SUPPLEMENTARY INFORMATION

A Mega-Analytic Study of White Matter Microstructural Differences Across Five Cohorts of Youth with Attention-Deficit/Hyperactivity Disorder

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Supplementary Methods

Study protocols for included datasets

Adolescent Brain Cognitive Development (ABCD)

The Adolescent Brain Cognitive Development (ABCD) study is an ongoing multisite, longitudinal neuroimaging study following a cohort of N=~11,875 youths[1,2]. See a special issue of Developmental Cognitive Neuroscience (Volume 32, Pages 1-164, August 2018) for a full discussion of the study. The children were aged between 9 and 11 years old at the time of the baseline assessments. They were largely recruited via probability sampling of public and private elementary schools within the catchment areas of 21 research sites in the United States of America. Demographic data were monitored to ensure that the study met targets for sex, socioeconomic, ethnic, and racial diversity. Exclusion criteria for children included not being fluent in English or having a parent not fluent in English or Spanish, major medical or neurological conditions, gestational age <28 weeks or birthweight <1200 g, contraindications to MRI scanning, a history of traumatic brain injury, a current diagnosis of schizophrenia, moderate/severe autism spectrum disorder, intellectual disability, or alcohol/substance use disorder.

Clinical and demographic data were taken from the ABCD-BIDS (NDA Collection 3165) participants.tsv file and ABCD release 3.0. Where possible, we used raw neuroimaging baseline data from the ABCD-BIDS study (NDA Collection 3165)[3]. However, for subjects without raw data at baseline in the collection we downloaded scans from the NDA Collection #2573 using the ABCD-BIDS protocol[3]. The raw data are available at https://nda.nih.gov/edit_collection.html?id=2573. We excluded scans recommended for

exclusion according to the ABCD quality control protocol (exclusion criteria: imgincl_dfmri_include=0)[1,2].

ADHD diagnoses were made according to a validated computerized parent-answered Kiddie Schedule of Affective Disorders and Schizophrenia for DSM-5 (KSADS-COMP) [4]. This included current-ADHD (ksads_14_853_p = 1) and ADHD-NOS (ksads_14_856_p =1). The KSADS-COMP algorithm for past-ADHD results in an unfeasibly high prevalence rate of ADHD (lifetime-ADHD: 21.0%; past-ADHD only at ages 9-10: 12.1%) and others have shown that not incorporating this measure returns prevalence estimates more in line with established estimates (9.17% in ABCD sample, which is in line with estimates of around 9% by the CDC(54, 55). The electronic KSADS-COMP was not clinician administered and was parent-completed. We speculate that the parents did not reflect upon impairment or age-inappropriateness when considering past possible symptoms of inattention and hyperactivity/impulsivity. Many of these 'symptoms' may have been age-appropriate behaviors (e.g. fidgeting). This taps into the general problem of retrospective recall of ADHD symptoms, which can be problematic (though mainly studied in adults thinking about their childhood symptoms). We have more confidence in parental reports of current symptoms, as (a) these give prevalence estimates closer to established point prevalence rates; (b) normative patterns of development involve improvements in attention and behavioral regulation, such that residual difficulties in these domains are more easily identifiable as age-inappropriate by age 9 and (c) it is simply more likely that reporting on current rather than past mental states and behavior will be more accurate.

Psychosis symptoms were assessed using the following items (ksads_4_851_p, ksads_4_852_p, ksads_4_826_p, ksads_4_827_p, ksads_4_829_p, ksads_4_828_p, ksads_4_850_p, ksads_4_849_p). Bipolar affective disorder symptoms were assessed using the

following items (ksads_2_837_p, ksads_2_835_p, ksads_2_836_p, ksads_2_831_p, ksads_2_832_p, ksads_2_830_p, ksads_2_833_p, ksads_2_834_p, ksads_2_839_p, ksads_2_838_p). Lacking a full-scale IQ measure in ABCD, we assessed the exclusion criteria of IQ<70 when the WISC-V Matrix Reasoning total scale score <3 (approximately equivalent to an estimated IQ <70): pea_wiscv_tss <3.

Subjects were considered as controls in the categorical analysis if they did not meet criteria for ADHD on the KSADS-COMP, had CBCL-ADHD t-scores <65, and were under no medications (stimulants, anti-depressants, anti-psychotics, anti-convulsants, anxiolytics, or other ADHD medications) during the study.

All procedures were approved by a central Institutional Review Board (IRB) at the University of California, San Diego, and by individual site IRBs. Parents/guardians provided written informed consent and children assented before participation in the study. We have access to the genetic and phenotypic data from the NIMH data archive (NDA) Adolescent Brain Cognitive Development (ABCD) / Connectome Coordination Facility (CCF) permission group under a data use certification agreement.

Healthy Brain Network (HBN)

The HBN project aims to include 10,000 individuals in the age range of 5-21 years from the New York area[8]. We included data from 3 sites: Rutgers (RUBIC), Cornell (CBIC), and City University of New York (CUNY), as data from the 4th site (Staten Island) were only acquired in 1.5T scanners. The sample is enriched for emotional and behavioral problems, with ADHD diagnoses present in more than half of the subjects released to date (release 9.0). Exclusion criteria included serious neurological disorders, neurodegenerative disorders, acute

encephalopathy, hearing or visual impairment, lifetime substance abuse necessitating chemical replacement therapy/acute intoxication at time of study, recent diagnosis of a severe mental disorder or manic/psychotic episode within the last 6 months without ongoing treatment, in addition to the onset of suicidality/homicidality where there is no current, ongoing treatment. All participants > 18 years provided signed informed consent, while parents/legal guardians signed informed consent for participants < 18, in addition to minors giving a written assent. The Chesapeake Institutional Review Board approved the study (https://www.chesapeakeirb.com/). Brain imaging data for the Healthy Brain Network (HBN) study are publicly available. We accessed additional phenotypic data via a signed data use agreement with the Child Mind Institute.

ADHD diagnoses, including presentation subtypes, were determined via the Diagnosis_ClinicianConsensus spreadsheet. These diagnoses considered the outcomes of parent, child and (where available) teacher KSADS-COMP. For some early subjects in the study, a non-computerized version of the KSADS was completed. The team of licensed clinicians further considered data from all other study assessments and medical notes and formed "consensus diagnoses" based on these assessments, notes, the automated K-SADS diagnoses and their own clinical judgement. Where the fields from the Diagnosis_ClinicianConsensus spreadsheet were ambiguous as to whether the ADHD presentation was current or historic, we consulted the Diagnosis_KSADS spreadsheet. Medication status was based on the DailyMeds spreadsheet, and considered psychostimulant medication reported at any of four study visits (the study protocol was completed over four separate days for each subject).

We excluded subjects with IQ<70. Subjects with missing IQ data were excluded. To be included in the unaffected controls group, subjects had to be without "consensus" diagnoses of

ADHD. Control subjects also had to have CBCL-ADHD t scores <65, and not be taking any medication (see ABCD medication criteria above).

Human Connectome Project – Developmental (HCP-D)

The HCP-D is an accelerated longitudinal study of healthy brain development (age range 5-21 years old at baseline)[9,10]. Psychiatric diagnoses were made using the KSADS-COMP, although diagnostic data was unavailable at the time of analysis. We included data from the HCP-Development Lifespan 2.0 release which included N=652 children, adolescents and young adults. This is a multi-site study with sites in four locations (Boston, Los Angeles, Minneapolis, St. Louis). While the study allows subjects with psychiatric diagnoses if they have not been treated for a duration >12 months, subjects in the initial partial release were all classified as "healthy subjects". Exclusion criteria included the subject or subject's parent having insufficient English abilities to complete screening and consent procedures, premature birth (more than 3 weeks early), low birth weight (<5 lb), lifetime history of serious medical conditions, a history of head injuries, hospitalization for two or more days, receiving special services at school and MRI contraindications. We have access to the phenotypic data from the NIMH data archive (NDA) Adolescent Brain Cognitive Development (ABCD) / Connectome Coordination Facility (CCF) permission group under a data use certification agreement. Subjects provided written informed consent and assent, although parents of participants under 18 years provided written informed consent for their child's participation. All procedures were approved by a central Institutional Review Board administered at Washington University in St. Louis (IRB #201603135).

Neurobehavioral Clinical Research (NCR)

We also used data from our intramural cohort. The NCR study aims to map brain development in children with and without ADHD[11–14]. The study was approved by the IRB of the NIH. Parents or guardians of children gave written consent and children gave assent. The sample was enriched for ADHD symptoms by targeting the recruitment of children and adolescents with ADHD traits regardless of diagnostic status, in addition to the specific recruitment of children and adolescents with existing ADHD diagnoses (e.g., from local clinics and support groups)[12]. The NCR cohort also includes data from ongoing ADHD family studies[15,16]. ADHD diagnoses were based on the Parent Diagnostic Interview for Children and Adolescents (DICA-IV), conducted by two experienced clinicians (interrater reliabilities of $\kappa > 0.9$), and made according to DSM-IV-TR criteria[17]. A symptom was defined as present if it caused impairment or an adverse impact on functioning at school, home and/or with peers (with a range from 0 to a maximum of 9 symptoms in each category). Attention-deficit/hyperactivity disorder combined type was diagnosed when the subject had both six or more symptoms of inattention and six or more symptoms of hyperactivity/impulsivity. The inattentive or hyperactive/impulsive subtypes were diagnosed when symptom counts ≥6 were confined to one of these domains. ADHD-NOS was considered when subjects had 5 impairing symptoms in either domain, but less than six symptoms in both domains. Diagnoses of past-ADHD/ADHD in partial remission were assigned for subjects who met criteria for ADHD or ADHD-NOS at an earlier timepoint of the study but not at the time of their included scan. The unaffected subjects did not meet criteria for ADHD at the time of their scan or at any previous assessment. Main exclusion criteria included IQ<70, evidence of neurological disorders, and psychosis.

National Consortium on Alcohol and Neurodevelopment in Adolescence (NCANDA)

The NCANDA cohort is from an accelerated longitudinal study of roughly 830 youths and young adults, aged 12 to 21 years old[18–23]. There are five data collection sites, all in the United States of America: Duke University, University of Pittsburgh Medical Center, Oregon Health & Science University, University of California, San Diego, and SRI International. Half of the cohort was enriched for those at risk for heavy drinking, and the remaining half comprised a community sample that was reflective of local racial/ethnic distributions of the surrounding area with equal sex proportions in each age group. Exclusion criteria for children included not being fluent in English or having a parent not fluent in English or Spanish, major medical or neurological conditions, IQ<70, gestational age <30 weeks or low birth weight, contraindications to MRI scanning, a history of traumatic brain injury, prenatal alcohol/drug exposure, a current or persistent major Axis I psychiatric disorder that would interfere with valid completion of the protocol including psychosis, substance dependence, parental history of psychotic disorder, intellectual disability, or use of psychotropic medications.

ADHD was evaluated based on DSM-IV criteria via the Computerized Semi–Structured Assessment for the Genetics of Alcoholism (SSAGA) interview administered by trained research staff [24]. Where possible, we based diagnostic status on parent interviews [25,26], although in the absence of these (e.g. in older subjects) we considered interviews with the subjects themselves. The interview assessed the presence of current ADHD but unlike those using lifetime versions of the KSADS did not assess lifetime ADHD or ADHD-NOS. All subjects were free from psychostimulant medication. The institutional review board at each site approved the study. Adult participants consented to participating, and minors provided written assent along with consent from a parent/legal guardian. We used data from NCANDA_PUBLIC_4Y_REDCAP_V01 (https://dx.doi.org/10.7303/syn22216455),

NCANDA_RELEASE_BASE_DIFFUSION_IMAGES_V01 (https://dx.doi.org/10.7303/syn22216451) and NCANDA_RELEASE_BASE_STRUCTURAL_IMAGES_V01 (https://dx.doi.org/10.7303/syn11541569). We accessed the de-identified NCANDA dataset via data use agreement in place with the National Institute on Alcohol Abuse and Alcoholism (NIAAA) (http://www.ncanda.org/datasharing.php).

MRI Acquisition

ABCD

Imaging acquisition methods and assessments were harmonized as best as possible across all sites, although some specific parameters differed slightly between sites (https://abcdstudy.org/images/Protocol_Imaging_Sequences.pdf). Full details regarding imaging acquisition are available elsewhere and the details are only discussed in brief here[1,2]. 3D T1-weighted images acquired in 3 Tesla scanners were used for registration to a template (Matrix 256 x 256, 1x1x1m resolution, TI 1060ms, flip angle 8 degrees, without multiband acceleration), and DWI scans consisted in a multi-shell sequence with 103 volumes (Matrix 140 x 140, 81 slices, FOV 240 x 240, 100% FOV phase, 1.7 x 1.7 x 1.7mm resolution, multiband acceleration 3, and 96 diffusion directions). DWI runs with the reverse phase encoding direction were acquired for later use in susceptibility distortion correction.

Healthy Brain Network

For more information about the MRI parameters, see http://fcon_1000.projects.nitrc.org/indi/cmi_healthy_brain_network/MRI%20Protocol.html.

Where possible, we used the structural scans with prospective motion correction as has been recommended by HBN authors for studies of 'hyperkinetic' neurodevelopmental populations[27]. The same parameters were used across sites, although RUBIC used a Siemens 3T Tim Trio scanner, while CBIC used a Siemens 3T Prisma scanner, and Staten Island used a Siemens 1.5T Avanto scanner. DWI scans consisted in a multi-shell sequence with 129 volumes, and runs with the reverse phase encoding direction were acquired for later use in susceptibility distortion correction.

Human Connectome Project – Development

Full details and rationales are provided elsewhere[9,10]. Scanning at all sites was performed using a Siemens 3T Prisma scanner on a 64-channel head coil, using 52 head elements. A high-resolution, multi-echo magnetization-prepared rapid gradient echo T1w image was also acquired using prospective motion correction (TR=2,400ms, TE=2.18ms, flip angle= 8°, FOV = 256 × 240 × 167 mm, 0.8 mm isotropic voxels, 208 slices). DWI scans consisted in a multi-shell sequence with 199 volumes, and runs with the reverse phase encoding direction were acquired for later use in susceptibility distortion correction.

NCANDA

Imaging data was collected via 3T General Electric (GE) Discovery MR750 at 3 sites (University of California San Diego, SRI International, and Duke University) and via 3T Siemens TIM TRIO scanners at 2 sites (University of Pittsburgh and Oregon Health & Sciences University). DWI image parameters varied per scanner type: GE sites used a 2D Axial Spin Echo, Echo-Planar protocol with two b=0/1000 and 60 directions (Acquisition Time: 8m 24sec,

TR=10,000mm, TE=85mm, Thick=2.5mm, Number of Slices=64, FOV=24cm, xy_matrix=96×96, Phase = A/P, Partial k-space (48/64), Acceleration=2, Resolution=2.5×2.5×2.5mm, Fat Sat=on); Siemens sites used a 2D Axial Spin Echo, Echo-Planar protocol with two b=0/1000 and 60 directions (Acquisition Time: 8m 42sec, TR=8,000ms, TE=89ms, Thick=2.5mm, Number of Slices=64, FOV=24cm, xy_matrix=96×96, GRAPPA, Acceleration=2, Resolution=2.5×2.5×2.5mm). Regarding structural images, the GE sites used an Array Spatial Sensitivity Encoding Technique (ASSET) for parallel and accelerated imaging with an 8-channel head coil and acquired an Inversion Recovery-Spoiled Gradient Recalled (IR-SPGR) echo sequence (TR = 5.904 ms, TI = 400 ms, TE = 1.932 ms, flip angle = 11°, NEX = 1, matrix = 256 × 256, FOV = 24 cm, slice dimensions = 1.2 × 0.9375 × 0.9375 mm, slices=146). The Siemens sites used a 12-channel head coil and parallel imaging and temporal acceleration with iPAT and acquired an MPRAGE sequence (TR = 1900 ms, TI = 900 ms, TE = 2.92 ms, flip angle = 9°, NEX = 1, matrix = 256 × 256, FOV = 24 cm, slice dimensions = 1.2 × 0.9375 × 0.9375 mm, slice=160). DWI scans consisted in a single-shell sequence with 62 volumes, and although runs with the reverse phase encoding direction were acquired, they were not used for preprocessing in this analysis.

NCR

DWI scans consisted in a multi-shell sequence with 60 volumes, and no runs with the reverse phase encoding direction were acquired. Specifically, DWI data were acquired (3T HDx MRI system; GE Healthcare, Milwaukee, WI) with a single-shot dual spin echo echo-planar imaging sequence with the following parameters: echo time = 85 ms, repetition time = 18.5

seconds, field of view = 240 mm, 96 × 96 matrix, slice thickness = 2.5 mm, gap = 0 mm, and acceleration factor = 2. A custom set of diffusion directions and weightings were acquired for a total of 60 volumes: 6 volumes at b value = 0 s/mm^2, 12 volumes with evenly distributed directions at b value = 300 s/mm^2, and 42 volumes with evenly distributed directions at b value = 1100 s/mm^2. T1-weighted anatomical image [magnetization prepared rapid acquisition gradient recalled echo sequence (MP RAGE)] were also acquired for alignment to a common template: 124 axial slices, 1.3-mm slice thickness, field of view = 22 cm, 224 × 224 acquisition matrix.

Preprocessing of DTI

ABCD, HBN, NCANDA and NCR DWI images were processed using QSIprep (https://qsiprep.readthedocs.io/en/latest/, version 0.8.0)(56) . HCP-D data were processed with version 0.14.2 as HCP-D scans had complete multi-shell sequences in opposing phase encoding directions, allowing the corrected images from both phase encoding directions to be averaged, a step that was not possible in version 0.8.0. For scans that had reverse phase encoding direction data, susceptibility distortion correction was applied. Registration of the DWI scans was predominantly to T1-weighted structural images, and in a few instances to synthetic T1 images generated from T2 weighted scans using SynthSR (https://github.com/BBillot/SynthSR)(57). If neither T1 nor T2 was present, the scan was not processed.

For all datasets, when scans were acquired in separate runs the images were denoised before being combined. Preprocessing included Gibbs unringing, B1 Bias field correction, head motion and eddy current correction. DWI images were aligned to the T1 space, and then transformed to the MNI152NLin2009cAsym template. Tensors were fitted using FSL's dtifit, and warped to the IIT Human Brain Atlas version 5.0 using DTI-TK (http://dti-

tk.sourceforge.net/pmwiki/pmwiki.php)(58-60). Masks for each of the 42 tracts defined in the IIT atlas were then calculated using a threshold at the 5% of the maximum value of each fiber bundle file. Finally, each mask was applied to the skeletonized FA, AD, and RD maps of each individual subject, to calculate 42 values in each DTI map for each scan (i.e. 3 * 42 = 126 values per scan). Those 126 values for each individual, along with metadata about motion and registration quality, were carried over to the quality control steps. While the 42 values for FA were used in the main analysis, the results for AD and RD are also shown for completeness.

Voxelwise analysis

The mean FA skeleton map provided in the IIT atlas was down-sampled from 1mm to 1.5mm voxels in all 3 dimensions for computational reasons, resulting in 32,593 voxels in the mask. Since all subjects were already in the IIT atlas template space following the DTI-TK step of pre-processing, the mask was applied to the FA map of each scan. The analysis then proceeded very similarly to the tract analysis, but using 32,593 FA values for each individual, instead of 42. Note that given its exploratory nature, the voxelwise analysis was only done for FA maps, and not AD and RD.

After running the same linear mixed models for each voxel, we construct a brain image of p-values and t-statistic, akin to the tables shown throughout this supplemental material. The next step is to cluster voxels that were nominally significant at $p < .05$ based on their spatial proximity (nearest neighbor, NN1 in AFNI). Finally, we assessed the significance of each cluster by permuting the brain data but not the independent variable nor the covariates (i.e. shuffling without replacement the left side of model equation, but not the right side). The same linear

mixed models are run for these shuffled data, generating a single brain image of p-values and t-statistics where the relationships between brain data and the model are broken. After repeating this shuffling procedure 100 times, we can count how often a cluster as big as the cluster obtained with the original data appeared, and this way assign a clusterwise p-value to the result.

Quality control steps

We initially considered 9,853 scans that finished the full preprocessing pipeline, and originated from subjects age <=18, >=6, who had a t1_dice_distance < .1 (which indicates an acceptable registration of the DWI to the anatomical image). Those scans also contained no bad slices (as marked by eddy), and had all volumes acquired according to the default sequences for each study (i.e. no incomplete scans were used). We first removed individuals whose family identity suggested that they were scanned at multiple scan locations (within the same cohort), leaving 9829 individuals. We then removed those scanned in the HBN at 1.5T, and those from 'site22' in ABCD (meaning "unknown site"), leaving 9696 individuals. We also removed subjects with missing covariate data or who were missing both diagnostic information and CBCL scores, leaving N=8763. Next, we considered six in-scanner motion parameters: mean and maximum framewise displacement, maximum absolute values for translation and rotation, and the maxima of their derivatives. We employed two levels of data quality control. In the main analyses, we excluded all subjects who had a value in one or more motion parameter that lay in the top 10% of the distribution across all cohorts, leaving 6993 scans (or unique individuals). Among the 6993 scans, the maximum mean framewise displacement was 1.06, maximum framewise displacement = 4.63, maximum absolute translation =2.64, maximum absolute rotation = 0.048, maximum relative translation = 1.81, maximum relative rotation = 0.036. Of these 6993 individuals, 6933

had CBCL scale data available; and 5835 had enough data to make a diagnosis of ADHD (further details in the study protocols section). We finally removed as an outlier any tract values that lay outside the mean +- 3 SDs for that tract within each cohort. At this stage, the removal was of some tracts within individuals, not entire individual datasets. The exact number of unique individuals retained in each model is given in the results tables.

We also conducted analyses at a more stringent level of quality control removing those who had any motion parameter in the top 20%, leaving 5533 subjects (63.14% of subjects with processed DTI images and necessary covariate data). In this cohort, the maximum mean framewise displacement was 0.85, maximum framewise displacement = 3.16, maximum absolute translation =1.9, maximum absolute rotation = 0.033, maximum relative translation = 1.31, maximum relative rotation = 0.023.

Between 50 to 100 scans in each cohort were randomly selected to check for errors in the registration between the anatomical scan and DWI. Further registration to the template was also visually inspected for those scans. Given that no errors were observed in the registrations, we proceeded with confidence that the registration algorithms in qsiprep and DTI-TK were working satisfactorily.

