and control cohorts. While this criterion was also used in the original ADHD GWAS (https://www.nature.com/articles/s41588-018-0269-7), it was not used in the original ASD GWAS (https://www.nature.com/articles/s41588-019-0344-8). The rationale for this decision lies in the interpretability of our results where we treated ADHD and ASD consistently.

Wave-wise pre-imputation QC and imputation of the iPSYCH case-cohort sample were taken from the original ADHD and ASD GWAS, respectively. Details about the respective steps and filters can be found in the original GWAS publications (see above). Since our analyses used a combined study cohort with samples from both the original ADHD and ASD GWAS, we performed some additional QC on the combined sample. Additional QC steps included the removal of related individuals across the original ADHD and ASD GWAS and a new principal component analysis (PCA) on the combined sample after exclusion of these related individuals. Following the same procedures as in the original studies, pairs of subjects were identified with pi-hat> 0.2 (using PLINK’s identity-by-state analysis) and one subject of each pair was excluded at random (with a preference for keeping cases). PCA was carried out using smartPCA in the EIGENSOFT software package using the Ricopili pipeline. The original PGC datasets for ADHD and ASD did not include overlapping individuals and therefore the original datasets and summary statistics were used. The final combined dataset across all samples comprised 34,462 cases (i.e., individuals with an ADHD and/or ASD diagnosis) and 41,201 controls. We only included samples of European ancestry from the original ADHD and ASD GWAS. Among the cases in the iPSYCH cohort 11,964 had an ADHD-only, 9,315 had an ASD-only, and 2,304 individuals had a comorbid diagnosis, respectively. Thus, the proportion of ADHD among ASD cases in the iPSYCH cohort was 19.8%, and the proportion of ASD among ADHD cases was 16.1%.

**File Description**

**adhdORasdWOid50\_filtered\_clean.gz**: GWAS meta-analysis of ADHD+ASD (34,462 CUD cases and 41,201 controls)

MD5 checksum (adhdORasdWOid50\_filtered\_clean.gz) = 9184c923d83beae21976bde60fb4e3dc

**CHR** Chromosome (hg19)  
**SNP** Marker name  
**BP** Base pair location (hg19)  
**A1** Reference allele for OR (may or may not be minor allele)

**A2** Alternative allele

**FRQ** A1 allele frequency in controls (‘<’ = f < 0.4 ; ’<>’ = 0.4 < f < 0.6; ‘>’ = f > 0.6)

**INFO** Imputation information score  
**OR** Odds ratio for the effect of the A1 allele  
**SE** Standard error of the log(OR)  
**P** P-value for association test in the meta-analysis

**Neff** Half effective sample size per SNP (cases and controls)

**Additional Notes**

For long insertion/deletion variants, the A1/A2 alleles are truncated to the first 13 bases with a specification of the remaining length (e.g. AACACACACACAC+16)

The reported imputation INFO score is a weighted average across the cohorts contributing to meta-analysis for that variant

Allele frequencies and case/control counts per variant are currently omitted from public release for data privacy. For inquiries about accessing this data, please contact Manuel Mattheisen ([manuel.mattheisen@gmail.com](mailto:manuel.mattheisen@gmail.com)) or Anders Børglum ([anders@biomed.au.dk](mailto:anders@biomed.au.dk)).

**Data Use Agreement**

If you download these data, you and your immediate collaborators (“investigators”) acknowledge and agree to all of the following conditions:

1. These data are provided on an "AS-IS" basis, without warranty of any type, expressed or implied, including but not limited to any warranty as to their performance, merchantability, or fitness for any particular purpose;
2. Investigators will use these results for scientific research and educational use only.
3. The downloaded results can be shared among collaborators but the reposting or public distribution of the result file is prohibited;
4. Investigators certify that they are in compliance with all applicable local, state, and federal laws or regulations and institutional policies regarding human subjects and genetics research;
5. Investigators will cite the appropriate publication in any communications or publications arising directly or indirectly from these data; and
6. Investigators will never attempt to identify any participant.

Experience has taught us that the appropriate use of these data requires considerable attention to detail, prior experience, and technical skill. Errors are easy to make. If investigators use these data, any and all consequences are entirely their responsibility.