Details on subjects included and excluded at each level of stringency are given in Supplementary Tables 1 & 2 below.

Supplementary Table 1. Comparison between subjects that were included and those that were excluded following the exclusion of subjects who fell in the worst 10% on any motion QC parameter. All subjects had DTI data that completed the preprocessing steps as well as complete covariate data.

	Included (N=6993)	**Excluded (N=1770)**	**Stat**	**p**
Age	10.62 (1.99)	10.02 (1.97)	t=14.8	p<0.0001
Sex	M=3627 (51.87%) F=3366 (48.13%)	M=1096 (61.92%) F=674 (38.08%)	z=-4.06	p<0.0001
Diagnosis	ADHD n=951 noADHD n=4884	ADHD n=637 noADHD n=780	z=-6.33	p<0.0001
IQ proxy	Z=0.05 (1)	Z=-0.09 (0.98)	t=4.91	p<0.0001
SES			z=2.6	p=0.009
<$50k per annum	1704 (24.37%)	458 (25.88%)		
$50-$100k	1977 (28.27%)	463 (26.16%)		
$100-$200k	2219 (31.73%)	460 (25.99%)		
>200k	1093 (15.63%)	389 (21.98%)		
Cohort			$\chi 2$=1157.17	p<0.0001
ABCD	5420 (77.51%)	863 (48.76%)		
HBN	564 (8.07%)	661 (37.34%)		
HCPD	292 (4.18%)	123 (6.95%)		
NCANDA	516 (7.38%)	27 (1.53%)		
NCR	201 (2.87%)	96 (5.42%)		

Abbreviations. ABCD, Adolescent Brain Cognitive Development; HBN, Healthy Brain Network; HCP-D, Human Connectome Project – Development; IQ, intelligence quotient; NCANDA, National Consortium on Alcohol and Neurodevelopment in Adolescence; NCR, Neurobehavioral Clinical Research.

Supplementary Table 2. Comparison between subjects that were included and those that were excluded following the exclusion of subjects who fell in the worst 20% on any motion QC parameter. All subjects had DTI data that completed preprocessing steps as well as complete covariate data.

	Included (N=5533)	**Excluded (N=3230)**	**Stat**	**p**
Age	10.71 (2.06)	10.14 (1.82)	t= 12.76	p<0.0001
Sex	M=2819 (50.95%) F=2714 (49.05%)	M=1902 (58.89%) F=1328 (41.11%)	z=-5.31	p<0.0001
Diagnosis	ADHD n=718 (15.31%) noADHD n= 3973 (84.69%)	ADHD n= 870 (33.97%) noADHD n= 1691 (66.03%)	z= 6.68	p<0.0001
IQ proxy	Z=0.06 (1)	Z=-0.05 (0.98)	t= 5.21	p<0.0001
SES			z= 2.12	p<0.0001
<$50k per annum	1315 (23.77%)	847 (26.22%)		
$50-$100k	1569 (28.36%)	871 (26.97%)		
$100-$200k	1788 (32.32%)	891 (27.59%)		
>200k	861 (15.56%)	621 (19.23%)		
Cohort			$\chi 2$=758.27	p<0.0001
ABCD	4278 (77.32%)	2005 (62.07%)		
HBN	425 (7.68%)	800 (24.77%)		
HCPD	175 (3.16%)	240 (7.43%)		
NCANDA	493 (8.91%)	50 (1.55%)		
NCR	162 (2.93%)	135 (4.18%)		

Abbreviations. ABCD, Adolescent Brain Cognitive Development; HBN, Healthy Brain Network; HCP-D, Human Connectome Project – Development; IQ, intelligence quotient; NCANDA, National Consortium on Alcohol and Neurodevelopment in Adolescence; NCR, Neurobehavioral Clinical Research.

Modeling approach

Main regression

Linear mixed models were used to determine associations between fractional anisotropy of tracts. The fixed terms were the CBCL empirical scales (raw scores) or ADHD diagnosis (Case or Control), age, age-squared, sex, 3 principal components for in-scanner motion terms, socio-economic status, and race-ethnicity. For socio-economic status we used the metric of annual household income as it was available in different forms across the cohorts. It was defined at the following levels (less than $50k per annum.; between $50-100k.; between $100-200k.; above $200k.). This was coded as a numeric variable using the upper bound of each range (taking a value of $250k for household income >$200k). The HBN cohort also coded for a household income between $100-150k, and had an upper limit of $150k (which was represented as $200k). Race-ethnicity was based on self-ascribed identity, and split into White, non-Hispanic; Black/African American, non-Hispanic; and 'other' (encompassing all other identities and missingness). The in-scanner motion terms were derived from a principal component analysis of the highly intercorrelated six measured in-scanner metrics and their squares (namely, mean and maximum framewise displacement, maximum absolute values for translation and rotation, and the maxima of their derivatives; and all squared terms). In deriving motion components we retained the three components with eigenvalues>1, that explained 85.4% of the variance- (Motion_PC1, Motion_PC2, Motion_PC3).

The cohorts included siblings. Specifically, N=6993 subjects were included from N=6127 nuclear families, with N=822 (13.41%) families including more than one family member, and N=1688 subjects included in the final sample along with at least one sibling. In the ABCD cohort, N=673 (14.23%) families had more than one-member (N=1364 siblings), while N=8

(1.43%) families from the HBN cohort had more than one member (N=16 siblings), N=40 families (27.97%) from the NCR cohort had more than one member (N=99 siblings), N=71 (16.17%) had more than one member from the NCANDA study (N=148 siblings) andN=30 families (11.4%) from the HCP-D study (N=61 siblings). For the ABCD study, these families included N=150 monozygotic twin pairs, largely recruited as part of the twins sub-study.(61) Work by Heeringa and Berglund(62) showed that estimates and standard errors produced via linear mixed effects models that included a random intercept term for nuclear family ID (nested within a random term for study site) were highly similar to those produced for the general population sample, i.e. when excluding the special twin sample cases. We therefore follow their recommendations to include subjects from the twin sub-study in our present analyses, and to control for family relatedness using a random intercept term for nuclear family. Therefore, in our models nested random intercept terms were retained to account for cohort, the study sites within cohorts, and nuclear family.

The primary model was based on the following syntax in the nlme package (3.1-153):

For the CBCL model, the following syntax was used:

m1 <- nlme(tract_metric ~ CBCL_scale +Age + Age^2 + Sex + Socioeconomic_status+ Race/ethnicity+Motion_PC1+ Motion_PC2+ Motion_PC3, random=~(1|Cohort/Site/family_ID))

For case control contrasts:

m1 <- nlme(tract_metric ~ Diagnosis + Age + Age^2 + Sex + Socioeconomic_status+ Race/ethnicity+Motion_PC1 + Motion_PC2 + Motion_PC3, random=~(1|Study/Site/family_ID))

Effect sizes were estimated using the effectsize package in R (version 0.5). Specifically, effect sizes related to diagnostic models used the function t_to_d(), and effect sizes related to the CBCL scales used the function t_to_r().

Robustness checks

We re-ran the main models after adding an extra covariate for estimated intelligence. The covariate was calculated by z-scoring either measures of IQ or scaled matrix within cohort, depending on the metric that was available. We also tested whether results were robust when excluding the 486 individuals who were reported to have Bipolar Disorder or psychosis (483 in ABCD and 3 in HBN).

Nearest neighbor matching

For the case-control comparison, we performed 1 case to 2 controls nearest neighbor matching. Matching was performed according to Mahalanobis distance using the MatchIt::matchit function in R (version 4.3.2) [52]. This involved using the following syntax.

Matched_ADHD_sample <- matchit(Diagnosis ~ Motion_PC1 + Motion_PC2 + Motion_PC3 + Sex + Age + Age^2 + Socioeconomic_status+ Race/ethnicity + Site, method = "nearest", distance = "mahalanobis", caliper = c(motion_PC1 = .25, motion_PC2=.1, motion_PC3=.25), ratio=2).

Strict calipers were included for the motion PCs to remove any significant relationship between motion and the variables of interest ($p > 0.1$). Note that a consequence of this was the removal of

ADHD cases who could not be matched to available controls according to these criteria. A similar syntax was applied to the data frame for CBCL scales. First, the CBCL ADHD scale was binarized such that controls were individuals with t-score of 50, and everyone else were considered to be cases. Then, matching proceeded as follows:

Matched_CBCL_sample <- matchit(CBCL_ADHD_categ ~ Motion_PC1 + Motion_PC2 + Motion_PC3 + Sex + Age + Age^2 + Socioeconomic_status+ Race/ethnicity + Site, method = "nearest", distance = "mahalanobis", caliper = c(motion_PC1 = .25, motion_PC2=.25, motion_PC3=.25), ratio=2).

Note that the 2 to 1 matched sample had different weights for the observations, and we had to account for that in the linear mixed model.

Testing for Differences between Two Coefficients

We next tested for differences in the associations between white matter tracts and scores on the attention problems scales and associations involving scores on the remaining empirical CBCL scales. We first fit the following model syntax (scores on the aggression problems scale is used in the exemplar, but similar models were examined for all remaining empirical CBCL scales - the anxious-depressed, withdrawn-depressed, somatic complaints, social problems, thought problems, and rule-breaking behavior scales).

m1 <- nlme(tract_fractional_anisotropy ~ Attention_problems + Aggression_problems +Age + Age^2 + Sex + Socioeconomic_status+ Race/ethnicity+Motion_PC1+ Motion_PC2+ Motion_PC3, random=~(1|Cohort/Site/family_ID))

We then compared model parameters using the linearHypothesis function.

linearHypothesis(m1, " Attention_problems - Aggression_problems = 0")

Forest plot results

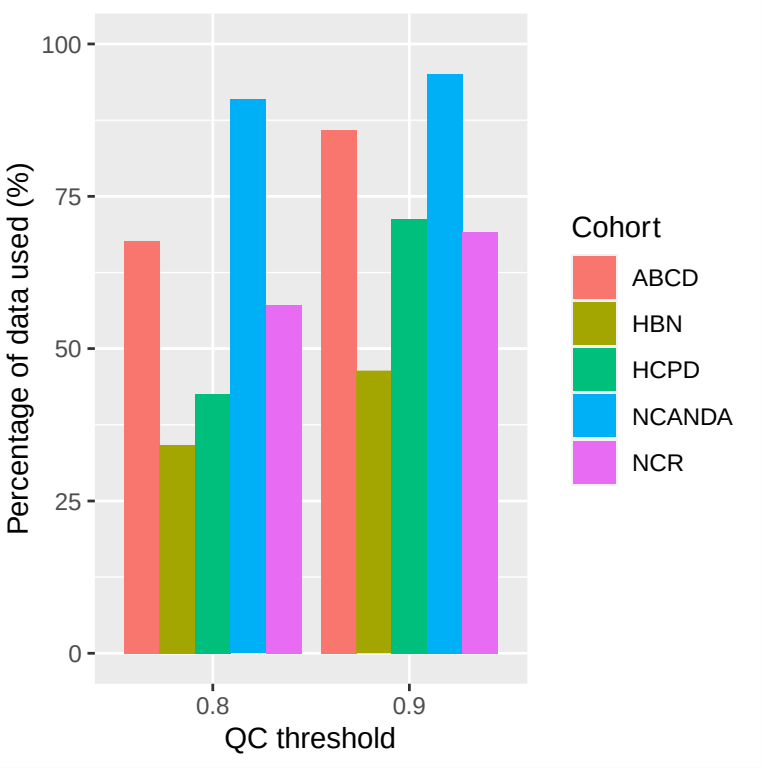
Forest Plots for the mega-analysis were derived from the models above. For individual site forest plots, NCANDA and HBN datasets did not have enough familial relatedness to fit a stable model with a random term for family ID, so only the site random term was used. The NCR cohort was collected at one site, so only the random term for family ID was included.

Contrasting "clinical" and "population" cohorts

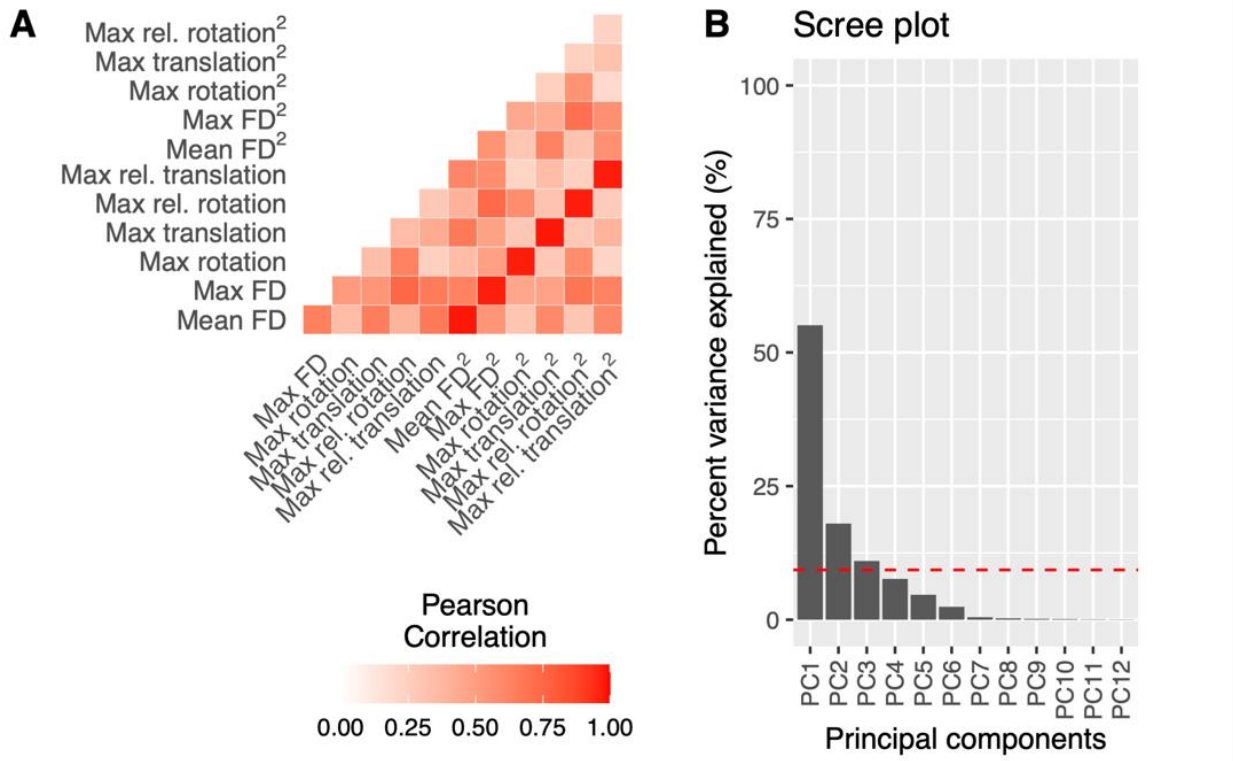
We contrasted the results from 'clinical' and 'population' cohorts. The clinical cohorts (NCR and HBN) were those in which a high proportion had a diagnosis of ADHD (>50%), and the diagnosis was made by clinicians based on both clinical interview and judgment. 'Population' cohorts had a sampling strategy that was more representative of the local communities, with prevalence rates of ADHD at rates of 10% or lower. The 'population' cohorts were ABCD (which had a sampling strategy that reflected local communities), HCP-D (composed of typically developing youth) and NCANDA (half of the cohort was representative of the local community, the other half enriched for risk for heavy alcohol, but not ADHD risk).

Interactions between attention problems or ADHD diagnosis and cohort type were formally tested using linear mixed models similar to the models used for the main analysis. The only difference was the addition of a term capturing cohort type, which was allowed to interact with either ADHD diagnosis or attention problems.

SUPPLEMENTARY RESULTS



Supplementary Figure 1. Percentage of data used from each cohort for the two different quality control levels.



Supplementary Figure 2. A) Correlation among movement variables; FD: framewise displacement. B) Scree plots showing the principal components for the movement variables.

Supplemental Table 3. Associations between attention problems as assessed using the CBCL and fractional anisotropy of the white matter tracts in the main analysis (10% QC threshold).

Tract names	B	SE	t	Uncorrected p value	FDR-p	N	Effect size (95% confidence interval)
Attention problems scale							
Anterior commissure	-0.0004	0.0002	-2.00	0.05	0.28	6926	-0.07 (-0.14 to -0.001)
Arcuate fasciculus (left)	-0.0002	0.00007	-3.05	0.002	0.07	6907	-0.11 (-0.17 to -0.04)
Arcuate fasciculus (right)	-0.0001	0.00007	-2.18	0.03	0.24	6906	-0.08 (-0.14 to -0.007)
Frontal aslant tract (left)	-0.0001	0.00006	-1.26	0.21	0.50	6893	-0.04 (-0.11 to 0.02)
Frontal aslant tract (right)	-0.0001	0.00006	-1.07	0.29	0.55	6899	-0.04 (-0.11 to 0.03)
Cingulum (left)	-0.0002	0.00008	-2.14	0.03	0.24	6907	-0.07 (-0.14 to -0.006)
Cingulum (right)	-0.0001	0.00007	-1.88	0.06	0.31	6907	-0.07 (-0.13 to 0.003)
Corpus callosum	-0.0001	0.00006	-1.72	0.08	0.35	6900	-0.06 (-0.13 to 0.008)
Forceps major	-0.0001	0.00007	-1.89	0.06	0.31	6888	-0.07 (-0.13 to 0.002)
Forceps minor	-0.0001	0.00008	-1.21	0.23	0.51	6895	-0.04 (-0.11 to 0.03)
Corpus callosum (mid)	-0.0001	0.00006	-0.84	0.40	0.66	6904	-0.03 (-0.01 to 0.034)
Corticospinal tract (left)	-0.0001	0.00006	-1.61	0.11	0.39	6901	-0.06 (-0.12 to 0.01)
Corticospinal tract (right)	-0.0001	0.00006	-1.33	0.18	0.48	6900	-0.05 (-0.11 to 0.02)
Fornix	-0.0001	0.00012	-1.19	0.23	0.51	6886	-0.04 (-0.11 to 0.03)
Frontopontine tract (left)	-0.0001	0.00006	-1.75	0.08	0.35	6909	-0.06 (-0.12 to 0.007)
Frontopontine tract (right)	-0.0001	0.00006	-1.48	0.14	0.42	6900	-0.05 (-0.12 to 0.02)
Inferior cerebellar peduncle (left)	-0.0001	0.00009	-0.38	0.71	0.86	6863	-0.01 (-0.08 to 0.06)
Inferior cerebellar peduncle (right)	-0.0001	0.00009	-0.59	0.56	0.80	6866	-0.02 (-0.09 to 0.05)
Inferior frontooccipital fasciculus (left)	-0.0002	0.00007	-2.89	0.004	0.09	6902	-0.1 (-0.17 to -0.03)
Inferior frontooccipital fasciculus (right)	-0.0002	0.00007	-2.19	0.03	0.24	6913	-0.08 (-0.14 to -0.008)
Inferior longitudinal fasciculus (left)	-0.0002	0.00007	-3.53	0.0004	<0.05	6904	-0.12 (-0.19 to -0.05)
Inferior longitudinal fasciculus (right)	-0.0002	0.00008	-3.04	0.002	0.07	6908	-0.11 (-0.17 to -0.04)
Middle cerebellar peduncle	-0.0001	0.00008	-0.97	0.33	0.59	6858	-0.03 (-0.10 to 0.04)

Medial longitudinal fasciculus (left)	-0.0002	0.00007	-2.50	0.01	0.16	6901	-0.09 (-0.15 to -0.02)
Medial longitudinal fasciculus (right)	-0.0002	0.00007	-2.60	0.01	0.14	6901	-0.09 (-0.16 to -0.02)
Medial leminiscus (left)	-0.0001	0.00008	-1.67	0.09	0.36	6904	-0.06 (-0.12 to 0.01)
Medial leminiscus (right)	-0.0001	0.00008	-1.15	0.25	0.53	6908	-0.04 (-0.11 to 0.03)
Occipitopontine tract (left)	-0.0001	0.00006	-2.16	0.03	0.24	6902	-0.08 (-0.14 to -0.007)
Occipitopontine tract (right)	-0.0001	0.00007	-1.70	0.09	0.35	6896	-0.06 (-0.13 to 0.009)
Optic radiation (left)	-0.0002	0.00007	-2.70	0.01	0.13	6908	-0.09 (-0.16 to -0.03)
Optic radiation (right)	-0.0002	0.00007	-2.69	0.01	0.13	6906	-0.09 (-0.16 to -0.025)
Parietopontine tract (left)	-0.0001	0.00006	-1.69	0.09	0.35	6901	-0.06 (-0.13 to 0.009)
Parietopontine tract (right)	-0.0001	0.00006	-1.80	0.07	0.34	6894	-0.06 (-0.13 to 0.006)
Superior cerebellar peduncle	-0.0001	0.00008	-1.58	0.11	0.39	6851	-0.06 (-0.12 to 0.01)
Superior longitudinal fasciculus (left)	-0.0002	0.00006	-3.17	0.002	0.07	6904	-0.11 (-0.18 to -0.04)
Superior longitudinal fasciculus (right)	-0.0002	0.00006	-2.85	0.004	0.10	6902	-0.1 (-0.17 to -0.03)
Spinothalamic tract (left)	-0.0001	0.00008	-1.70	0.09	0.35	6906	-0.06 (-0.13 to 0.009)
Spinothalamic tract (right)	-0.0001	0.00008	-1.43	0.15	0.45	6907	-0.05 (-0.12 to 0.02)
Uncinate fasciculus (left)	-0.0003	0.00008	-4.13	0.00004	0.02	6911	-0.14 (-0.21 to -0.07)
Uncinate fasciculus (right)	-0.0002	0.00008	-1.98	<0.05	0.29	6913	-0.07 (-0.13 to -0.0004)
Ventral occipital fasciculus (left)	-0.0001	0.00008	-1.61	0.11	0.39	6904	-0.06 (-0.12 to 0.01)
Ventral occipital fasciculus (right)	-0.0001	0.00009	-1.51	0.13	0.42	6909	-0.05 (-0.12 to 0.02)
Anxious-depressed							
Anterior commissure	-0.0004	0.0002	-1.91	0.06	0.31	6926	-0.07 (-0.13 to 0)
Arcuate fasciculus (left)	-0.00001	0.00007	-0.14	0.89	0.95	6907	-0.01 (-0.07 to 0.06)
Arcuate fasciculus (right)	-0.00003	0.00007	-0.35	0.73	0.86	6906	-0.01 (-0.08 to 0.06)
Frontal aslant tract (left)	0.00003	0.00007	0.52	0.60	0.82	6893	0.02 (-0.05 to 0.09)
Frontal aslant tract (right)	0.000001	0.00006	0.01	0.99	0.99	6899	0.0003 (-0.07 to 0.07)
Cingulum (left)	-0.000101	0.00008	-1.23	0.22	0.51	6907	-0.04 (-0.11 to 0.03)
Cingulum (right)	-0.00004	0.00008	-0.43	0.67	0.85	6907	-0.02 (-0.08 to 0.05)
Corpus callosum	-0.00002	0.00006	-0.32	0.75	0.87	6900	-0.01 (-0.08 to 0.06)

Forceps major	0.000005	0.00008	0.07	0.95	0.97	6888	0.002 (-0.07 to 0.07)
Forceps minor	0.00002	0.00008	0.23	0.82	0.92	6895	0.01 (-0.06 to 0.08)
Corpus callosum (mid)	-0.00003	0.00007	-0.44	0.66	0.85	6904	-0.02 (-0.08 to 0.05)
Corticospinal tract (left)	0.00002	0.00007	0.35	0.73	0.86	6901	0.01 (-0.06 to 0.08)
Corticospinal tract (right)	-0.00001	0.00007	-0.20	0.84	0.93	6900	-0.01 (-0.08 to 0.06)
Fornix	-0.00005	0.0001	-0.37	0.71	0.86	6886	-0.01 (-0.08 to 0.06)
Frontopontine tract (left)	0.00003	0.00006	0.41	0.68	0.86	6909	0.01 (-0.05 to 0.08)
Frontopontine tract (right)	-0.00001	0.00006	-0.16	0.87	0.95	6900	-0.01 (-0.07 to 0.06)
Inferior cerebellar peduncle (left)	0.0002	0.0001	1.77	0.08	0.34	6863	0.06 (-0.01 to 0.13)
Inferior cerebellar peduncle (right)	0.00006	0.0001	0.59	0.56	0.80	6866	0.02 (-0.05 to 0.09)
Inferior frontooccipital fasciculus (left)	-0.00001	0.00008	-0.17	0.86	0.95	6902	-0.01 (-0.07 to 0.06)
Inferior frontooccipital fasciculus (right)	0.00003	0.00008	0.37	0.71	0.86	6913	0.01 (-0.06 to 0.08)
Inferior longitudinal fasciculus (left)	-0.00001	0.00007	-0.19	0.85	0.94	6904	-0.01 (-0.07 to 0.06)
Inferior longitudinal fasciculus (right)	0.00002	0.00008	0.21	0.84	0.93	6908	0.01 (-0.06 to 0.08)
Middle cerebellar peduncle	0.0001	0.00008	1.67	0.10	0.36	6858	0.06 (-0.01 to 0.13)
Medial longitudinal fasciculus (left)	-0.00004	0.00007	-0.51	0.61	0.82	6901	-0.02 (-0.09 to 0.05)
Medial longitudinal fasciculus (right)	0.00002	0.00007	0.32	0.75	0.87	6901	0.01 (-0.06 to 0.08)
Medial leminiscus (left)	0.00002	0.00009	0.25	0.80	0.91	6904	0.01 (-0.06 to 0.08)
Medial leminiscus (right)	0.000002	0.00008	0.03	0.98	0.98	6908	0.001 (-0.07 to 0.07)
Occipitopontine tract (left)	0.000006	0.00007	0.09	0.93	0.97	6902	0.003 (-0.07 to 0.07)
Occipitopontine tract (right)	0.00005	0.00007	0.64	0.52	0.77	6896	0.02 (-0.05 to 0.09)
Optic radiation (left)	-0.000002	0.00008	-0.03	0.98	0.98	6908	-0.001 (-0.07 to 0.07)
Optic radiation (right)	0.00005	0.00007	0.63	0.53	0.78	6906	0.02 (-0.05 to 0.09)
Parietopontine tract (left)	0.00002	0.00007	0.28	0.78	0.90	6901	0.01 (-0.06 to 0.08)
Parietopontine tract (right)	-0.00002	0.00007	-0.25	0.80	0.91	6894	-0.01 (-0.08 to 0.06)
Superior cerebellar peduncle	0.00006	0.00008	0.72	0.47	0.74	6851	0.03 (-0.04 to 0.09)
Superior longitudinal fasciculus (left)	-0.00007	0.00007	-1.00	0.32	0.58	6904	-0.04 (-0.1 to 0.03)
Superior longitudinal fasciculus (right)	-0.00004	0.00007	-0.59	0.55	0.80	6902	-0.02 (-0.09 to 0.05)

Spinothalamic tract (left)	0.000009	0.00008	0.11	0.92	0.96	6906	0.004 (-0.06 to 0.07)
Spinothalamic tract (right)	0.000004	0.00009	0.04	0.97	0.98	6907	0.001 (-0.07 to 0.07)
Uncinate fasciculus (left)	-0.00005	0.00008	-0.56	0.58	0.81	6911	-0.02 (-0.09 to 0.05)
Uncinate fasciculus (right)	-0.00001	0.00008	-0.12	0.90	0.96	6913	-0.004 (-0.07 to 0.06)
Ventral occipital fasciculus (left)	-0.00008	0.00009	-0.96	0.34	0.59	6904	-0.03 (-0.1 to 0.04)
Ventral occipital fasciculus (right)	-0.00008	0.00009	-0.89	0.37	0.63	6909	-0.03 (-0.1 to 0.04)
Withdrawn-depressed							
Anterior commissure	-0.0003	0.0004	-0.89	0.38	0.63	6926	-0.03 (-0.1 to 0.04)
Arcuate fasciculus (left)	-0.00008	0.0001	-0.64	0.52	0.77	6907	-0.02 (-0.09 to 0.05)
Arcuate fasciculus (right)	-0.00008	0.0001	-0.68	0.50	0.75	6906	-0.02 (-0.1 to 0.04)
Frontal aslant tract (left)	-0.00009	0.0001	-0.81	0.42	0.67	6893	-0.03 (-0.01 to 0.04)
Frontal aslant tract (right)	-0.0002	0.0001	-1.57	0.12	0.39	6899	-0.05 (-0.12 to 0.01)
Cingulum (left)	-0.0002	0.0001	-1.60	0.11	0.39	6907	-0.06 (-0.12 to 0.01)
Cingulum (right)	-0.0004	0.0001	-2.64	0.01	0.13	6907	-0.09 (-0.16 to -0.02)
Corpus callosum	-0.0002	0.0001	-1.48	0.14	0.42	6900	-0.05 (-0.12 to 0.02)
Forceps major	-0.0002	0.0001	-1.51	0.13	0.41	6888	-0.05 (-0.12 to 0.02)
Forceps minor	0.00004	0.0001	0.28	0.78	0.90	6895	0.01 (-0.06 to 0.08)
Corpus callosum (mid)	-0.0002	0.0001	-1.81	0.07	0.33	6904	-0.06 (-0.13 to 0.005)
Corticospinal tract (left)	-0.0002	0.0001	-1.30	0.19	0.49	6901	-0.05 (-0.11 to 0.02)
Corticospinal tract (right)	-0.0001	0.0001	-1.23	0.22	0.51	6900	-0.04 (-0.11 to 0.03)
Fornix	-0.0002	0.0002	-0.98	0.33	0.58	6886	-0.03 (-0.1 to 0.03)
Frontopontine tract (left)	-0.0001	0.0001	-1.30	0.19	0.49	6909	-0.05 (-0.11 to 0.02)
Frontopontine tract (right)	-0.0002	0.0001	-1.43	0.15	0.45	6900	-0.05 (-0.12 to 0.02)
Inferior cerebellar peduncle (left)	0.0002	0.0002	1.21	0.23	0.51	6863	0.04 (-0.03 to 0.11)
Inferior cerebellar peduncle (right)	0.0002	0.0002	1.19	0.24	0.51	6866	0.04(-0.03 to 0.11)
Inferior frontooccipital fasciculus (left)	-0.00003	0.0001	-0.25	0.80	0.91	6902	-0.009 (-0.08 to 0.06)
Inferior frontooccipital fasciculus (right)	-0.00004	0.0001	-0.34	0.74	0.86	6913	-0.01 (-0.08 to 0.06)
Inferior longitudinal fasciculus (left)	-0.0002	0.0001	-1.30	0.20	0.49	6904	-0.05 (-0.11 to 0.02)

Inferior longitudinal fasciculus (right)	-0.0002	0.0001	-1.43	0.15	0.45	6908	-0.05 (-0.12 to 0.02)
Middle cerebellar peduncle	0.0002	0.0001	1.21	0.23	0.51	6858	0.04 (-0.03 to 0.11)
Medial longitudinal fasciculus (left)	-0.0002	0.0001	-1.72	0.09	0.35	6901	-0.06 (-0.13 to 0.008)
Medial longitudinal fasciculus (right)	-0.0001	0.0001	-0.82	0.41	0.67	6901	-0.03 (-0.1 to 0.04)
Medial leminiscus (left)	0.00001	0.0001	0.07	0.95	0.97	6904	0.002 (-0.07 to 0.07)
Medial leminiscus (right)	-0.00007	0.0001	-0.47	0.64	0.85	6908	-0.02 (-0.08 to 0.05)
Occipitopontine tract (left)	-0.0002	0.0001	-1.96	0.05	0.29	6902	-0.068 (-0.14 to 0)
Occipitopontine tract (right)	-0.0001	0.0001	-0.87	0.38	0.64	6896	-0.03 (-0.1 to 0.04)
Optic radiation (left)	-0.0002	0.0001	-1.34	0.18	0.48	6908	-0.05 (-0.11 to 0.02)
Optic radiation (right)	-0.0002	0.0001	-1.21	0.23	0.51	6906	-0.04 (-0.11 to 0.026)
Parietopontine tract (left)	-0.0002	0.0001	-1.42	0.16	0.45	6901	-0.05 (-0.117 to 0.019)
Parietopontine tract (right)	-0.0002	0.0001	-1.58	0.11	0.39	6894	-0.06 (-0.122 to 0.013)
Superior cerebellar peduncle	0.0001	0.0001	0.88	0.38	0.63	6851	0.03 (-0.038 to 0.098)
Superior longitudinal fasciculus (left)	-0.00012	0.0001	-1.56	0.12	0.39	6904	-0.05 (-0.12 to 0.014)
Superior longitudinal fasciculus (right)	-0.0002	0.0001	-1.77	0.08	0.34	6902	-0.06 (-0.13 to 0.007)
Spinothalamic tract (left)	-0.00001	0.0001	-0.06	0.95	0.97	6906	-0.002 (-0.07 to 0.07)
Spinothalamic tract (right)	-0.00005	0.0001	-0.36	0.72	0.86	6907	-0.01 (-0.08 to 0.06)
Uncinate fasciculus (left)	-0.00002	0.0001	-0.11	0.91	0.96	6911	-0.004 (-0.07 to 0.06)
Uncinate fasciculus (right)	0.00003	0.0001	0.18	0.85	0.94	6913	0.006 (-0.06 to 0.07)
Ventral occipital fasciculus (left)	-0.0002	0.0001	-1.56	0.12	0.39	6904	-0.05 (-0.12 to 0.01)
Ventral occipital fasciculus (right)	-0.00007	0.0002	-0.44	0.66	0.85	6909	-0.02 (-0.08 to 0.05)
Somatic complaints							
Anterior commissure	0.00012	0.00035	0.34	0.74	0.86	6926	0.01 (-0.06 to 0.08)
Arcuate fasciculus (left)	-0.00007	0.00011	-0.60	0.55	0.79	6907	-0.02 (-0.09 to 0.05)
Arcuate fasciculus (right)	-0.00006	0.00011	-0.52	0.60	0.82	6906	-0.02 (-0.086 to 0.05)
Frontal aslant tract (left)	-0.00004	0.00010	-0.41	0.68	0.86	6893	-0.014 (-0.082 to 0.054)
Frontal aslant tract (right)	-0.00006	0.00010	-0.64	0.52	0.77	6899	-0.022 (-0.09 to 0.046)
Cingulum (left)	-0.0002	0.00013	-1.31	0.19	0.49	6907	-0.045 (-0.112 to 0.023)

Cingulum (right)	-0.00004	0.00013	-0.34	0.74	0.86	6907	-0.012 (-0.079 to 0.056)
Corpus callosum	-0.00003	0.00010	-0.27	0.79	0.90	6900	-0.009 (-0.077 to 0.058)
Forceps major	0.00001	0.00012	0.09	0.93	0.97	6888	0.003 (-0.065 to 0.071)
Forceps minor	0.00007	0.00013	0.52	0.60	0.82	6895	0.018 (-0.05 to 0.086)
Corpus callosum (mid)	-0.00004	0.00010	-0.35	0.73	0.86	6904	-0.012 (-0.08 to 0.056)
Corticospinal tract (left)	-0.00008	0.00011	-0.72	0.47	0.74	6901	-0.025 (-0.093 to 0.043)
Corticospinal tract (right)	-0.0002	0.0001	-1.74	0.08	0.35	6900	-0.06 (-0.127 to 0.008)
Fornix	0.0002	0.0002	1.13	0.26	0.54	6886	0.039 (-0.029 to 0.107)
Frontopontine tract (left)	-0.00004	0.0001	-0.46	0.65	0.85	6909	-0.016 (-0.083 to 0.052)
Frontopontine tract (right)	-0.0002	0.0001	-1.59	0.11	0.39	6900	-0.055 (-0.122 to 0.013)
Inferior cerebellar peduncle (left)	0.0003	0.0002	1.77	0.08	0.34	6863	0.061 (-0.007 to 0.129)
Inferior cerebellar peduncle (right)	0.00012	0.0002	1.20	0.23	0.51	6866	0.042 (-0.026 to 0.109)
Inferior frontooccipital fasciculus (left)	-0.00002	0.0001	-0.14	0.89	0.96	6902	-0.005 (-0.073 to 0.063)
Inferior frontooccipital fasciculus (right)	-0.00007	0.0001	-0.54	0.59	0.81	6913	-0.019 (-0.086 to 0.049)
Inferior longitudinal fasciculus (left)	-0.00007	0.0001	-0.56	0.57	0.81	6904	-0.019 (-0.087 to 0.048)
Inferior longitudinal fasciculus (right)	-0.00007	0.0001	-0.57	0.57	0.80	6908	-0.02 (-0.087 to 0.048)
Middle cerebellar peduncle	0.0002	0.0001	1.82	0.07	0.33	6858	0.063 (-0.005 to 0.13)
Medial longitudinal fasciculus (left)	0.00000	0.0001	0.02	0.98	0.98	6901	0.001 (-0.067 to 0.069)
Medial longitudinal fasciculus (right)	0.00002	0.0001	0.21	0.84	0.93	6901	0.007 (-0.061 to 0.075)
Medial leminiscus (left)	-0.00006	0.0001	-0.45	0.65	0.85	6904	-0.016 (-0.083 to 0.052)
Medial leminiscus (right)	-0.0001	0.0001	-0.88	0.38	0.63	6908	-0.03 (-0.098 to 0.038)
Occipitopontine tract (left)	-0.00004	0.0001	-0.40	0.69	0.86	6902	-0.014 (-0.082 to 0.054)
Occipitopontine tract (right)	-0.00002	0.0001	-0.15	0.88	0.95	6896	-0.005 (-0.073 to 0.063)
Optic radiation (left)	-0.00003	0.0001	-0.23	0.82	0.92	6908	-0.008 (-0.076 to 0.06)
Optic radiation (right)	-0.00004	0.0001	-0.37	0.71	0.86	6906	-0.013 (-0.08 to 0.055)
Parietopontine tract (left)	-0.00007	0.0001	-0.70	0.48	0.74	6901	-0.024 (-0.092 to 0.044)
Parietopontine tract (right)	-0.00006	0.0001	-0.61	0.54	0.78	6894	-0.021 (-0.089 to 0.047)
Superior cerebellar peduncle	0.0002	0.0001	1.37	0.17	0.48	6851	0.048 (-0.021 to 0.115)

Superior longitudinal fasciculus (left)	-0.00012	0.0001	-1.16	0.25	0.53	6904	-0.04 (-0.107 to 0.028)
Superior longitudinal fasciculus (right)	-0.00004	0.0001	-0.36	0.72	0.86	6902	-0.013 (-0.08 to 0.055)
Spinothalamic tract (left)	-0.00007	0.0001	-0.53	0.60	0.81	6906	-0.018 (-0.086 to 0.05)
Spinothalamic tract (right)	-0.00002	0.0001	-0.17	0.87	0.95	6907	-0.006 (-0.074 to 0.062)
Uncinate fasciculus (left)	0.00006	0.0001	0.43	0.67	0.85	6911	0.015 (-0.053 to 0.083)
Uncinate fasciculus (right)	0.00007	0.0001	0.51	0.61	0.82	6913	0.018 (-0.05 to 0.085)
Ventral occipital fasciculus (left)	0.00003	0.0001	0.24	0.81	0.91	6904	0.008 (-0.059 to 0.076)
Ventral occipital fasciculus (right)	0.00007	0.0002	0.47	0.64	0.85	6909	0.016 (-0.052 to 0.084)
Social problems							
Anterior commissure	-0.0007	0.0003	-2.29	0.02	0.23	6926	-0.08 (-0.15 to -0.01)
Arcuate fasciculus (left)	-0.0002	0.0001	-1.54	0.12	0.40	6907	-0.05 (-0.12 to 0.02)
Arcuate fasciculus (right)	-0.0002	0.0001	-1.87	0.06	0.31	6906	-0.07 (-0.13 to 0.003)
Frontal aslant tract (left)	-0.0001	0.0001	-1.08	0.28	0.55	6893	-0.04 (-0.11 to 0.03)
Frontal aslant tract (right)	-0.0002	0.0001	-2.07	0.04	0.24	6899	-0.07 (-0.14to -0.004)
Cingulum (left)	-0.0003	0.0001	-2.27	0.02	0.23	6907	-0.08 (-0.15 to -0.01)
Cingulum (right)	-0.0002	0.0001	-2.12	0.03	0.24	6907	-0.07 (-0.14 to -0.005)
Corpus callosum	-0.0002	0.0001	-2.34	0.02	0.21	6900	-0.08 (-0.15 to -0.01)
Forceps major	-0.0003	0.0001	-2.98	0.003	0.08	6888	-0.1 (-0.17 to -0.04)
Forceps minor	-0.00008	0.0001	-0.70	0.49	0.74	6895	-0.02 (-0.1 to 0.04)
Corpus callosum (mid)	-0.0002	0.0001	-1.92	0.06	0.31	6904	-0.07 (-0.13 to 0.002)
Corticospinal tract (left)	-0.0001	0.0001	-1.17	0.24	0.52	6901	-0.04 (-0.11 to 0.03)
Corticospinal tract (right)	-0.0001	0.0001	-1.39	0.17	0.47	6900	-0.05 (-0.12 to 0.02)
Fornix	-0.0003	0.0002	-1.76	0.08	0.35	6886	-0.06 (-0.13 to 0.007)
Frontopontine tract (left)	-0.0001	0.0001	-1.48	0.14	0.42	6909	-0.05 (-0.12 to 0.02)
Frontopontine tract (right)	-0.0001	0.0001	-1.50	0.13	0.42	6900	-0.05 (-0.12 to 0.02)
Inferior cerebellar peduncle (left)	0.0001	0.0001	0.93	0.35	0.62	6863	0.03 (-0.04to 0.1)
Inferior cerebellar peduncle (right)	0.00008	0.0001	0.55	0.58	0.81	6866	0.02 (-0.05 to 0.09)
Inferior frontooccipital fasciculus (left)	-0.0002	0.0001	-2.13	0.03	0.24	6902	-0.07 (-0.14 to -0.006)

Inferior frontooccipital fasciculus (right)	-0.0002	0.0001	-1.56	0.12	0.39	6913	-0.05 (-0.12 to 0.014)
Inferior longitudinal fasciculus (left)	-0.0003	0.0001	-3.07	0.002	0.07	6904	-0.11 (-0.17 to -0.04)
Inferior longitudinal fasciculus (right)	-0.0003	0.0001	-2.23	0.03	0.24	6908	-0.08 (-0.14 to -0.009)
Middle cerebellar peduncle	0.00005	0.0001	0.40	0.69	0.86	6858	0.014 (-0.05 to 0.08)
Medial longitudinal fasciculus (left)	-0.0003	0.0001	-3.05	0.002	0.07	6901	-0.11 (-0.17 to -0.04)
Medial longitudinal fasciculus (right)	-0.0003	0.0001	-2.41	0.02	0.19	6901	-0.08 (-0.15 to -0.02)
Medial leminiscus (left)	-0.0001	0.0001	-0.89	0.37	0.63	6904	-0.03 (-0.1 to 0.04)
Medial leminiscus (right)	-0.0001	0.0001	-1.06	0.29	0.56	6908	-0.04 (-0.10 to 0.03)
Occipitopontine tract (left)	-0.0002	0.0001	-2.07	0.04	0.24	6902	-0.07 (-0.14 to -0.004)
Occipitopontine tract (right)	-0.0002	0.0001	-1.91	0.06	0.31	6896	-0.07 (-0.13 to 0.002)
Optic radiation (left)	-0.0003	0.0001	-2.68	0.007	0.13	6908	-0.09 (-0.16 to -0.03)
Optic radiation (right)	-0.0002	0.0001	-2.12	0.03	0.24	6906	-0.07 (-0.14 to -0.005)
Parietopontine tract (left)	-0.0001	0.0001	-1.29	0.2	0.49	6901	-0.05 (-0.11 to 0.02)
Parietopontine tract (right)	-0.0002	0.0001	-1.74	0.08	0.35	6894	-0.06 (-0.13 to 0.008)
Superior cerebellar peduncle	-0.00002	0.0001	-0.13	0.9	0.96	6851	-0.004 (-0.07 to 0.06)
Superior longitudinal fasciculus (left)	-0.0003	0.0001	-3.05	0.002	0.07	6904	-0.11 (-0.17 to -0.4)
Superior longitudinal fasciculus (right)	-0.0003	0.0001	-3.26	0.001	0.06	6902	-0.11 (-0.18 to -0.05)
Spinothalamic tract (left)	-0.0001	0.0001	-1.08	0.28	0.55	6906	-0.04 (-0.101 to 0.03)
Spinothalamic tract (right)	-0.0001	0.0001	-1.12	0.26	0.54	6907	-0.04 (-0.11 to 0.03)
Uncinate fasciculus (left)	-0.0003	0.0001	-2.66	0.008	0.13	6911	-0.09 (-0.16 to -0.02)
Uncinate fasciculus (right)	-0.0001	0.0001	-0.84	0.4	0.66	6913	-0.03 (-0.1 to 0.04)
Ventral occipital fasciculus (left)	-0.0003	0.0001	-2.71	0.007	0.13	6904	-0.09 (-0.16 to -0.03)
Ventral occipital fasciculus (right)	-0.0002	0.0001	-1.63	0.10	0.38	6909	-0.06 (-0.12 to 0.01)
Thought problems							
Anterior commissure	-0.0003	0.0003	-1.05	0.30	0.56	6926	-0.04 (-0.10 to 0.03)
Arcuate fasciculus (left)	-0.0002	0.0001	-1.88	0.06	0.31	6907	-0.07 (-0.13 to 0.003)
Arcuate fasciculus (right)	-0.0001	0.0001	-1.34	0.18	0.48	6906	-0.05 (-0.11 to 0.02)
Frontal aslant tract (left)	-0.00004	0.0001	-0.38	0.71	0.86	6893	-0.01 (-0.08 to 0.06)

Frontal aslant tract (right)	-0.00002	0.0001	-0.27	0.79	0.90	6899	-0.009 (-0.08 to 0.06)
Cingulum (left)	-0.0002	0.0001	-1.46	0.14	0.43	6907	-0.05 (-0.12 to 0.02)
Cingulum (right)	-0.00006	0.0001	-0.56	0.58	0.81	6907	-0.02 (-0.09 to 0.05)
Corpus callosum	-0.00008	0.0001	-0.96	0.34	0.59	6900	-0.03 (-0.10 to 0.04)
Forceps major	-0.00007	0.0001	-0.62	0.54	0.78	6888	-0.02 (-0.09 to 0.05)
Forceps minor	-0.00005	0.0001	-0.43	0.67	0.85	6895	-0.02 (-0.08 to 0.05)
Corpus callosum (mid)	-0.00004	0.0001	-0.46	0.65	0.85	6904	-0.02 (-0.08 to 0.05)
Corticospinal tract (left)	-0.00001	0.0001	-0.10	0.92	0.97	6901	-0.003 (-0.07 to 0.07)
Corticospinal tract (right)	-0.00001	0.0001	-0.08	0.93	0.97	6900	-0.003 (-0.07 to 0.07)
Fornix	-0.00008	0.0002	-0.40	0.69	0.86	6886	-0.014 (-0.08 to 0.05)
Frontopontine tract (left)	0.00004	0.0001	0.43	0.67	0.85	6909	0.02 (-0.05 to 0.08)
Frontopontine tract (right)	0.00001	0.0001	0.08	0.93	0.97	6900	0.003 (-0.07 to 0.07)
Inferior cerebellar peduncle (left)	0.0002	0.0001	1.35	0.18	0.48	6863	0.05 (-0.02 to 0.11)
Inferior cerebellar peduncle (right)	0.00008	0.0001	0.59	0.56	0.80	6866	0.02 (-0.05 to 0.09)
Inferior frontooccipital fasciculus (left)	-0.0001	0.0001	-1.19	0.23	0.51	6902	-0.04 (-0.11 to 0.03)
Inferior frontooccipital fasciculus (right)	-0.0001	0.0001	-0.90	0.37	0.63	6913	-0.03 (-0.1 to 0.04)
Inferior longitudinal fasciculus (left)	-0.0001	0.0001	-1.09	0.28	0.55	6904	-0.04 (-0.11 to 0.03)
Inferior longitudinal fasciculus (right)	-0.0002	0.0001	-1.24	0.22	0.51	6908	-0.04 (-0.11 to 0.03)
Middle cerebellar peduncle	0.00011	0.0001	0.89	0.37	0.63	6858	0.03 (-0.04 to 0.19)
Medial longitudinal fasciculus (left)	-0.00012	0.0001	-1.11	0.27	0.54	6901	-0.04 (-0.11 to 0.03)
Medial longitudinal fasciculus (right)	-0.00008	0.0001	-0.75	0.45	0.72	6901	-0.03 (-0.1 to 0.04)
Medial leminiscus (left)	-0.00003	0.0001	-0.22	0.82	0.92	6904	-0.008 (-0.08 to 0.06)
Medial leminiscus (right)	-0.00007	0.0001	-0.54	0.59	0.81	6908	-0.02 (-0.09 to 0.05)
Occipitopontine tract (left)	-0.00006	0.0001	-0.66	0.51	0.77	6902	-0.02 (-0.09 to 0.05)
Occipitopontine tract (right)	-0.00003	0.0001	-0.28	0.78	0.90	6896	-0.01 (-0.08 to 0.06)
Optic radiation (left)	-0.00013	0.0001	-1.15	0.25	0.53	6908	-0.04 (-0.11 to 0.03)
Optic radiation (right)	-0.0001	0.0001	-1.01	0.31	0.57	6906	-0.04 (-0.10 to 0.03)
Parietopontine tract (left)	-0.00001	0.0001	-0.15	0.88	0.95	6901	-0.005 (-0.07 to 0.06)

Parietopontine tract (right)	-0.00004	0.0001	-0.44	0.66	0.85	6894	-0.015 (-0.083 to 0.053)
Superior cerebellar peduncle	0.00007	0.0001	0.62	0.54	0.78	6851	0.022 (-0.047 to 0.089)
Superior longitudinal fasciculus (left)	-0.0002	0.0001	-2.23	0.03	0.24	6904	-0.077 (-0.144 to -0.009)
Superior longitudinal fasciculus (right)	-0.0002	0.0001	-1.56	0.12	0.39	6902	-0.054 (-0.121 to 0.014)
Spinothalamic tract (left)	-0.00005	0.0001	-0.38	0.7	0.86	6906	-0.013 (-0.081 to 0.055)
Spinothalamic tract (right)	-0.00005	0.0001	-0.39	0.7	0.86	6907	-0.014 (-0.081 to 0.054)
Uncinate fasciculus (left)	-0.0002	0.0001	-1.20	0.23	0.51	6911	-0.041 (-0.109 to 0.026)
Uncinate fasciculus (right)	-0.00002	0.0001	-0.16	0.87	0.95	6913	-0.006 (-0.073 to 0.062)
Ventral occipital fasciculus (left)	-0.0001	0.0001	-1.12	0.26	0.54	6904	-0.039 (-0.106 to 0.029)
Ventral occipital fasciculus (right)	-0.00009	0.0001	-0.64	0.52	0.77	6909	-0.022 (-0.09 to 0.046)
Aggressive behavior							
Anterior commissure	-0.00034	0.0001	-2.15	0.03	0.24	6926	-0.07 (-0.14 to -0.006)
Arcuate fasciculus (left)	0.000003	0.00005	0.05	0.96	0.98	6907	0.002 (-0.07 to 0.07)
Arcuate fasciculus (right)	-0.000002	0.00005	-0.04	0.96	0.98	6906	-0.002 (-0.07 to 0.07)
Frontal aslant tract (left)	-0.00004	0.00005	-0.79	0.43	0.69	6893	-0.03 (-0.1 to 0.04)
Frontal aslant tract (right)	-0.00002	0.00005	-0.33	0.74	0.87	6899	-0.01 (-0.08 to 0.06)
Cingulum (left)	-0.00008	0.00006	-1.31	0.19	0.49	6907	-0.05 (-0.11 to 0.023)
Cingulum (right)	-0.00007	0.00006	-1.23	0.22	0.51	6907	-0.04 (-0.11 to 0.03)
Corpus callosum	-0.00006	0.00004	-1.29	0.20	0.49	6900	-0.05 (-0.11 to 0.02)
Forceps major	-0.00005	0.00005	-0.99	0.32	0.58	6888	-0.03 (-0.1 to 0.03)
Forceps minor	-0.00003	0.00006	-0.55	0.58	0.81	6895	-0.02 (-0.09 to 0.05)
Corpus callosum (mid)	-0.00006	0.00005	-1.22	0.22	0.51	6904	-0.04 (-0.11 to 0.03)
Corticospinal tract (left)	-0.00006	0.00005	-1.28	0.20	0.50	6901	-0.04 (-0.11 to 0.02)
Corticospinal tract (right)	-0.00004	0.00005	-0.90	0.37	0.63	6900	-0.033 (-0.1 to 0.04)
Fornix	-0.00003	0.00009	-0.37	0.71	0.86	6886	-0.01 (-0.08 to 0.06)
Frontopontine tract (left)	-0.00005	0.00004	-1.12	0.26	0.54	6909	-0.04 (-0.11 to 0.03)
Frontopontine tract (right)	-0.00004	0.00005	-0.78	0.44	0.69	6900	-0.03 (-0.1 to 0.04)
Inferior cerebellar peduncle (left)	0.00008	0.00007	1.08	0.28	0.55	6863	0.04 (-0.03 to 0.11)

Inferior cerebellar peduncle (right)	0.00007	0.00007	0.98	0.33	0.58	6866	0.03 (-0.03 to 0.1)
Inferior frontooccipital fasciculus (left)	-0.0001	0.00006	-1.69	0.09	0.35	6902	-0.06 (-0.13 to 0.01)
Inferior frontooccipital fasciculus (right)	-0.00006	0.00006	-0.99	0.32	0.58	6913	-0.03 (-0.1 to 0.03)
Inferior longitudinal fasciculus (left)	-0.0001	0.00005	-1.86	0.06	0.31	6904	-0.06 (-0.13 to 0.004)
Inferior longitudinal fasciculus (right)	-0.00009	0.00006	-1.51	0.13	0.41	6908	-0.05 (-0.12 to 0.02)
Middle cerebellar peduncle	0.00006	0.00006	1.02	0.31	0.57	6858	0.04 (-0.03 to 0.10)
Medial longitudinal fasciculus (left)	-0.00005	0.00005	-0.85	0.40	0.65	6901	-0.03 (-0.1 to 0.04)
Medial longitudinal fasciculus (right)	-0.00001	0.00005	-0.14	0.89	0.96	6901	-0.005 (-0.07 to 0.06)
Medial leminiscus (left)	-0.00006	0.00006	-1.03	0.30	0.57	6904	-0.04 (-0.1 to 0.03)
Medial leminiscus (right)	-0.00006	0.00006	-1.08	0.28	0.55	6908	-0.04 (-0.11 to 0.03)
Occipitopontine tract (left)	-0.00007	0.00005	-1.48	0.14	0.42	6902	-0.05 (-0.12 to 0.02)
Occipitopontine tract (right)	-0.00004	0.00005	-0.71	0.47	0.74	6896	-0.03 (-0.09 to 0.04)
Optic radiation (left)	-0.0001	0.00006	-1.87	0.06	0.31	6908	-0.07 (-0.13 to 0.003)
Optic radiation (right)	-0.00007	0.00005	-1.34	0.18	0.48	6906	-0.05 (-0.11 to 0.02)
Parietopontine tract (left)	-0.00006	0.00005	-1.32	0.19	0.49	6901	-0.05 (-0.11 to 0.02)
Parietopontine tract (right)	-0.00005	0.00005	-1.01	0.31	0.57	6894	-0.04 (-0.1 to 0.03)
Superior cerebellar peduncle	0.00004	0.00006	0.69	0.49	0.75	6851	0.02 (-0.04 to 0.09)
Superior longitudinal fasciculus (left)	-0.00004	0.00005	-0.89	0.37	0.63	6904	-0.03 (-0.1 to 0.04)
Superior longitudinal fasciculus (right)	-0.00002	0.00005	-0.40	0.69	0.86	6902	-0.01 (-0.08 to 0.05)
Spinothalamic tract (left)	-0.00006	0.00006	-1.04	0.30	0.56	6906	-0.04 (-0.1 to 0.03)
Spinothalamic tract (right)	-0.00005	0.00006	-0.78	0.43	0.69	6907	-0.03 (-0.1 to 0.04)
Uncinate fasciculus (left)	-0.00013	0.00006	-2.15	0.03	0.24	6911	-0.07 (-0.14 to -0.007)
Uncinate fasciculus (right)	0.00001	0.00006	0.12	0.91	0.96	6913	0.004 (-0.06 to 0.07)
Ventral occipital fasciculus (left)	-0.00008	0.00006	-1.35	0.18	0.48	6904	-0.05 (-0.11 to 0.02)
Ventral occipital fasciculus (right)	-0.00007	0.00007	-1.01	0.31	0.57	6909	-0.04 (-0.1 to 0.03)
Rule breaking							
Anterior commissure	-0.00053	0.0004	-1.45	0.15	0.44	6926	-0.05 (-0.12 to 0.02)
Arcuate fasciculus (left)	-0.00012	0.0001	-1.02	0.31	0.57	6907	-0.04 (-0.1 to 0.03)

Arcuate fasciculus (right)	-0.0001	0.0001	-1.16	0.25	0.53	6906	-0.04 (-0.11 to 0.03)
Frontal aslant tract (left)	-0.0002	0.0001	-1.63	0.10	0.38	6893	-0.06 (-0.12 to 0.01)
Frontal aslant tract (right)	-0.0001	0.0001	-1.34	0.18	0.48	6899	-0.05 (-0.11 to 0.02)
Cingulum (left)	-0.0002	0.0001	-1.22	0.22	0.51	6907	-0.04 (-0.11 to 0.03)
Cingulum (right)	-0.0002	0.0001	-1.23	0.22	0.51	6907	-0.04 (-0.11 to 0.03)
Corpus callosum	-0.00005	0.0001	-0.51	0.61	0.82	6900	-0.02 (-0.09 to 0.05)
Forceps major	0.00005	0.0001	0.39	0.70	0.86	6888	0.01 (-0.05 to 0.08)
Forceps minor	0.00001	0.0001	0.05	0.96	0.98	6895	0.002 (-0.07 to 0.07)
Corpus callosum (mid)	-0.00007	0.0001	-0.63	0.53	0.78	6904	-0.02 (-0.09 to 0.05)
Corticospinal tract (left)	-0.0001	0.0001	-1.10	0.27	0.55	6901	-0.04 (-0.11 to 0.03)
Corticospinal tract (right)	-0.0001	0.0001	-1.29	0.20	0.49	6900	-0.05 (-0.11 to 0.02)
Fornix	-0.0002	0.0002	-0.84	0.40	0.66	6886	-0.03 (-0.1 to 0.04)
Frontopontine tract (left)	-0.00007	0.0001	-0.69	0.49	0.74	6909	-0.02 (-0.09 to 0.04)
Frontopontine tract (right)	-0.0001	0.0001	-1.03	0.30	0.57	6900	-0.04 (-0.1 to 0.03)
Inferior cerebellar peduncle (left)	0.0002	0.0002	1.27	0.20	0.50	6863	0.04 (-0.04 to 0.11)
Inferior cerebellar peduncle (right)	0.00009	0.0002	0.53	0.59	0.81	6866	0.02 (-0.05 to 0.09)
Inferior frontooccipital fasciculus (left)	-0.0001	0.0001	-1.05	0.29	0.56	6902	-0.04 (-0.10 to 0.03)
Inferior frontooccipital fasciculus (right)	-0.00007	0.0001	-0.58	0.56	0.80	6913	-0.02 (-0.09 to 0.05)
Inferior longitudinal fasciculus (left)	-0.0002	0.0001	-1.39	0.16	0.47	6904	-0.05 (-0.12 to 0.02)
Inferior longitudinal fasciculus (right)	-0.0002	0.0001	-1.10	0.27	0.54	6908	-0.04 (-0.11 to 0.03)
Middle cerebellar peduncle	0.00008	0.0001	0.56	0.57	0.81	6858	0.02 (-0.05 to 0.09)
Medial longitudinal fasciculus (left)	-0.00001	0.0001	-0.05	0.96	0.98	6901	-0.002 (-0.07 to 0.07)
Medial longitudinal fasciculus (right)	0.00003	0.0001	0.22	0.83	0.92	6901	0.008 (-0.06 to 0.08)
Medial leminiscus (left)	0.00002	0.0001	0.12	0.91	0.96	6904	0.004 (-0.06 to 0.07)
Medial leminiscus (right)	-0.0001	0.0001	-0.73	0.47	0.74	6908	-0.03 (-0.09 to 0.04)
Occipitopontine tract (left)	-0.0002	0.0001	-1.39	0.16	0.47	6902	-0.05 (-0.12 to 0.02)
Occipitopontine tract (right)	0.00001	0.0001	0.12	0.90	0.96	6896	0.004 (-0.06 to 0.07)
Optic radiation (left)	-0.0002	0.0001	-1.14	0.25	0.53	6908	-0.04 (-0.11 to 0.03)

Optic radiation (right)	-0.00009	0.0001	-0.75	0.46	0.72	6906	-0.03 (-0.09 to 0.04)
Parietopontine tract (left)	-0.0001	0.0001	-1.05	0.29	0.56	6901	-0.04 (-0.1 to 0.03)
Parietopontine tract (right)	-0.0001	0.0001	-1.21	0.23	0.51	6894	-0.04 (-0.11 to 0.03)
Superior cerebellar peduncle	0.00006	0.0001	0.42	0.68	0.86	6851	0.02 (-0.05 to 0.08)
Superior longitudinal fasciculus (left)	-0.0001	0.0001	-1.14	0.26	0.53	6904	-0.04 (-0.11 to 0.03)
Superior longitudinal fasciculus (right)	-0.0001	0.0001	-1.11	0.27	0.54	6902	-0.04 (-0.11 to 0.03)
Spinothalamic tract (left)	0.00001	0.0001	0.07	0.94	0.97	6906	0.002 (-0.07 to 0.07)
Spinothalamic tract (right)	-0.00005	0.0001	-0.38	0.71	0.86	6907	-0.01 (-0.08 to 0.06)
Uncinate fasciculus (left)	-0.0002	0.0001	-1.36	0.17	0.48	6911	-0.05 (-0.11 to 0.02)
Uncinate fasciculus (right)	0.00006	0.0001	0.44	0.66	0.85	6913	0.02 (-0.05 to 0.08)
Ventral occipital fasciculus (left)	-0.0001	0.0001	-0.70	0.48	0.74	6904	-0.02 (-0.09 to 0.04)
Ventral occipital fasciculus (right)	-0.00005	0.0002	-0.35	0.73	0.86	6909	-0.01 (-0.08 to 0.06)

Supplemental Table 4. Shows the results of the statistical comparison between the associations of the attention problems subscale and fractional anisotropy and the associations between fractional anisotropy and scores on the remaining empirical CBCL subscales.

	Anxious-depressed		Withdrawn-depressed		Somatic complaints		Social problems		Thought problems		Aggressive behavior		Rule-breaking behavior	
	$\chi2(1)$	p	$\chi2(1)$	p	$\chi2(1)$	p	$\chi2(1)$	p	$\chi2(1)$	p	$\chi2(1)$	p	$\chi2(1)$	p
Anterior commissure	8.97	0.003	2.47	0.12	3.26	0.07	1.72	0.19	1.12	0.29	11.16	0.0008	2.11	0.15
Arcuate fasciculus (left)	3.53	0.06	0.97	0.32	0.99	0.32	0.01	0.94	0.27	0.60	5.61	0.02	0.57	0.45
Arcuate fasciculus (right)	4.11	0.04	0.15	0.70	0.49	0.48	0.09	0.77	0.64	0.43	0.24	0.62	0.25	0.62
Frontal aslant tract (left)	1.32	0.25	0.23	0.63	0.03	0.87	1.15	0.28	0.81	0.37	1.02	0.31	0.17	0.68
Frontal aslant tract (right)	4.54	0.03	0.01	0.91	2.77	0.10	1.44	0.23	1.51	0.22	1.46	0.23	3.83	0.05
Cingulum (left)	3.74	0.05	2.08	0.15	2.66	0.10	1.36	0.24	1.02	0.31	2.44	0.12	2.57	0.11
Cingulum (right)	0.89	0.35	0.89	0.35	0.04	0.85	1.03	0.31	0.08	0.77	0.01	0.92	0.05	0.82
Corpus callosum	3.61	0.06	0.001	0.98	1.46	0.23	0.12	0.73	0.41	0.52	1.39	0.24	1.31	0.25
Forceps major	1.86	0.17	0.06	0.81	0.30	0.59	0.01	0.90	0.28	0.59	1.94	0.16	0.83	0.36
Forceps minor	3.47	0.06	1.08	0.30	1.35	0.25	0.003	0.96	1.93	0.16	1.51	0.22	0.34	0.56
Corpus callosum (mid)	4.71	0.03	0.01	0.92	0.38	0.54	0.11	0.74	2.32	0.13	0.18	0.67	0.12	0.73
Corticospinal tract (left)	1.84	0.18	0.005	0.95	0.30	0.58	0.03	0.87	1.78	0.18	0.37	0.54	0.02	0.88
Corticospinal tract (right)	0.86	0.35	0.002	0.96	3.15	0.08	0.73	0.39	0.33	0.56	0.83	0.36	0.04	0.85
Fornix	5.83	0.02	0.01	0.93	1.06	0.30	0.07	0.79	4.44	0.04	0.74	0.39	1.02	0.31
Frontopontine tract (left)	2.17	0.14	0.01	0.91	0.13	0.72	0.004	0.95	2.92	0.09	1.02	0.31	0.06	0.80

Frontopontine tract (right)	5.24	0.02	2.10	0.15	5.18	0.02	2.46	0.12	3.32	0.07	2.97	0.08	2.77	0.10
Inferior cerebellar peduncle (left)	1.73	0.19	2.21	0.14	2.73	0.10	1.40	0.24	1.31	0.25	3.10	0.08	1.21	0.27
Inferior cerebellar peduncle (right)	7.39	0.01	2.75	0.10	4.15	0.04	0.72	0.40	1.31	0.25	2.71	0.10	2.39	0.12
Inferior frontooccipital fasciculus (left)	6.57	0.01	1.58	0.21	1.80	0.18	0.94	0.33	1.05	0.30	4.17	0.04	2.82	0.09
Inferior frontooccipital fasciculus (right)	11.62	0.001	1.44	0.23	4.57	0.03	0.05	0.83	3.99	<0.05	4.54	0.03	2.53	0.11
Inferior longitudinal fasciculus (left)	9.38	0.002	0.64	0.42	3.02	0.08	0.52	0.47	2.20	0.14	4.17	0.04	2.66	0.10
Inferior longitudinal fasciculus (right)	7.57	0.01	3.94	0.05	7.85	0.01	1.98	0.16	3.90	0.05	5.29	0.02	2.22	0.14
Middle cerebellar peduncle	4.99	0.03	0.01	0.93	4.17	0.04	0.35	0.55	1.48	0.22	4.15	0.04	4.30	0.04
Medial longitudinal fasciculus (left)	9.28	0.002	1.81	0.18	4.37	0.04	0.06	0.81	2.61	0.11	7.21	0.01	4.89	0.03
Medial longitudinal fasciculus (right)	5.07	0.02	2.08	0.15	1.00	0.32	1.19	0.28	2.40	0.12	1.23	0.27	2.98	0.08
Medial leminiscus (left)	2.93	0.09	0.40	0.53	0.02	0.88	0.05	0.82	0.86	0.35	0.35	0.55	0.20	0.66
Medial leminiscus (right)	5.85	0.02	0.14	0.71	1.76	0.19	0.04	0.84	1.98	0.16	0.90	0.34	0.21	0.65
Occipitopontine tract (left)	6.60	0.01	0.45	0.50	1.80	0.18	0.02	0.89	2.01	0.16	2.03	0.15	2.10	0.15
Occipitopontine tract (right)	7.82	0.01	0.29	0.59	3.44	0.06	0.004	0.95	1.42	0.23	1.24	0.26	1.29	0.26
Optic radiation (left)	10.62	0.001	0.92	0.34	3.26	0.07	0.45	0.50	2.55	0.11	3.60	0.06	2.81	0.09
Optic radiation (right)	4.93	0.03	0.02	0.89	0.59	0.44	0.14	0.71	2.42	0.12	0.25	0.62	0.25	0.62

Parietopontine tract (left)	3.21	0.07	0.01	0.93	0.47	0.49	0.02	0.90	1.74	0.19	0.88	0.35	0.02	0.88
Parietopontine tract (right)	6.34	0.01	3.74	0.05	7.80	0.01	2.53	0.11	5.19	0.02	7.07	0.01	3.57	0.06
Superior cerebellar peduncle	5.18	0.02	0.60	0.44	1.50	0.22	0.02	0.88	0.54	0.46	6.95	0.01	2.25	0.13
Superior longitudinal fasciculus (left)	5.71	0.02	0.43	0.51	3.31	0.07	0.54	0.46	1.03	0.31	8.36	0.00	1.86	0.17
Superior longitudinal fasciculus (right)	4.96	0.03	1.76	0.18	0.88	0.35	0.85	0.36	2.10	0.15	1.32	0.25	2.88	0.09
Spinothalamic tract (left)	3.73	0.05	0.89	0.35	0.98	0.32	0.19	0.66	1.78	0.18	1.38	0.24	1.08	0.30
Spinothalamic tract (right)	13.76	0.0002	8.53	0.003	11.05	0.001	2.84	0.09	6.48	0.01	7.55	0.01	6.18	0.01
Uncinate fasciculus (left)	4.14	0.04	2.83	0.09	4.43	0.04	2.96	0.09	2.86	0.09	9.41	0.00	7.31	0.01
Uncinate fasciculus (right)	0.67	0.41	0.20	0.65	1.44	0.23	2.00	0.16	0.02	0.90	0.11	0.74	0.42	0.51
Ventral occipital fasciculus (left)	0.27	0.6	0.51	0.48	2.06	0.15	0.37	0.55	0.49	0.48	0.25	0.62	0.66	0.42

Supplemental Table 5. Associations between ADHD diagnosis and fractional anisotropy of the white matter tracts in the main analysis (10% QC threshold).

Tract names	B	SE	t	Uncorrected p value	FDR-p	N	Effect size (95% confidence interval)
Anterior commissure	-0.001	0.002	-0.45	0.66	0.85	5829	-0.04 (-0.19 to 0.12)
Arcuate fasciculus (left)	-0.002	0.001	-2.40	0.02	0.19	5814	-0.19 (-0.34 to -0.03)
Arcuate fasciculus (right)	-0.002	0.001	-2.09	0.04	0.24	5812	-0.16 (-0.32 to -0.01)
Frontal aslant tract (left)	-0.002	0.001	-2.21	0.03	0.24	5801	-0.17 (-0.32 to -0.02)
Frontal aslant tract (right)	-0.001	0.001	-1.70	0.09	0.35	5806	-0.13 (-0.29 to 0.02)
Cingulum (left)	-0.002	0.001	-2.12	0.03	0.24	5812	-0.16 (-0.32 to -0.01)
Cingulum (right)	-0.002	0.001	-2.52	0.01	0.16	5809	-0.2 (-0.35 to -0.04)
Corpus callosum	-0.001	0.001	-2.10	0.04	0.24	5805	-0.16 (-0.32 to -0.01)
Forceps major	-0.002	0.001	-2.10	0.04	0.24	5798	-0.16 (-0.32 to -0.01)
Forceps minor	-0.002	0.001	-1.90	0.06	0.31	5801	-0.15 (-0.3 to 0.005)
Corpus callosum (mid)	-0.001	0.001	-1.38	0.17	0.47	5807	-0.11 (-0.26 to 0.05)
Corticospinal tract (left)	-0.001	0.001	-1.81	0.07	0.33	5805	-0.14 (-0.29 to 0.01)
Corticospinal tract (right)	-0.002	0.001	-2.35	0.02	0.21	5806	-0.18 (-0.34 to -0.03)
Fornix	-0.002	0.001	-1.56	0.12	0.39	5798	-0.12 (-0.27 to 0.03)
Frontopontine tract (left)	-0.001	0.001	-2.22	0.03	0.24	5814	-0.17 (-0.33 to -0.02)
Frontopontine tract (right)	-0.002	0.001	-2.47	0.01	0.17	5809	-0.19 (-0.34 to -0.04)
Inferior cerebellar peduncle (left)	-0.001	0.001	-0.71	0.48	0.74	5779	-0.06 (-0.21 to 0.1)
Inferior cerebellar peduncle (right)	-0.001	0.001	-0.95	0.34	0.6	5782	-0.07 (-0.23 to 0.08)
Inferior frontooccipital fasciculus (left)	-0.002	0.001	-2.61	0.009	0.14	5809	-0.2 (-0.36 to -0.05)
Inferior frontooccipital fasciculus (right)	-0.002	0.001	-2.89	0.004	0.09	5817	-0.22 (-0.38 to -0.07)
Inferior longitudinal fasciculus (left)	-0.003	0.001	-3.43	0.001	0.048	5811	-0.27 (-0.42 to -0.11)
Inferior longitudinal fasciculus (right)	-0.003	0.001	-3.49	0.001	0.048	5814	-0.27 (-0.42 to -0.12)
Middle cerebellar peduncle	-0.001	0.001	-1.18	0.24	0.52	5776	-0.09 (-0.24 to 0.06)

Medial longitudinal fasciculus (left)	-0.001	0.001	-1.76	0.08	0.34	5809	-0.14 (-0.29 to 0.02)
Medial longitudinal fasciculus (right)	-0.002	0.001	-2.73	0.006	0.13	5811	-0.21 (-0.37 to -0.06)
Medial leminiscus (left)	-0.001	0.001	-1.70	0.09	0.35	5812	-0.13 (-0.29 to 0.02)
Medial leminiscus (right)	-0.001	0.001	-1.57	0.12	0.39	5816	-0.12 (-0.28 to 0.03)
Occipitopontine tract (left)	-0.002	0.001	-2.15	0.03	0.24	5808	-0.17 (-0.32 to -0.014)
Occipitopontine tract (right)	-0.002	0.001	-2.19	0.03	0.24	5805	-0.17 (-0.32 to -0.02)
Optic radiation (left)	-0.002	0.001	-2.32	0.02	0.22	5813	-0.18 (-0.33 to -0.03)
Optic radiation (right)	-0.003	0.001	-3.33	0.001	0.06	5811	-0.26 (-0.41 to -0.11)
Parietopontine tract (left)	-0.001	0.001	-1.89	0.06	0.31	5805	-0.15 (-0.3 to 0.006)
Parietopontine tract (right)	-0.002	0.001	-2.57	0.01	0.15	5800	-0.2 (-0.35 to -0.05)
Superior cerebellar peduncle	-0.001	0.001	-0.90	0.37	0.63	5767	-0.07 (-0.22 to 0.08)
Superior longitudinal fasciculus (left)	-0.001	0.001	-2.08	0.04	0.24	5812	-0.16 (-0.31 to -0.009)
Superior longitudinal fasciculus (right)	-0.002	0.001	-2.51	0.01	0.16	5806	-0.2 (-0.35 to -0.04)
Spinothalamic tract (left)	-0.001	0.001	-1.70	0.09	0.35	5813	-0.13 (-0.29 to 0.02)
Spinothalamic tract (right)	-0.001	0.001	-1.83	0.07	0.33	5814	-0.14 (-0.3 to 0.01)
Uncinate fasciculus (left)	-0.003	0.001	-3.85	0.0001	0.02	5816	-0.3 (-0.45 to -0.15)
Uncinate fasciculus (right)	-0.002	0.001	-2.12	0.03	0.24	5818	-0.17 (-0.32 to -0.01)
Ventral occipital fasciculus (left)	-0.002	0.001	-1.90	0.06	0.31	5808	-0.15 (-0.3 to 0.005)
Ventral occipital fasciculus (right)	-0.002	0.001	-1.77	0.08	0.34	5815	-0.14 (-0.29 to 0.02)

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Supplemental Table 6. Results of complementary pairs stability. Numbers represent the fraction of 100 random splits of the data where the association was nominally significant p < .05 in both halves. The maximum fraction seen in 1000 permutations of the tract data was .06.

Tract names	ADHD Diagnosis	Attention Problems	Aggressive Behavior	Anxious - Depressed	Rule Breaking Behavior	Social Problems	Somatic Complaints	Thought Problems	Withdrawn Depressed
Anterior commissure	0.01	0	0	0	0	0	0	0	0
Arcuate fasciculus (left)	0	0.23	0	0	0	0	0	0	0.01
Arcuate fasciculus (right)	0	0	0	0	0	0	0	0	0.01
Frontal aslant tract (left)	0	0	0	0	0	0	0	0.01	0
Frontal aslant tract (right)	0	0	0	0	0	0	0	0	0
Cingulum (left)	0	0	0	0	0	0	0	0	0
Cingulum (right)	0	0	0	0	0	0	0	0	0
Corpus callosum	0	0	0	0	0	0	0	0	0
Forceps major	0	0	0	0	0	0.13	0	0	0
Forceps minor	0	0	0	0	0.01	0	0	0.01	0.01
Corpus callosum (mid)	0	0	0	0	0	0	0	0	0
Corticospinal tract (left)	0	0	0	0	0	0	0	0.01	0
Corticospinal tract (right)	0	0	0	0	0	0	0	0	0.01
Fornix	0	0	0	0	0.01	0	0	0	0
Frontopontine tract (left)	0	0	0	0	0.01	0	0	0.01	0
Frontopontine tract (right)	0	0	0	0	0	0	0	0.02	0.01
Inferior cerebellar peduncle (left)	0	0	0	0	0	0	0	0	0
Inferior cerebellar peduncle (right)	0	0	0	0	0	0	0	0	0
Inferior frontooccipital fasciculus (left)	0	0.06	0	0	0	0	0	0	0
Inferior frontooccipital fasciculus (right)	0.1	0	0	0	0	0	0	0.01	0.03

Inferior longitudinal fasciculus (left)	0.47	0.5	0	0	0	0.18	0	0	0
Inferior longitudinal fasciculus (right)	0.47	0.16	0	0	0	0	0	0	0
Middle cerebellar peduncle	0	0	0	0	0.01	0	0	0	0
Medial longitudinal fasciculus (left)	0	0	0	0	0.01	0.19	0	0	0
Medial longitudinal fasciculus (right)	0.02	0	0.01	0	0.02	0	0	0	0.01
Medial leminiscus (left)	0	0	0	0	0.01	0	0	0	0.04
Medial leminiscus (right)	0	0	0	0.02	0.01	0	0	0	0.01
Occipitopontine tract (left)	0	0	0	0	0	0	0	0	0
Occipitopontine tract (right)	0	0	0	0	0.04	0	0	0.01	0.01
Optic radiation (left)	0	0	0	0	0	0.01	0	0	0
Optic radiation (right)	0.42	0.01	0	0	0	0	0	0	0
Parietopontine tract (left)	0	0	0	0	0	0	0	0.01	0
Parietopontine tract (right)	0	0	0	0	0	0	0	0	0
Superior cerebellar peduncle	0	0	0.01	0	0.01	0	0	0	0
Superior longitudinal fasciculus (left)	0	0.26	0	0	0	0.2	0	0	0
Superior longitudinal fasciculus (right)	0	0.02	0	0	0	0.42	0	0	0
Spinothalamic tract (left)	0	0	0	0	0.02	0	0	0	0.04
Spinothalamic tract (right)	0	0	0	0.02	0.01	0	0	0	0.01
Uncinate fasciculus (left)	0.64	0.77	0	0	0	0.01	0	0	0
Uncinate fasciculus (right)	0	0	0	0	0.01	0	0	0.01	0.01
Ventral occipital fasciculus (left)	0	0	0	0	0	0	0	0	0
Ventral occipital fasciculus (right)	0	0	0	0	0	0	0	0.02	0

Supplemental Table 7. Associations between attention problems as assessed using the CBCL and fractional anisotropy of the white matter tracts at a more stringent motion threshold (20% exclusion threshold).

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.0006	0.0002	-2.48	0.01	5478	-0.1 (-0.18 to -0.02)
Arcuate fasciculus (left)	-0.0002	0.00008	-3.14	0.002	5449	-0.13 (-0.20 to -0.05)
Arcuate fasciculus (right)	-0.0001	0.00007	-1.94	0.05	5448	-0.08 (-0.16 to 0.001)
Frontal aslant tract (left)	-0.0001	0.00007	-1.81	0.07	5456	-0.07 (-0.15 to 0.006)
Frontal aslant tract (right)	-0.0001	0.00007	-1.56	0.12	5454	-0.06 (-0.14 to 0.02)
Cingulum (left)	-0.0002	0.00009	-2.41	0.02	5457	-0.1 (-0.17 to -0.02)
Cingulum (right)	-0.0002	0.00008	-1.85	0.07	5459	-0.08 (-0.15 to 0.005)
Corpus callosum	-0.0001	0.00006	-2.31	0.02	5449	-0.09 (-0.17 to -0.014)
Forceps major	-0.0002	0.00008	-2.20	0.03	5441	-0.09 (-0.17 to -0.01)
Forceps minor	-0.0001	0.00009	-1.53	0.13	5443	-0.06 (-0.14 to 0.018)
Corpus callosum (mid)	-0.0001	0.00007	-1.61	0.11	5451	-0.07 (-0.14 to 0.014)
Corticospinal tract (left)	-0.0001	0.00007	-1.96	0.05	5454	-0.08 (-0.16 to 0.0002)
Corticospinal tract (right)	-0.0001	0.00007	-1.37	0.17	5446	-0.06 (-0.13 to 0.02)
Fornix	-0.0002	0.0001	-1.29	0.2	5445	-0.05 (-0.13 to 0.03)
Frontopontine tract (left)	-0.0001	0.00006	-1.90	0.06	5449	-0.08 (-0.16 to 0.002)
Frontopontine tract (right)	-0.0001	0.00007	-1.51	0.13	5445	-0.06 (-0.14 to 0.02)
Inferior cerebellar peduncle (left)	0.0000	0.0001	-0.27	0.79	5424	-0.01 (-0.09 to 0.07)
Inferior cerebellar peduncle (right)	0.0000	0.0001	-0.21	0.83	5433	-0.009 (-0.09 to 0.07)
Inferior frontooccipital fasciculus (left)	-0.0002	0.00008	-2.48	0.01	5453	-0.1 (-0.18 to -0.02)
Inferior frontooccipital fasciculus (right)	-0.0002	0.00008	-2.62	0.009	5455	-0.11 (-0.18 to -0.03)
Inferior longitudinal fasciculus (left)	-0.0002	0.00008	-2.94	0.003	5453	-0.12 (-0.2 to -0.04)
Inferior longitudinal fasciculus (right)	-0.0003	0.00009	-3.47	0.001	5455	-0.14 (-0.22 to -0.06)

Middle cerebellar peduncle	0.0000	0.00009	-0.26	0.79	5413	-0.01 (-0.09 to 0.07)
Medial longitudinal fasciculus (left)	-0.0002	0.00008	-2.42	0.02	5453	-0.1 (-0.18 to -0.02)
Medial longitudinal fasciculus (right)	-0.0002	0.00008	-2.79	0.005	5448	-0.11 (-0.19 to -0.03)
Medial leminiscus (left)	-0.0001	0.00009	-1.15	0.25	5461	-0.05 (-0.13 to 0.03)
Medial leminiscus (right)	-0.0001	0.00009	-0.95	0.34	5458	-0.04 (-0.12 to 0.04)
Occipitopontine tract (left)	-0.0001	0.00007	-2.07	0.04	5456	-0.08 (-0.16 to -0.004)
Occipitopontine tract (right)	-0.0001	0.00008	-1.69	0.09	5449	-0.07 (-0.15 to 0.01)
Optic radiation (left)	-0.0002	0.00008	-2.20	0.03	5456	-0.09 (-0.17 to -0.009)
Optic radiation (right)	-0.0002	0.00008	-2.96	0.003	5451	-0.12 (-0.2 to -0.04)
Parietopontine tract (left)	-0.0001	0.00007	-1.96	0.05	5456	-0.08 (-0.16 to 0.0002)
Parietopontine tract (right)	-0.0002	0.00007	-2.30	0.02	5447	-0.09 (-0.17 to -0.014)
Superior cerebellar peduncle	-0.0001	0.00008	-0.74	0.46	5412	-0.03 (-0.11 to 0.05)
Superior longitudinal fasciculus (left)	-0.0002	0.00007	-2.86	0.004	5453	-0.12 (-0.19 to -0.04)
Superior longitudinal fasciculus (right)	-0.0002	0.00007	-2.74	0.006	5451	-0.11 (-0.19 to -0.03)
Spinothalamic tract (left)	-0.0001	0.00009	-1.33	0.18	5458	-0.05 (-0.13 to 0.03)
Spinothalamic tract (right)	-0.0001	0.00009	-1.15	0.25	5456	-0.05 (-0.13 to 0.03)
Uncinate fasciculus (left)	-0.0003	0.00009	-3.41	0.001	5454	-0.14 (-0.21 to -0.06)
Uncinate fasciculus (right)	-0.0001	0.00009	-1.65	0.1	5459	-0.07 (-0.15 to 0.01)
Ventral occipital fasciculus (left)	-0.0001	0.00009	-1.18	0.24	5460	-0.05 (-0.13 to 0.03)
Ventral occipital fasciculus (right)	-0.0001	0.0001	-1.07	0.29	5460	-0.04 (-0.12 to 0.04)

Supplemental Table 8. Associations between ADHD diagnosis and fractional anisotropy of the white matter tracts at a more stringent motion (20% exclusion threshold).

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.002	0.003	-0.69	0.49	4686	-0.06 (-0.24 to 0.11)
Arcuate fasciculus (left)	-0.003	0.0009	-2.85	0.005	4662	-0.25 (-0.43 to -0.08)
Arcuate fasciculus (right)	-0.002	0.0008	-2.30	0.02	4660	-0.21 (-0.38 to -0.03)
Frontal aslant tract (left)	-0.002	0.0008	-2.82	0.005	4668	-0.25 (-0.43 to -0.08)
Frontal aslant tract (right)	-0.002	0.0008	-2.39	0.02	4665	-0.21 (-0.39 to -0.04)
Cingulum (left)	-0.003	0.001	-2.81	0.005	4666	-0.25 (-0.42 to -0.07)
Cingulum (right)	-0.003	0.001	-2.54	0.01	4666	-0.23 (-0.4 to -0.05)
Corpus callosum	-0.002	0.0007	-2.26	0.02	4658	-0.2 (-0.38 to -0.03)
Forceps major	-0.002	0.0009	-1.65	0.1	4652	-0.15 (-0.32 to 0.03)
Forceps minor	-0.002	0.001	-2.08	0.04	4653	-0.19 (-0.36 to -0.01)
Corpus callosum (mid)	-0.002	0.0008	-2.04	0.04	4660	-0.18 (-0.36 to -0.006)
Corticospinal tract (left)	-0.002	0.0008	-2.29	0.02	4663	-0.2 (-0.38 to -0.03)
Corticospinal tract (right)	-0.002	0.0008	-1.99	0.05	4658	-0.18 (-0.35 to -0.002)
Fornix	-0.001	0.002	-0.85	0.39	4658	-0.08 (-0.25 to 0.1)
Frontopontine tract (left)	-0.002	0.0007	-2.44	0.02	4658	-0.22 (-0.39 to -0.04)
Frontopontine tract (right)	-0.002	0.0007	-2.38	0.02	4659	-0.21 (-0.39 to -0.04)
Inferior cerebellar peduncle (left)	0.00003	0.001	0.03	0.98	4641	0.003 (-0.17 to 0.18)
Inferior cerebellar peduncle (right)	-0.001	0.001	-0.93	0.35	4650	-0.08 (-0.26 to 0.09)
Inferior frontooccipital fasciculus (left)	-0.002	0.0010	-2.37	0.02	4665	-0.21 (-0.39 to -0.04)
Inferior frontooccipital fasciculus (right)	-0.003	0.0009	-3.01	0.003	4664	-0.27 (-0.44 to -0.09)
Inferior longitudinal fasciculus (left)	-0.003	0.0009	-2.95	0.003	4665	-0.26 (-0.44 to -0.09)
Inferior longitudinal fasciculus (right)	-0.003	0.001	-3.25	0.001	4664	-0.29 (-0.47 to -0.11)
Middle cerebellar peduncle	-0.001	0.0009	-1.14	0.25	4631	-0.1 (-0.28 to 0.07)

Medial longitudinal fasciculus (left)	-0.001	0.0009	-1.39	0.16	4665	-0.12 (-0.3 to 0.05)
Medial longitudinal fasciculus (right)	-0.002	0.0009	-2.06	0.04	4662	-0.18 (-0.36 to -0.008)
Medial leminiscus (left)	-0.002	0.0009	-1.76	0.08	4671	-0.16 (-0.33 to 0.02)
Medial leminiscus (right)	-0.001	0.0009	-1.49	0.14	4668	-0.13 (-0.31 to 0.04)
Occipitopontine tract (left)	-0.002	0.0008	-1.97	0.05	4667	-0.18 (-0.35 to -0.001)
Occipitopontine tract (right)	-0.001	0.0009	-1.49	0.14	4662	-0.13 (-0.31 to 0.04)
Optic radiation (left)	-0.002	0.001	-1.53	0.13	4666	-0.14 (-0.31 to 0.04)
Optic radiation (right)	-0.002	0.0009	-2.63	0.009	4661	-0.23 (-0.41 to -0.06)
Parietopontine tract (left)	-0.002	0.0008	-2.31	0.02	4665	-0.21 (-0.4 to -0.03)
Parietopontine tract (right)	-0.002	0.0008	-2.22	0.03	4658	-0.2 (-0.37 to -0.02)
Superior cerebellar peduncle	-0.0007	0.0009	-0.82	0.41	4629	-0.07 (-0.25 to 0.1)
Superior longitudinal fasciculus (left)	-0.002	0.0008	-2.13	0.03	4665	-0.19 (-0.36 to -0.01)
Superior longitudinal fasciculus (right)	-0.002	0.0008	-2.96	0.003	4660	-0.26 (-0.44 to -0.09)
Spinothalamic tract (left)	-0.002	0.0009	-1.76	0.08	4667	-0.16 (-0.33 to 0.02)
Spinothalamic tract (right)	-0.002	0.0009	-1.81	0.07	4666	-0.16 (-0.34 to 0.01)
Uncinate fasciculus (left)	-0.003	0.001	-3.09	0.002	4665	-0.28 (-0.45 to -0.1)
Uncinate fasciculus (right)	-0.002	0.001	-2.01	0.05	4667	-0.18 (-0.35 to -0.004)
Ventral occipital fasciculus (left)	-0.001	0.001	-1.34	0.18	4669	-0.12 (-0.29 to 0.06)
Ventral occipital fasciculus (right)	-0.0009	0.001	-0.80	0.42	4669	-0.07 (-0.25 to 0.1)

Supplemental Table 9. Associations between movement QC variables and CBCL attention problem and ADHD diagnosis, before and after matching.

QC variable	B	SE	t-value	p-value	ES (95% CI of ES)
Associations between motion QC parameters and CBCL attention problems score prior to matching on QC parameters (N=6933)					
PC1	0.01	0.005	2.61	0.01	0.09 (0.02 to 0.16)
PC2	-0.01	0.002	-2.57	0.01	-0.09 (-0.15 to -0.02)
PC3	0.001	0.002	0.88	0.38	0.03 (-0.04 to 0.1)
Associations between motion QC parameters and CBCL attention problems score after matching on QC parameters (N=6121)					
PC1	0.001	0.004	0.3	0.77	0.01 (-0.06 to 0.08)
PC2	-0.001	0.002	-0.48	0.63	-0.02 (-0.09 to 0.06)
PC3	0.003	0.002	1.89	0.06	0.07 (-0.003 to 0.14)
Associations between motion QC parameters and ADHD diagnosis prior to matching on QC parameters (N=5835)					
PC1	0.34	0.1	3.46	0.001	0.27 (0.12 to 0.42)
PC2	-0.13	0.05	-2.74	0.01	-0.21 (-0.36 to -0.06)
PC3	0.06	0.03	1.73	0.08	0.13 (-0.02 to 0.29)
Associations between motion QC parameters and ADHD diagnosis after matching on QC parameters (N=2097)					
PC1	0.11	0.1	1.17	0.24	0.23 (-0.16 to 0.62)
PC2	0.07	0.05	1.41	0.16	0.28 (-0.11 to 0.67)
PC3	0.04	0.03	1.29	0.2	0.25 (-0.14 to 0.64)

Abbreviations. ADHD, attention deficit/hyperactivity disorder; PC1, principal component 1; PC2, principal component; PC3, principal component; QC, quality control.

Supplemental Table 10. Associations between attention problems as assessed using the CBCL and fractional anisotropy of the white matter tracts following 1:2 matching on motion and other key variables.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.0004	0.0002	-1.84	0.07	6114	-0.07 (-0.14 to 0.005)
Arcuate fasciculus (left)	-0.0002	0.00007	-2.77	0.006	6101	-0.1 (-0.18 to -0.03)
Arcuate fasciculus (right)	-0.00009	0.00007	-1.31	0.19	6097	-0.05 (-0.12 to 0.02)
Frontal aslant tract (left)	-0.00004	0.00006	-0.65	0.52	6092	-0.02 (-0.1 to 0.05)
Frontal aslant tract (right)	-0.00002	0.00006	-0.29	0.77	6094	-0.01 (-0.09 to 0.03)
Cingulum (left)	-0.0001	0.00008	-1.53	0.13	6102	-0.06 (-0.13 to 0.02)
Cingulum (right)	-0.00009	0.00008	-1.15	0.25	6099	-0.04 (-0.12 to 0.03)
Corpus callosum	-0.00007	0.00006	-1.20	0.23	6095	-0.05 (-0.12 to 0.03)
Forceps major	-0.0001	0.00008	-1.60	0.11	6085	-0.06 (-0.13 to 0.01)
Forceps minor	-0.00006	0.00008	-0.73	0.47	6088	-0.03 (-0.1 to 0.05)
Corpus callosum (mid)	-0.00002	0.00006	-0.37	0.71	6099	-0.01 (-0.09 to 0.06)
Corticospinal tract (left)	-0.00008	0.00007	-1.12	0.26	6097	-0.04 (-0.12 to 0.03)
Corticospinal tract (right)	-0.00005	0.00007	-0.77	0.44	6094	-0.03 (-0.1 to 0.05)
Fornix	-0.0002	0.0001	-1.33	0.19	6085	-0.05 (-0.12 to 0.02)
Frontopontine tract (left)	-0.00007	0.00006	-1.17	0.24	6103	-0.04 (-0.12 to 0.03)
Frontopontine tract (right)	-0.00006	0.00006	-0.91	0.36	6093	-0.03 (-0.11 to 0.04)
Inferior cerebellar peduncle (left)	-0.00002	0.0001	-0.22	0.83	6066	-0.008 (-0.08 to 0.07)
Inferior cerebellar peduncle (right)	0.000005	0.0001	0.05	0.96	6066	0.002 (-0.07 to 0.08)
Inferior frontooccipital fasciculus (left)	-0.0002	0.00008	-2.49	0.01	6096	-0.09 (-0.17 to -0.02)
Inferior frontooccipital fasciculus (right)	-0.0002	0.00008	-2.06	0.04	6105	-0.08 (-0.15 to -0.004)
Inferior longitudinal fasciculus (left)	-0.0002	0.00007	-3.13	0.002	6096	-0.12 (-0.19 to -0.04)
Inferior longitudinal fasciculus (right)	-0.0002	0.00008	-2.92	0.004	6101	-0.11 (-0.18 to -0.04)
Middle cerebellar peduncle	-0.00004	0.00008	-0.43	0.67	6056	-0.02 (-0.09 to 0.06)

Medial longitudinal fasciculus (left)	-0.0002	0.00007	-2.01	0.05	6094	-0.08 (-0.15 to -0.002)
Medial longitudinal fasciculus (right)	-0.0001	0.00007	-1.97	0.05	6096	-0.07 (-0.15 to -0.0004)
Medial leminiscus (left)	-0.00008	0.00008	-1.04	0.3	6098	-0.04 (-0.11 to 0.04)
Medial leminiscus (right)	-0.00007	0.00008	-0.85	0.4	6100	-0.03 (-0.11 to 0.04)
Occipitopontine tract (left)	-0.0001	0.00007	-1.57	0.12	6096	-0.06 (-0.13 to 0.02)
Occipitopontine tract (right)	-0.0001	0.00007	-1.39	0.17	6091	-0.05 (-0.13 to 0.02)
Optic radiation (left)	-0.0002	0.00008	-2.44	0.02	6100	-0.09 (-0.16 to -0.02)
Optic radiation (right)	-0.0002	0.00007	-2.68	0.008	6100	-0.1 (-0.17 to -0.03)
Parietopontine tract (left)	-0.00008	0.00007	-1.19	0.24	6097	-0.05 (-0.12 to 0.03)
Parietopontine tract (right)	-0.00008	0.00006	-1.28	0.2	6089	-0.05 (-0.12 to 0.03)
Superior cerebellar peduncle	-0.00008	0.00008	-0.94	0.35	6052	-0.04 (-0.11 to 0.04)
Superior longitudinal fasciculus (left)	-0.0002	0.00007	-2.52	0.01	6098	-0.09 (-0.17 to -0.02)
Superior longitudinal fasciculus (right)	-0.0001	0.00007	-2.11	0.04	6095	-0.08 (-0.15 to -0.006)
Spinothalamic tract (left)	-0.00009	0.00008	-1.18	0.24	6099	-0.05 (-0.12 to 0.03)
Spinothalamic tract (right)	-0.00009	0.00008	-1.07	0.28	6101	-0.04 (-0.11 to 0.03)
Uncinate fasciculus (left)	-0.0003	0.00008	-3.39	0.001	6104	-0.13 (-0.2 to -0.05)
Uncinate fasciculus (right)	-0.0001	0.00008	-1.42	0.16	6107	-0.05 (-0.13 to 0.02)
Ventral occipital fasciculus (left)	-0.00009	0.00009	-1.07	0.29	6095	-0.04 (-0.11 to 0.03)
Ventral occipital fasciculus (right)	-0.0001	0.00009	-1.19	0.23	6102	-0.05 (-0.12 to 0.03)

Supplemental Table 11. Associations between ADHD diagnosis and fractional anisotropy of the white matter tracts following 1:2 matching on motion and other key variables.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	0.002	0.003	0.63	0.53	2096	0.13 (-0.27, 0.52)
Arcuate fasciculus (left)	-0.002	0.001	-2.13	0.04	2089	-0.43 (-0.83, -0.03)
Arcuate fasciculus (right)	-0.002	0.001	-1.84	0.07	2088	-0.37 (-0.77, 0.03)
Frontal aslant tract (left)	-0.002	0.001	-1.73	0.09	2087	-0.35 (-0.74, 0.05)
Frontal aslant tract (right)	-0.002	0.001	-1.75	0.08	2088	-0.35 (-0.75, 0.05)
Forceps major	-0.002	0.001	-1.49	0.14	2083	-0.30 (-0.69, 0.10)
Forceps minor	-0.002	0.001	-1.59	0.11	2083	-0.32 (-0.72, 0.08)
Corpus callosum (mid)	-0.001	0.001	-1.40	0.17	2088	-0.28 (-0.68, 0.12)
Corpus callosum	-0.002	0.001	-1.74	0.09	2084	-0.35 (-0.75, 0.05)
Cingulum (left)	-0.002	0.001	-2.15	0.03	2085	-0.43 (-0.83, -0.03)
Cingulum (right)	-0.002	0.001	-1.76	0.08	2089	-0.35 (-0.75, 0.04)
Corticospinal tract (left)	-0.002	0.001	-1.54	0.13	2087	-0.31 (-0.71, 0.09)
Corticospinal tract (right)	-0.001	0.001	-1.35	0.18	2087	-0.27 (-0.67, 0.13)
Fornix	-0.003	0.002	-1.34	0.18	2086	-0.27 (-0.66, 0.13)
Frontopontine tract (left)	-0.002	0.001	-1.70	0.09	2091	-0.34 (-0.74, 0.06)
Frontopontine tract (right)	-0.001	0.001	-1.57	0.12	2088	-0.32 (-0.71, 0.08)
Inferior cerebellar peduncle (left)	-0.0009	0.001	-0.72	0.47	2082	-0.14 (-0.54, 0.25)
Inferior cerebellar peduncle (right)	-0.002	0.001	-1.24	0.22	2080	-0.25 (-0.64, 0.15)
Inferior frontooccipital fasciculus (left)	-0.002	0.001	-1.57	0.12	2086	-0.32 (-0.71, 0.08)
Inferior frontooccipital fasciculus (right)	-0.002	0.001	-1.76	0.08	2092	-0.35 (-0.75, 0.04)
Inferior longitudinal fasciculus (left)	-0.003	0.001	-2.61	0.01	2084	-0.52 (-0.92, -0.12)
Inferior longitudinal fasciculus (right)	-0.003	0.001	-2.49	0.01	2087	-0.50 (-0.90, -0.10)

Middle cerebellar peduncle	-0.002	0.001	-1.47	0.15	2076	-0.30 (-0.69, 0.10)
Medial longitudinal fasciculus (left)	-0.0008	0.001	-0.74	0.46	2089	-0.15 (-0.54, 0.25)
Medial longitudinal fasciculus (right)	-0.002	0.001	-1.52	0.13	2091	-0.31 (-0.70, 0.09)
Medial leminiscus (left)	-0.001	0.001	-1.18	0.24	2089	-0.24 (-0.63, 0.16)
Medial leminiscus (right)	-0.0008	0.001	-0.76	0.45	2091	-0.15 (-0.55, 0.24)
Occipitopontine tract (left)	-0.001	0.001	-1.45	0.15	2088	-0.29 (-0.69, 0.11)
Occipitopontine tract (right)	-0.0007	0.001	-0.69	0.49	2086	-0.14 (-0.53, 0.26)
Optic radiation (left)	-0.002	0.001	-1.35	0.18	2083	-0.27 (-0.67, 0.13)
Optic radiation (right)	-0.002	0.001	-1.98	0.05	2088	-0.40 (-0.79, 0.00)
Parietopontine tract (left)	-0.001	0.001	-1.50	0.14	2088	-0.30 (-0.70, 0.10)
Parietopontine tract (right)	-0.001	0.001	-1.39	0.17	2086	-0.28 (-0.67, 0.12)
Superior cerebellar peduncle	-0.001	0.001	-1.12	0.27	2081	-0.23 (-0.62, 0.17)
Superior longitudinal fasciculus (left)	-0.002	0.001	-1.88	0.06	2086	-0.38 (-0.77, 0.02)
Superior longitudinal fasciculus (right)	-0.002	0.001	-2.28	0.02	2087	-0.46 (-0.86, -0.06)
Spinothalamic tract (left)	-0.001	0.001	-1.11	0.27	2092	-0.22 (-0.62, 0.17)
Spinothalamic tract (right)	-0.001	0.001	-0.99	0.32	2091	-0.20 (-0.59, 0.20)
Uncinate fasciculus (left)	-0.003	0.001	-2.40	0.02	2091	-0.48 (-0.88, -0.08)
Uncinate fasciculus (right)	-0.002	0.001	-1.37	0.17	2090	-0.28 (-0.67, 0.12)
Ventral occipital fasciculus (left)	-0.001	0.001	-1.22	0.23	2087	-0.25 (-0.64, 0.15)
Ventral occipital fasciculus (right)	-0.0003	0.001	-0.28	0.78	2089	-0.06 (-0.45, 0.34)

Supplemental Table 12. Associations between attention problems as assessed using the CBCL and fractional anisotropy of the white matter tracts after controlling for estimates of general intelligence.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.0004	0.0002	-1.93	0.05	6926	-0.07 (-0.13 to 0.001)
Arcuate fasciculus (left)	-0.0002	0.00007	-2.88	0.004	6907	-0.1 (-0.17 to -0.03)
Arcuate fasciculus (right)	-0.0001	0.00007	-1.94	0.05	6906	-0.07 (-0.13 to 0.001)
Frontal aslant tract (left)	-0.00007	0.00006	-1.14	0.26	6893	-0.04 (-0.11 to 0.03)
Frontal aslant tract (right)	-0.00006	0.00006	-0.94	0.35	6899	-0.03 (-0.1 to 0.04)
Cingulum (left)	-0.0002	0.00008	-2.03	0.04	6907	-0.07 (-0.14 to -0.002)
Cingulum (right)	-0.0001	0.00008	-1.77	0.08	6907	-0.06 (-0.13 to 0.007)
Corpus callosum	-0.00009	0.00006	-1.56	0.12	6900	-0.05 (-0.12 to 0.01)
Forceps major	-0.0001	0.00007	-1.72	0.09	6888	-0.06 (-0.13 to 0.008)
Forceps minor	-0.00008	0.00008	-1.10	0.27	6895	-0.04 (-0.11 to 0.03)
Corpus callosum (mid)	-0.00004	0.00006	-0.73	0.47	6904	-0.03 (-0.09 to 0.04)
Corticospinal tract (left)	-0.0001	0.00006	-1.52	0.13	6901	-0.05 (-0.12 to 0.02)
Corticospinal tract (right)	-0.00008	0.00006	-1.22	0.22	6900	-0.04 (-0.11 to 0.03)
Fornix	-0.0001	0.0001	-0.99	0.32	6886	-0.03 (-0.1 to 0.03)
Frontopontine tract (left)	-0.00009	0.00006	-1.60	0.11	6909	-0.06 (-0.12 to 0.01)
Frontopontine tract (right)	-0.00008	0.00006	-1.35	0.18	6900	-0.05 (-0.11 to 0.02)
Inferior cerebellar peduncle (left)	-0.00003	0.00009	-0.30	0.76	6863	-0.01 (-0.08 to 0.06)
Inferior cerebellar peduncle (right)	-0.00005	0.00009	-0.55	0.59	6866	-0.02 (-0.09 to 0.05)
Inferior frontooccipital fasciculus (left)	-0.00020	0.00007	-2.62	0.009	6902	-0.09 (-0.16 to -0.02)
Inferior frontooccipital fasciculus (right)	-0.0001	0.00007	-1.94	0.05	6913	-0.07 (-0.13 to 0.001)

Inferior longitudinal fasciculus (left)	-0.0002	0.00007	-3.28	0.001	6904	-0.11 (-0.18 to -0.05)
Inferior longitudinal fasciculus (right)	-0.0002	0.00008	-2.80	0.005	6908	-0.1 (-0.16 to -0.03)
Middle cerebellar peduncle	-0.00007	0.00008	-0.90	0.37	6858	-0.03 (-0.1 to 0.04)
Medial longitudinal fasciculus (left)	-0.0002	0.00007	-2.37	0.02	6901	-0.08 (-0.15 to -0.01)
Medial longitudinal fasciculus (right)	-0.0002	0.00007	-2.47	0.01	6901	-0.09 (-0.15 to -0.02)
Medial leminiscus (left)	-0.0001	0.00008	-1.59	0.11	6904	-0.06 (-0.12 to 0.01)
Medial leminiscus (right)	-0.00008	0.00008	-1.05	0.29	6908	-0.04 (-0.1 to 0.03)
Occipitopontine tract (left)	-0.0001	0.00006	-2.03	0.04	6902	-0.07 (-0.14 to -0.002)
Occipitopontine tract (right)	-0.0001	0.00007	-1.57	0.12	6896	-0.05 (-0.12 to 0.01)
Optic radiation (left)	-0.0002	0.00007	-2.48	0.01	6908	-0.09 (-0.15 to -0.02)
Optic radiation (right)	-0.0002	0.00007	-2.49	0.01	6906	-0.09 (-0.15 to -0.02)
Parietopontine tract (left)	-0.0001	0.00006	-1.59	0.11	6901	-0.06 (-0.12 to 0.01)
Parietopontine tract (right)	-0.0001	0.00006	-1.68	0.09	6894	-0.06 (-0.13 to 0.01)
Superior cerebellar peduncle	-0.0001	0.00008	-1.50	0.13	6851	-0.05 (-0.12 to 0.02)
Superior longitudinal fasciculus (left)	-0.0002	0.00006	-2.96	0.003	6904	-0.1 (-0.17 to -0.04)
Superior longitudinal fasciculus (right)	-0.0002	0.00006	-2.56	0.01	6902	-0.09 (-0.16 to -0.02)
Spinothalamic tract (left)	-0.0001	0.00008	-1.60	0.11	6906	-0.06 (-0.12 to 0.01)
Spinothalamic tract (right)	-0.0001	0.00008	-1.33	0.18	6907	-0.05 (-0.11 to 0.02)
Uncinate fasciculus (left)	-0.0003	0.00008	-3.88	0.0001	6911	-0.13 (-0.2 to -0.07)
Uncinate fasciculus (right)	-0.0001	0.00008	-1.84	0.07	6913	-0.06 (-0.13 to 0.004)
Ventral occipital fasciculus (left)	-0.0001	0.00008	-1.38	0.17	6904	-0.05 (-0.12 to 0.02)
Ventral occipital fasciculus (right)	-0.0001	0.00009	-1.21	0.23	6909	-0.04 (-0.11 to 0.03)

Supplemental Table 13. Associations between ADHD diagnosis and fractional anisotropy of the white matter tracts after controlling for estimates of general intelligence.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.001	0.002	-0.4	0.69	5829	-0.03 (-0.18 to 0.12)
Arcuate fasciculus (left)	-0.002	0.0008	-2.23	0.03	5814	-0.17 (-0.33 to -0.02)
Arcuate fasciculus (right)	-0.001	0.0008	-1.89	0.06	5812	-0.15 (-0.3 to 0.006)
Frontal aslant tract (left)	-0.002	0.0007	-2.09	0.04	5801	-0.16 (-0.32 to -0.01)
Frontal aslant tract (right)	-0.001	0.0007	-1.59	0.11	5806	-0.12 (-0.28 to 0.03)
Cingulum (left)	-0.002	0.0009	-2.03	0.04	5812	-0.16 (-0.31 to -0.005)
Cingulum (right)	-0.002	0.0009	-2.41	0.02	5809	-0.19 (-0.34 to -0.03)
Corpus callosum	-0.001	0.0007	-1.96	0.05	5805	-0.15 (-0.31 to -0.00001)
Forceps major	-0.002	0.0008	-1.93	0.05	5798	-0.15 (-0.3 to 0.003)
Forceps minor	-0.002	0.0009	-1.83	0.07	5801	-0.14 (-0.29 to 0.011)
Corpus callosum (mid)	-0.0009	0.0007	-1.29	0.2	5807	-0.1 (-0.25 to 0.052)
Corticospinal tract (left)	-0.001	0.0007	-1.72	0.09	5805	-0.13 (-0.29 to 0.02)
Corticospinal tract (right)	-0.002	0.0007	-2.23	0.03	5806	-0.17 (-0.33 to -0.02)
Fornix	-0.002	0.001	-1.40	0.16	5798	-0.11 (-0.26 to 0.044)
Frontopontine tract (left)	-0.001	0.0007	-2.07	0.04	5814	-0.16 (-0.31 to -0.008)
Frontopontine tract (right)	-0.002	0.0007	-2.33	0.02	5809	-0.18 (-0.33 to -0.03)
Inferior cerebellar peduncle (left)	-0.0006	0.001	-0.59	0.56	5779	-0.05 (-0.2 to 0.11)
Inferior cerebellar peduncle (right)	-0.0009	0.001	-0.86	0.39	5782	-0.07 (-0.22 to 0.09)
Inferior frontooccipital fasciculus (left)	-0.002	0.0009	-2.38	0.02	5809	-0.19 (-0.34 to -0.03)

Inferior frontooccipital fasciculus (right)	-0.002	0.0008	-2.68	0.008	5817	-0.21 (-0.36 to -0.06)
Inferior longitudinal fasciculus (left)	-0.003	0.0008	-3.20	0.001	5811	-0.25 (-0.4 to -0.1)
Inferior longitudinal fasciculus (right)	-0.003	0.0009	-3.28	0.001	5814	-0.26 (-0.41 to -0.1)
Middle cerebellar peduncle	-0.0009	0.0008	-1.09	0.28	5776	-0.09 (-0.24 to 0.07)
Medial longitudinal fasciculus (left)	-0.001	0.0008	-1.62	0.11	5809	-0.13 (-0.28 to 0.03)
Medial longitudinal fasciculus (right)	-0.002	0.0008	-2.60	0.009	5811	-0.2 (-0.36 to -0.05)
Medial leminiscus (left)	-0.001	0.0008	-1.55	0.12	5812	-0.12 (-0.27 to 0.03)
Medial leminiscus (right)	-0.001	0.0008	-1.42	0.16	5816	-0.11 (-0.26 to 0.04)
Occipitopontine tract (left)	-0.002	0.0007	-2.02	0.04	5808	-0.16 (-0.31 to -0.004)
Occipitopontine tract (right)	-0.002	0.0008	-2.08	0.04	5805	-0.16 (-0.31 to -0.009)
Optic radiation (left)	-0.002	0.0009	-2.12	0.04	5813	-0.17 (-0.32 to -0.01)
Optic radiation (right)	-0.003	0.0008	-3.16	0.002	5811	-0.25 (-0.4 to -0.09)
Parietopontine tract (left)	-0.001	0.0007	-1.78	0.08	5805	-0.14 (-0.29 to 0.01)
Parietopontine tract (right)	-0.002	0.0007	-2.46	0.01	5800	-0.19 (-0.34 to -0.04)
Superior cerebellar peduncle	-0.0006	0.0008	-0.74	0.46	5767	-0.06 (-0.21 to 0.1)
Superior longitudinal fasciculus (left)	-0.001	0.0007	-1.87	0.06	5812	-0.15 (-0.3 to 0.007)
Superior longitudinal fasciculus (right)	-0.002	0.0007	-2.23	0.03	5806	-0.17 (-0.33 to -0.02)
Spinothalamic tract (left)	-0.001	0.0008	-1.53	0.13	5813	-0.12 (-0.27 to 0.03)
Spinothalamic tract (right)	-0.001	0.0008	-1.65	0.1	5814	-0.13 (-0.28 to 0.02)
Uncinate fasciculus (left)	-0.003	0.0009	-3.65	0.0003	5816	-0.28 (-0.44 to -0.13)
Uncinate fasciculus (right)	-0.002	0.0009	-2.01	0.05	5818	-0.16 (-0.31 to -0.004)
Ventral occipital fasciculus (left)	-0.002	0.0009	-1.68	0.09	5808	-0.13 (-0.28 to 0.02)
Ventral occipital fasciculus (right)	-0.002	0.001	-1.49	0.14	5815	-0.12 (-0.27 to 0.04)

Supplemental Table 14. Associations between attention problems as assessed using the CBCL and fractional anisotropy of the white matter tracts after correcting scores for medication status.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.0005	0.0002	-2.39	0.017	6926	-0.08 (-0.15 to -0.02)
Arcuate fasciculus (left)	-0.0002	0.00006	-3.27	0.001	6907	-0.11 (-0.18 to -0.05)
Arcuate fasciculus (right)	-0.0001	0.00006	-2.34	0.020	6906	-0.08 (-0.15 to -0.01)
Frontal aslant tract (left)	-0.00007	0.00006	-1.29	0.197	6893	-0.05 (-0.11 to 0.02)
Frontal aslant tract (right)	-0.00006	0.00005	-1.16	0.248	6899	-0.04 (-0.11 to 0.03)
Cingulum (left)	-0.0002	0.00007	-2.07	0.039	6907	-0.07 (-0.14 to -0.004)
Cingulum (right)	-0.0001	0.00007	-2.02	0.044	6907	-0.07 (-0.14 to -0.002)
Corpus callosum	-0.0001	0.00005	-1.85	0.065	6900	-0.06 (-0.13 to 0.004)
Forceps major	-0.0001	0.00007	-2.04	0.041	6888	-0.07 (-0.14 to -0.003)
Forceps minor	-0.00008	0.00007	-1.18	0.238	6895	-0.04 (-0.11 to 0.03)
Corpus callosum (mid)	-0.00005	0.00006	-0.94	0.345	6904	-0.03 (-0.1 to 0.04)
Corticospinal tract (left)	-0.00009	0.00006	-1.47	0.141	6901	-0.05 (-0.12 to 0.02)
Corticospinal tract (right)	-0.00008	0.00006	-1.31	0.191	6900	-0.05 (-0.11 to 0.02)
Fornix	-0.0001	0.0001	-1.04	0.299	6886	-0.04 (-0.1 to 0.03)
Frontopontine tract (left)	-0.00009	0.00005	-1.62	0.106	6909	-0.06 (-0.12 to 0.01)
Frontopontine tract (right)	-0.00008	0.00005	-1.49	0.137	6900	-0.05 (-0.12 to 0.012)
Inferior cerebellar peduncle (left)	-0.00003	0.00009	-0.30	0.762	6863	-0.011 (-0.08 to 0.06)

Inferior cerebellar peduncle (right)	-0.00003	0.00009	-0.29	0.769	6866	-0.01 (-0.08 to 0.06)
Inferior frontooccipital fasciculus (left)	-0.0002	0.00007	-2.96	0.003	6902	-0.1 (-0.17 to -0.03)
Inferior frontooccipital fasciculus (right)	-0.0002	0.00007	-2.43	0.015	6913	-0.08 (-0.15 to -0.02)
Inferior longitudinal fasciculus (left)	-0.0002	0.00006	-3.58	0.0004	6904	-0.12 (-0.19 to -0.06)
Inferior longitudinal fasciculus (right)	-0.0002	0.00007	-3.27	0.001	6908	-0.11 (-0.18 to -0.05)
Middle cerebellar peduncle	-0.00005	0.00007	-0.61	0.541	6858	-0.02 (-0.09 to 0.05)
Medial longitudinal fasciculus (left)	-0.0002	0.00006	-2.64	0.008	6901	-0.09 (-0.16 to -0.02)
Medial longitudinal fasciculus (right)	-0.0002	0.00006	-2.59	0.010	6901	-0.09 (-0.16 to -0.02)
Medial leminiscus (left)	-0.0001	0.00007	-1.37	0.170	6904	-0.05 (-0.12 to 0.02)
Medial leminiscus (right)	-0.00007	0.00007	-0.96	0.337	6908	-0.03 (-0.1 to 0.04)
Occipitopontine tract (left)	-0.0001	0.00006	-2.19	0.029	6902	-0.08 (-0.14 to -0.008)
Occipitopontine tract (right)	-0.0001	0.00006	-1.64	0.102	6896	-0.06 (-0.12 to 0.01)
Optic radiation (left)	-0.0002	0.00007	-2.82	0.005	6908	-0.1 (-0.16 to -0.03)
Optic radiation (right)	-0.0002	0.00006	-2.86	0.004	6906	-0.1 (-0.17 to -0.03)
Parietopontine tract (left)	-0.00009	0.00006	-1.58	0.115	6901	-0.06 (-0.12 to 0.01)
Parietopontine tract (right)	-0.0001	0.00006	-1.92	0.055	6894	-0.07 (-0.13 to 0.001)
Superior cerebellar peduncle	-0.00009	0.00007	-1.32	0.188	6851	-0.05 (-0.11 to 0.02)
Superior longitudinal fasciculus (left)	-0.0002	0.00006	-3.48	0.001	6904	-0.12 (-0.19 to -0.05)
Superior longitudinal fasciculus (right)	-0.0002	0.00006	-3.15	0.002	6902	-0.11 (-0.18 to -0.04)
Spinothalamic tract (left)	-0.0001	0.00007	-1.43	0.153	6906	-0.05 (-0.12 to 0.02)
Spinothalamic tract (right)	-0.00009	0.00008	-1.18	0.239	6907	-0.04 (-0.11 to 0.03)
Uncinate fasciculus (left)	-0.0003	0.00007	-4.18	0.00003	6911	-0.14 (-0.21 to -0.08)
Uncinate fasciculus (right)	-0.0001	0.00007	-1.97	0.049	6913	-0.07 (-0.14 to -0.0003)
Ventral occipital fasciculus (left)	-0.0001	0.00008	-1.88	0.061	6904	-0.07 (-0.13 to 0.003)
Ventral occipital fasciculus (right)	-0.0001	0.00008	-1.49	0.138	6909	-0.05 (-0.12 to 0.02)

Supplemental Table 15. Associations between attention problems as assessed using the CBCL and fractional anisotropy of the white matter tracts after removing subjects with possible bipolar and psychosis symptoms.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.0005	0.0002	-2.3	0.02	6492	-0.08 (-0.15 to -0.01)
Arcuate fasciculus (left)	-0.0002	0.00007	-2.93	0.004	6476	-0.11 (-0.18 to -0.04)
Arcuate fasciculus (right)	-0.0002	0.00007	-2.22	0.03	6476	-0.08 (-0.15 to -0.009)
Frontal aslant tract (left)	-0.00008	0.00007	-1.26	0.21	6463	-0.05 (-0.12 to 0.03)
Frontal aslant tract (right)	-0.00005	0.00006	-0.83	0.41	6468	-0.03 (-0.1 to 0.04)
Cingulum (left)	-0.0002	0.00008	-1.82	0.07	6474	-0.07 (-0.14 to 0.005)
Cingulum (right)	-0.0001	0.00008	-1.72	0.09	6474	-0.06 (-0.13 to 0.009)
Corpus callosum	-0.0001	0.00006	-2.06	0.04	6469	-0.08 (-0.15 to -0.003)
Forceps major	-0.0002	0.00008	-2.44	0.01	6457	-0.09 (-0.16 to -0.02)
Forceps minor	-0.0001	0.00008	-1.33	0.18	6463	-0.05 (-0.12 to 0.02)
Corpus callosum (mid)	-0.00006	0.00007	-0.94	0.35	6472	-0.03 (-0.11 to 0.04)
Corticospinal tract (left)	-0.0001	0.00007	-1.61	0.11	6471	-0.06 (-0.13 to 0.01)
Corticospinal tract (right)	-0.00009	0.00007	-1.38	0.17	6469	-0.05 (-0.12 to 0.02)
Fornix	-0.0002	0.0001	-1.30	0.19	6452	-0.05 (-0.12 to 0.02)
Frontopontine tract (left)	-0.0001	0.00006	-1.80	0.07	6476	-0.07 (-0.14 to 0.006)
Frontopontine tract (right)	-0.0001	0.00006	-1.58	0.12	6470	-0.06 (-0.13 to 0.01)
Inferior cerebellar peduncle (left)	-0.00006	0.0001	-0.64	0.52	6436	-0.02 (-0.1 to 0.05)
Inferior cerebellar peduncle (right)	-0.00009	0.0001	-0.90	0.37	6437	-0.03 (-0.1 to 0.04)
Inferior frontooccipital fasciculus (left)	-0.0003	0.00008	-3.51	0.0005	6471	-0.13 (-0.2 to -0.06)
Inferior frontooccipital fasciculus (right)	-0.0002	0.00008	-2.45	0.01	6479	-0.09 (-0.16 to -0.02)
Inferior longitudinal fasciculus (left)	-0.0003	0.00008	-3.91	0.0001	6473	-0.14 (-0.21 to -0.07)
Inferior longitudinal fasciculus (right)	-0.0003	0.00008	-3.38	0.0008	6475	-0.12 (-0.19 to -0.05)
Middle cerebellar peduncle	-0.0001	0.00009	-1.26	0.21	6433	-0.05 (-0.12 to 0.03)

Medial longitudinal fasciculus (left)	-0.0002	0.00007	-2.83	0.005	6470	-0.1 (-0.17 to -0.03)
Medial longitudinal fasciculus (right)	-0.0002	0.00007	-2.90	0.004	6468	-0.11 (-0.18 to -0.03)
Medial leminiscus (left)	-0.0002	0.00009	-1.87	0.06	6474	-0.07 (-0.14 to 0.003)
Medial leminiscus (right)	-0.0001	0.00009	-1.29	0.20	6477	-0.05 (-0.12 to 0.02)
Occipitopontine tract (left)	-0.0002	0.00007	-2.26	0.02	6471	-0.09 (-0.15 to -0.01)
Occipitopontine tract (right)	-0.0002	0.00007	-2.04	0.04	6465	-0.07 (-0.14 to -0.003)
Optic radiation (left)	-0.0003	0.00008	-3.29	0.001	6477	-0.12 (-0.19 to -0.05)
Optic radiation (right)	-0.0002	0.00008	-2.87	0.004	6473	-0.1 (-0.17 to -0.03)
Parietopontine tract (left)	-0.0001	0.00007	-1.72	0.09	6471	-0.06 (-0.13 to 0.009)
Parietopontine tract (right)	-0.0001	0.00007	-2.04	0.04	6463	-0.07 (-0.14 to -0.003)
Superior cerebellar peduncle	-0.0002	0.00008	-1.94	0.05	6424	-0.07 (-0.14 to 0.001)
Superior longitudinal fasciculus (left)	-0.0002	0.00007	-3.40	0.0007	6473	-0.12 (-0.19 to -0.05)
Superior longitudinal fasciculus (right)	-0.0002	0.00007	-2.83	0.005	6470	-0.1 (-0.17 to -0.03)
Spinothalamic tract (left)	-0.0002	0.00009	-1.87	0.06	6475	-0.07 (-0.14 to 0.004)
Spinothalamic tract (right)	-0.0001	0.00009	-1.61	0.11	6476	-0.06 (-0.13 to 0.01)
Uncinate fasciculus (left)	-0.0004	0.00009	-4.26	0.00002	6478	-0.15 (-0.22 to -0.08)
Uncinate fasciculus (right)	-0.0002	0.00009	-2.44	0.02	6480	-0.09 (-0.16 to -0.02)
Ventral occipital fasciculus (left)	-0.0002	0.00009	-1.85	0.06	6471	-0.07 (-0.14 to 0.004)
Ventral occipital fasciculus (right)	-0.0001	0.00009	-1.49	0.14	6476	-0.05 (-0.13 to 0.02)

Supplemental Table 16. Associations between ADHD diagnosis and fractional anisotropy of the white matter tracts after removing subjects with possible bipolar and psychosis symptoms.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.002	0.003	-0.73	0.46	5521	-0.06 (-0.22 to 0.1)
Arcuate fasciculus (left)	-0.002	0.001	-2.03	0.04	5509	-0.16 (-0.32 to -0.005)
Arcuate fasciculus (right)	-0.002	0.001	-2.10	0.04	5508	-0.17 (-0.33 to -0.01)
Frontal aslant tract (left)	-0.002	0.001	-2.05	0.04	5497	-0.16 (-0.32 to -0.007)
Frontal aslant tract (right)	-0.001	0.001	-1.37	0.17	5501	-0.11 (-0.27 to 0.05)
Cingulum (left)	-0.002	0.001	-1.77	0.08	5505	-0.14 (-0.3 to 0.02)
Cingulum (right)	-0.002	0.001	-2.23	0.03	5502	-0.18 (-0.34 to -0.02)
Corpus callosum	-0.002	0.001	-2.14	0.03	5499	-0.17 (-0.33 to -0.01)
Forceps major	-0.002	0.001	-2.41	0.02	5491	-0.19 (-0.35 to -0.04)
Forceps minor	-0.002	0.001	-1.83	0.07	5495	-0.15 (-0.31 to 0.01)
Corpus callosum (mid)	-0.001	0.001	-1.13	0.26	5501	-0.09 (-0.25 to 0.07)
Corticospinal tract (left)	-0.001	0.001	-1.36	0.17	5501	-0.11 (-0.27 to 0.05)
Corticospinal tract (right)	-0.002	0.001	-2.24	0.03	5501	-0.18 (-0.34 to -0.02)
Fornix	-0.002	0.002	-1.12	0.26	5490	-0.09 (-0.25 to 0.07)
Frontopontine tract (left)	-0.001	0.001	-1.85	0.06	5507	-0.15 (-0.31 to 0.009)
Frontopontine tract (right)	-0.002	0.001	-2.36	0.02	5504	-0.19 (-0.35 to -0.03)
Inferior cerebellar peduncle (left)	-0.001	0.001	-1.06	0.29	5477	-0.09 (-0.24 to 0.07)
Inferior cerebellar peduncle (right)	-0.001	0.001	-1.35	0.18	5478	-0.11 (-0.27 to 0.05)
Inferior frontooccipital fasciculus (left)	-0.003	0.001	-2.89	0.004	5503	-0.23 (-0.39 to -0.07)
Inferior frontooccipital fasciculus (right)	-0.003	0.001	-3.01	0.003	5509	-0.24 (-0.4 to -0.08)
Inferior longitudinal fasciculus (left)	-0.003	0.001	-3.51	0.0005	5504	-0.28 (-0.44 to -0.12)
Inferior longitudinal fasciculus (right)	-0.003	0.001	-3.42	0.001	5506	-0.28 (-0.43 to -0.12)
Middle cerebellar peduncle	-0.001	0.001	-1.31	0.19	5475	-0.11 (-0.26 to 0.05)
Medial longitudinal fasciculus (left)	-0.002	0.001	-1.79	0.07	5503	-0.14 (-0.3 to 0.01)

Medial longitudinal fasciculus (right)	-0.003	0.001	-2.98	0.003	5503	-0.24 (-0.4 to -0.08)
Medial leminiscus (left)	-0.002	0.001	-2.00	0.05	5508	-0.16 (-0.32 to -0.003)
Medial leminiscus (right)	-0.001	0.001	-1.59	0.11	5511	-0.13 (-0.29 to 0.03)
Occipitopontine tract (left)	-0.001	0.001	-1.62	0.11	5503	-0.13 (-0.29 to 0.03)
Occipitopontine tract (right)	-0.002	0.001	-2.17	0.03	5498	-0.17 (-0.33 to -0.02)
Optic radiation (left)	-0.002	0.001	-2.34	0.02	5506	-0.19 (-0.35 to -0.03)
Optic radiation (right)	-0.003	0.001	-3.09	0.002	5503	-0.25 (-0.41 to -0.09)
Parietopontine tract (left)	-0.001	0.001	-1.46	0.15	5501	-0.12 (-0.27 to 0.04)
Parietopontine tract (right)	-0.002	0.001	-2.55	0.01	5494	-0.21 (-0.36 to -0.05)
Superior cerebellar peduncle	-0.001	0.001	-1.34	0.18	5465	-0.11 (-0.27 to 0.05)
Superior longitudinal fasciculus (left)	-0.001	0.001	-1.70	0.09	5507	-0.14 (-0.29 to 0.02)
Superior longitudinal fasciculus (right)	-0.002	0.001	-2.47	0.01	5500	-0.2 (-0.36 to -0.04)
Spinothalamic tract (left)	-0.002	0.001	-1.96	0.05	5508	-0.16 (-0.32to 0.001)
Spinothalamic tract (right)	-0.002	0.001	-2.01	0.04	5509	-0.16 (-0.32 to -0.004)
Uncinate fasciculus (left)	-0.004	0.001	-3.96	0.00008	5509	-0.32 (-0.48 to -0.16)
Uncinate fasciculus (right)	-0.002	0.001	-2.50	0.01	5511	-0.2 (-0.36 to -0.04)
Ventral occipital fasciculus (left)	-0.002	0.001	-1.60	0.1	5501	-0.13 (-0.29 to 0.03)
Ventral occipital fasciculus (right)	-0.002	0.001	-1.65	0.1	5508	-0.13 (-0.29 to 0.03)

Supplemental Table 17. Results of the exploratory examination of age by attention problems interactions. No tracts survived FDR correction for the interaction between ADHD diagnosis and age.

Tract names	Best fitting age term	B	SE	t value	p value	FDR adjusted p value	N	Effect size (95% confidence interval)
Medial leminiscus (left)	Cubic	-0.04	0.01	-3.60	0.0003	0.007	1569	-0.09 (-0.14, -0.04)
Spinothalamic tract (left)	Cubic	-0.04	0.01	-3.71	0.0002	0.007	1568	-0.1 (-0.15, -0.05)
Spinothalamic tract (right)	Cubic	-0.04	0.01	-3.41	0.0007	0.009	1568	-0.09 (-0.14, -0.04)
Medial leminiscus (right)	Cubic	-0.03	0.01	-3.20	0.001	0.02	1566	-0.09 (-0.14, -0.03)
Corticospinal tract (left)	Quad	-0.02	0.01	-2.77	0.006	0.04	1566	-0.07 (-0.12, -0.02)
Parietopontine tract (left)	Quad	-0.02	0.01	-2.81	0.005	0.04	1566	-0.07 (-0.13, -0.02)

Supplemental Table 18. Associations between attention problems as assessed using the CBCL and axial diffusivity of the white matter tracts.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.0004	0.0001	-2.88	0.004	5828	-0.1 (-0.17 to -0.03)
Arcuate fasciculus (left)	-0.0002	0.00008	-2.47	0.01	5813	-0.09 (-0.15 to -0.02)
Arcuate fasciculus (right)	-0.00009	0.00008	-1.15	0.25	5814	-0.04 (-0.11 to 0.03)
Frontal aslant tract (left)	-0.0002	0.00009	-1.83	0.07	5803	-0.06 (-0.13 to 0.005)
Frontal aslant tract (right)	-0.0001	0.00008	-1.5	0.14	5805	-0.05 (-0.12 to 0.02)
Cingulum (left)	-0.0002	0.0001	-2.46	0.01	5822	-0.08 (-0.15 to -0.02)
Cingulum (right)	-0.0002	0.0001	-1.95	0.05	5822	-0.07 (-0.13 to 0)
Corpus callosum	-0.0002	0.0001	-2.1	0.04	5817	-0.07 (-0.14 to -0.005)
Forceps major	0.00006	0.0001	0.56	0.58	5818	0.02 (-0.05 to 0.09)
Forceps minor	-0.0003	0.0001	-2.44	0.02	5818	-0.08 (-0.15 to -0.02)
Corpus callosum (mid)	-0.0002	0.0001	-2.27	0.02	5814	-0.08 (-0.15 to -0.01)
Corticospinal tract (left)	-0.0002	0.00009	-1.76	0.08	5812	-0.06 (-0.13 to 0.01)
Corticospinal tract (right)	-0.0002	0.00009	-1.68	0.09	5817	-0.06 (-0.13 to 0.01)
Fornix	-0.0006	0.0003	-1.85	0.07	5823	-0.06 (-0.13 to 0.004)
Frontopontine tract (left)	-0.0002	0.00009	-1.85	0.06	5817	-0.06 (-0.13 to 0.004)
Frontopontine tract (right)	-0.0002	0.00009	-1.85	0.06	5813	-0.06 (-0.13 to 0.004)
Inferior cerebellar peduncle (left)	-0.00012	0.0001	-1.48	0.14	5801	-0.05 (-0.12 to 0.02)
Inferior cerebellar peduncle (right)	-0.00002	0.0001	-0.21	0.83	5804	-0.01 (-0.07 to 0.06)
Inferior frontooccipital fasciculus (left)	-0.0002	0.0001	-1.9	0.06	5826	-0.07 (-0.13 to 0.002)
Inferior frontooccipital fasciculus (right)	-0.0002	0.0001	-1.45	0.15	5825	-0.05 (-0.12 to 0.02)
Inferior longitudinal fasciculus (left)	-0.0001	0.0001	-1.39	0.17	5824	-0.05 (-0.12 to 0.02)
Inferior longitudinal fasciculus (right)	-0.0002	0.0001	-1.55	0.12	5826	-0.05 (-0.12 to 0.01)
Middle cerebellar peduncle	-0.0001	0.0001	-0.96	0.34	5811	-0.03 (-0.1 to 0.03)

Medial longitudinal fasciculus (left)	-0.0001	0.00009	-1.25	0.21	5816	-0.04 (-0.11 to 0.02)
Medial longitudinal fasciculus (right)	-0.00009	0.00009	-0.95	0.34	5821	-0.03 (-0.1 to 0.04)
Medial leminiscus (left)	-0.00008	0.0001	-0.65	0.52	5824	-0.02 (-0.09 to 0.05)
Medial leminiscus (right)	-0.00008	0.0001	-0.66	0.51	5823	-0.02 (-0.09 to 0.04)
Occipitopontine tract (left)	-0.0002	0.00009	-2.29	0.02	5813	-0.08 (-0.15 to -0.01)
Occipitopontine tract (right)	-0.00009	0.0001	-0.9	0.37	5822	-0.03 (-0.1 to 0.04)
Optic radiation (left)	-0.0002	0.0001	-1.31	0.19	5824	-0.05 (-0.11 to 0.02)
Optic radiation (right)	-0.0001	0.0001	-1.16	0.24	5826	-0.04 (-0.11 to 0.03)
Parietopontine tract (left)	-0.0002	0.00009	-1.88	0.06	5812	-0.07 (-0.13 to 0.003)
Parietopontine tract (right)	-0.0002	0.00009	-1.8	0.07	5815	-0.06 (-0.13 to 0.01)
Superior cerebellar peduncle	-0.0001	0.0001	-1.06	0.29	5814	-0.04 (-0.1 to 0.03)
Superior longitudinal fasciculus (left)	-0.00012	0.00007	-2.51	0.01	5810	-0.09 (-0.15 to -0.02)
Superior longitudinal fasciculus (right)	-0.0001	0.00008	-1.75	0.08	5809	-0.06 (-0.13 to 0.01)
Spinothalamic tract (left)	-0.00009	0.0001	-0.73	0.46	5824	-0.03 (-0.09 to 0.04)
Spinothalamic tract (right)	-0.00007	0.0001	-0.54	0.59	5824	-0.02 (-0.09 to 0.05)
Uncinate fasciculus (left)	-0.0004	0.0001	-3.17	0.002	5824	-0.11 (-0.18 to -0.04)
Uncinate fasciculus (right)	-0.0001	0.0001	-1.4	0.16	5824	-0.05 (-0.12 to 0.02)
Ventral occipital fasciculus (left)	0.000002	0.0001	0.02	0.99	5820	0.0005 (-0.07 to 0.07)
Ventral occipital fasciculus (right)	0.00001	0.0001	0.1	0.92	5819	0.004 (-0.06 to 0.07)

Supplemental Table 19. Associations between attention problems as assessed using the CBCL and radial diffusivity of the white matter tracts.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	0.0002	0.0001	0.89	0.38	6921	0.03 (-0.04 to 0.1)
Arcuate fasciculus (left)	0.00004	0.00008	0.60	0.55	6899	0.02 (-0.05 to 0.09)
Arcuate fasciculus (right)	-0.000009	0.00008	-0.13	0.90	6895	-0.005 (-0.07 to 0.06)
Frontal aslant tract (left)	0.000005	0.00009	0.08	0.94	6896	0.003 (-0.07 to 0.07)
Frontal aslant tract (right)	-0.00002	0.00008	-0.33	0.74	6899	-0.01 (-0.08 to 0.06)
Cingulum (left)	0.00004	0.0001	0.53	0.59	6883	0.02 (-0.05 to 0.09)
Cingulum (right)	-0.000005	0.0001	-0.07	0.94	6893	-0.003 (-0.07 to 0.07)
Corpus callosum	0.000007	0.0001	0.12	0.91	6900	0.004 (-0.06 to 0.07)
Forceps major	0.0001	0.0001	1.57	0.12	6899	0.05 (-0.01 to 0.12)
Forceps minor	-0.00004	0.0001	-0.47	0.64	6896	-0.02 (-0.08 to 0.05)
Corpus callosum (mid)	-0.00006	0.0001	-0.89	0.37	6912	-0.03 (-0.1 to 0.04)
Corticospinal tract (left)	-0.000003	0.00009	-0.06	0.95	6902	-0.002 (-0.07 to 0.07)
Corticospinal tract (right)	-0.00002	0.00009	-0.22	0.83	6896	-0.008 (-0.08 to 0.06)
Fornix	-0.00002	0.0003	-0.07	0.94	6800	-0.002 (-0.07 to 0.07)
Frontopontine tract (left)	-0.00003	0.00009	-0.50	0.62	6904	-0.02 (-0.09 to 0.05)
Frontopontine tract (right)	-0.00001	0.00009	-0.26	0.80	6895	-0.009 (-0.08 to 0.06)
Inferior cerebellar peduncle (left)	-0.00004	0.0001	-0.49	0.62	6868	-0.02 (-0.09 to 0.05)
Inferior cerebellar peduncle (right)	-0.00001	0.0001	-0.19	0.85	6884	-0.007 (-0.08 to 0.06)
Inferior frontooccipital fasciculus (left)	0.0001	0.0001	1.44	0.15	6893	0.05 (-0.02 to 0.12)
Inferior frontooccipital fasciculus (right)	0.00007	0.0001	0.94	0.35	6904	0.03 (-0.04 to 0.1)
Inferior longitudinal fasciculus (left)	0.0002	0.0001	2.37	0.02	6902	0.08 (0.01 to 0.15)
Inferior longitudinal fasciculus (right)	0.0001	0.0001	1.77	0.08	6899	0.06 (-0.007 to 0.13)
Middle cerebellar peduncle	-0.00005	0.0001	-0.55	0.58	6871	-0.02 (-0.09 to 0.05)
Medial longitudinal fasciculus (left)	0.00005	0.00009	0.70	0.49	6904	0.02 (-0.04 to 0.09)

Medial longitudinal fasciculus (right)	0.0001	0.00009	1.51	0.13	6908	0.05 (-0.02 to 0.12)
Medial leminiscus (left)	0.00003	0.0001	0.53	0.60	6873	0.02 (-0.05 to 0.09)
Medial leminiscus (right)	0.00002	0.0001	0.29	0.77	6887	0.01 (-0.06 to 0.08)
Occipitopontine tract (left)	-0.00001	0.00009	-0.16	0.87	6907	-0.006 (-0.07 to 0.06)
Occipitopontine tract (right)	0.00005	0.0001	0.76	0.45	6902	0.03 (-0.04 to 0.1)
Optic radiation (left)	0.0001	0.0001	1.68	0.09	6901	0.06 (-0.01 to 0.13)
Optic radiation (right)	0.0001	0.0001	1.69	0.09	6899	0.06 (-0.01 to 0.13)
Parietopontine tract (left)	-0.00001	0.00009	-0.19	0.85	6902	-0.007 (-0.07 to 0.06)
Parietopontine tract (right)	0.000005	0.00009	0.09	0.93	6896	0.003 (-0.07 to 0.07)
Superior cerebellar peduncle	0.00004	0.0001	0.54	0.59	6882	0.02 (-0.05 to 0.09)
Superior longitudinal fasciculus (left)	0.00007	0.00007	1.06	0.29	6907	0.04 (-0.03 to 0.1)
Superior longitudinal fasciculus (right)	0.00002	0.00008	0.27	0.79	6901	0.009 (-0.06 to 0.08)
Spinothalamic tract (left)	0.00005	0.0001	0.77	0.44	6879	0.03 (-0.04 to 0.1)
Spinothalamic tract (right)	0.00005	0.0001	0.75	0.45	6881	0.03 (-0.04 to 0.09)
Uncinate fasciculus (left)	0.0001	0.0001	1.28	0.20	6901	0.04 (-0.02 to 0.1)
Uncinate fasciculus (right)	-0.00001	0.0001	-0.17	0.87	6902	-0.006 (-0.07 to 0.06)
Ventral occipital fasciculus (left)	0.00009	0.0001	1.09	0.28	6907	0.04 (-0.03 to 0.11)
Ventral occipital fasciculus (right)	0.0001	0.0001	1.09	0.28	6909	0.04 (-0.03 to 0.11)

Supplemental Table 20. Associations between ADHD diagnostic status and axial diffusivity of the white matter tracts.

Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.002	0.002	-1.08	0.28	5828	-0.08 (-0.24 to 0.07)
Arcuate fasciculus (left)	-0.0006	0.001	-0.59	0.55	5813	-0.05 (-0.2 to 0.11)
Arcuate fasciculus (right)	0.0003	0.0009	0.35	0.73	5814	0.03 (-0.13 to 0.18)
Frontal aslant tract (left)	-0.001	0.001	-0.98	0.33	5803	-0.08 (-0.23 to 0.08)
Frontal aslant tract (right)	-0.0004	0.001	-0.38	0.71	5805	-0.03 (-0.18 to 0.12)
Cingulum (left)	-0.001	0.001	-0.97	0.33	5818	-0.08 (-0.23 to 0.08)
Cingulum (right)	-0.001	0.001	-1.16	0.25	5818	-0.09 (-0.24 to 0.06)
Corpus callosum	-0.0008	0.001	-0.83	0.41	5814	-0.07 (-0.22 to 0.09)
Forceps major	0.001	0.001	0.84	0.40	5817	0.07 (-0.09 to 0.22)
Forceps minor	-0.002	0.001	-1.60	0.11	5822	-0.12 (-0.28 to 0.03)
Corpus callosum (mid)	-0.0013	0.001	-1.09	0.28	5822	-0.09 (-0.24 to 0.07)
Corticospinal tract (left)	-0.0004	0.001	-0.38	0.70	5812	-0.03 (-0.18 to 0.12)
Corticospinal tract (right)	-0.0009	0.001	-0.86	0.39	5817	-0.07 (-0.22 to 0.09)
Fornix	-0.002	0.004	-0.48	0.63	5823	-0.04 (-0.19 to 0.11)
Frontopontine tract (left)	-0.0005	0.001	-0.52	0.60	5817	-0.04 (-0.19 to 0.11)
Frontopontine tract (right)	-0.001	0.001	-0.98	0.33	5813	-0.08 (-0.23 to 0.08)
Inferior cerebellar peduncle (left)	-0.002	0.001	-1.46	0.14	5801	-0.11 (-0.27 to 0.04)
Inferior cerebellar peduncle (right)	-0.0009	0.001	-0.74	0.46	5804	-0.06 (-0.21 to 0.09)
Inferior frontooccipital fasciculus (left)	-0.001	0.001	-0.82	0.41	5826	-0.06 (-0.22 to 0.09)
Inferior frontooccipital fasciculus (right)	-0.002	0.001	-1.42	0.15	5825	-0.11 (-0.26 to 0.04)
Inferior longitudinal fasciculus (left)	-0.0007	0.001	-0.59	0.56	5824	-0.05 (-0.2 to 0.11)
Inferior longitudinal fasciculus (right)	-0.002	0.001	-1.48	0.14	5826	-0.12 (-0.27 to 0.04)

Middle cerebellar peduncle	0.0004	0.001	0.28	0.78	5811	0.02 (-0.13 to 0.17)
Medial longitudinal fasciculus (left)	0.0002	0.001	0.16	0.87	5816	0.01 (-0.14 to 0.16)
Medial longitudinal fasciculus (right)	-0.0001	0.001	-0.13	0.90	5821	-0.01 (-0.16 to 0.14)
Medial leminiscus (left)	0.002	0.001	0.78	0.43	5824	0.06 (-0.01 to 0.21)
Medial leminiscus (right)	0.0007	0.001	0.54	0.59	5823	0.04 (-0.11 to 0.19)
Occipitopontine tract (left)	-0.0007	0.001	-0.65	0.52	5813	-0.05 (-0.2 to 0.1)
Occipitopontine tract (right)	0.00007	0.001	0.06	0.95	5822	0.005 (-0.15 to 0.16)
Optic radiation (left)	-0.00009	0.001	-0.06	0.95	5824	-0.005 (-0.16 to 0.15)
Optic radiation (right)	-0.001	0.001	-0.86	0.39	5826	-0.07 (-0.22 to 0.09)
Parietopontine tract (left)	-0.0005	0.001	-0.48	0.63	5812	-0.04 (-0.19 to 0.12)
Parietopontine tract (right)	-0.001	0.001	-0.95	0.34	5815	-0.07 (-0.23 to 0.08)
Superior cerebellar peduncle	-0.001	0.001	-1.21	0.23	5814	-0.09 (-0.25 to 0.06)
Superior longitudinal fasciculus (left)	-0.0004	0.0009	-0.47	0.64	5810	-0.04 (-0.19 to 0.12)
Superior longitudinal fasciculus (right)	-0.0003	0.0009	-0.37	0.71	5809	-0.03 (-0.18 to 0.12)
Spinothalamic tract (left)	0.0007	0.001	0.54	0.59	5824	0.04 (-0.11 to 0.19)
Spinothalamic tract (right)	0.0008	0.001	0.61	0.54	5824	0.05 (-0.11 to 0.2)
Uncinate fasciculus (left)	-0.002	0.001	-1.44	0.15	5824	-0.11 (-0.26 to 0.04)
Uncinate fasciculus (right)	-0.001	0.001	-0.81	0.42	5824	-0.06 (-0.21 to 0.09)
Ventral occipital fasciculus (left)	0.001	0.001	0.82	0.41	5820	0.06 (-0.09 to 0.22)
Ventral occipital fasciculus (right)	0.0003	0.001	0.25	0.80	5819	0.02 (-0.13 to 0.17)

Supplemental Table 21. Associations between ADHD diagnostic status and radial diffusivity of the white matter tracts.

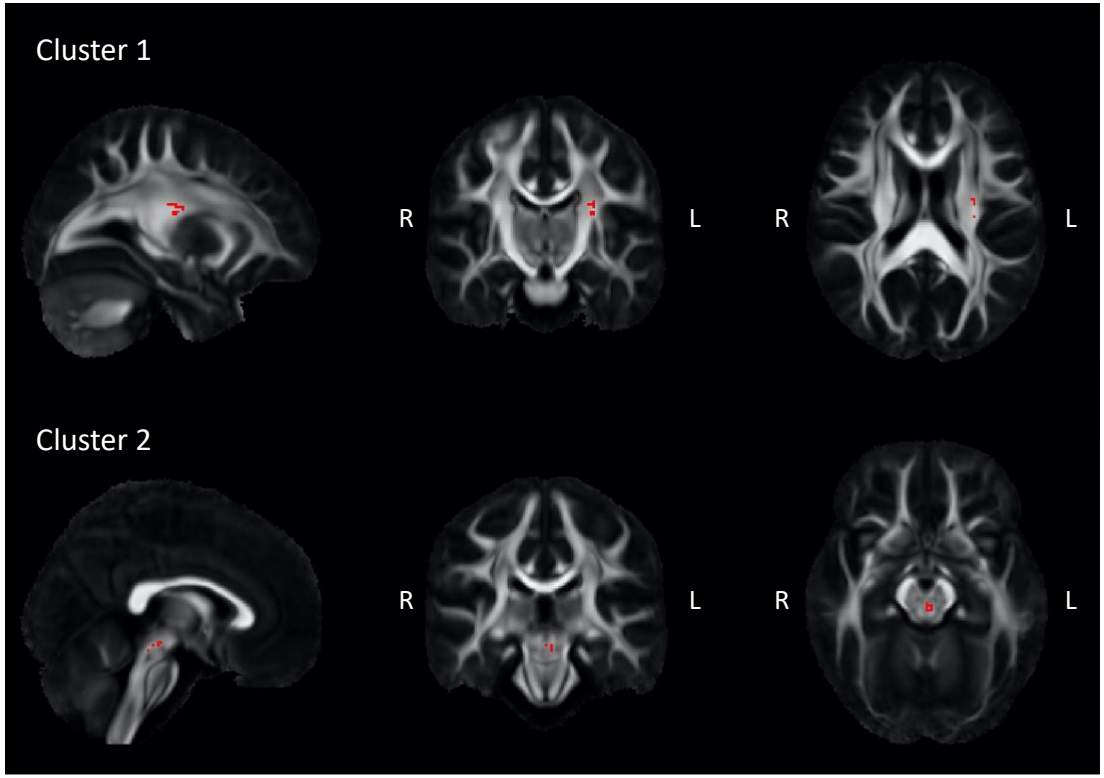
Tract names	B	SE	t	Uncorrected p value	N	Effect size (95% confidence interval)
Anterior commissure	-0.0002	0.002	-0.10	0.92	5825	-0.008 (-0.16 to 0.14)
Arcuate fasciculus (left)	0.001	0.0008	1.68	0.09	5810	0.13 (-0.02 to 0.28)
Arcuate fasciculus (right)	0.0008	0.0008	1.03	0.30	5808	0.08 (-0.07 to 0.23)
Frontal aslant tract (left)	0.001	0.0007	1.45	0.15	5805	0.1 (-0.04 to 0.27)
Frontal aslant tract (right)	0.0006	0.0007	0.82	0.41	5807	0.06 (-0.09 to 0.22)
Cingulum (left)	0.001	0.0008	1.43	0.15	5804	0.11 (-0.04 to 0.26)
Cingulum (right)	0.001	0.0008	1.12	0.26	5818	0.09 (-0.07 to 0.24)
Corpus callosum	0.001	0.0007	1.35	0.18	5806	0.11 (-0.05 to 0.26)
Forceps major	0.002	0.0009	2.20	0.03	5793	0.17 (0.02 to 0.32)
Forceps minor	0.0007	0.0009	0.82	0.41	5801	0.06 (-0.09 to 0.22)
Corpus callosum (mid)	0.001	0.0007	0.77	0.44	5807	0.06 (-0.09 to 0.21)
Corticospinal tract (left)	0.001	0.0006	1.59	0.11	5811	0.1 (-0.03 to 0.28)
Corticospinal tract (right)	0.0008	0.0006	1.23	0.22	5802	0.1 (-0.06 to 0.25)
Fornix	0.004	0.003	1.25	0.21	5717	0.1 (-0.06 to 0.25)
Frontopontine tract (left)	0.001	0.0006	1.58	0.12	5812	0.12 (-0.03 to 0.27)
Frontopontine tract (right)	0.0009	0.0006	1.50	0.13	5803	0.12 (-0.04 to 0.27)
Inferior cerebellar peduncle (left)	-0.000003	0.0009	-0.004	0.999	5780	-0.0003 (-0.15 to 0.15)
Inferior cerebellar peduncle (right)	0.0004	0.0008	0.48	0.63	5789	0.04 (-0.12 to 0.19)
Inferior frontooccipital fasciculus (left)	0.001	0.0009	1.72	0.09	5803	0.13 (-0.02 to 0.29)
Inferior frontooccipital fasciculus (right)	0.001	0.0008	1.20	0.23	5812	0.09 (-0.06 to 0.25)
Inferior longitudinal fasciculus (left)	0.002	0.0009	2.76	0.01	5812	0.21 (0.06 to 0.37)
Inferior longitudinal fasciculus (right)	0.002	0.0009	1.73	0.08	5807	0.13 (-0.02 to 0.29)

Middle cerebellar peduncle	0.001	0.001	1.45	0.15	5783	0.11 (-0.04 to 0.27)
Medial longitudinal fasciculus (left)	0.001	0.0009	1.57	0.12	5811	0.12 (-0.03 to 0.27)
Medial longitudinal fasciculus (right)	0.002	0.0009	1.94	0.05	5816	0.15 (-0.002 to 0.3)
Medial leminiscus (left)	0.002	0.0007	2.23	0.03	5784	0.17 (0.02 to 0.33)
Medial leminiscus (right)	0.001	0.0006	1.96	0.05	5795	0.15 (0 to 0.31)
Occipitopontine tract (left)	0.001	0.0007	1.43	0.15	5815	0.11 (-0.04 to 0.26)
Occipitopontine tract (right)	0.001	0.0008	1.57	0.12	5810	0.12 (-0.03 to 0.27)
Optic radiation (left)	0.002	0.0009	2.30	0.02	5808	0.18 (0.03 to 0.33)
Optic radiation (right)	0.002	0.0008	2.07	0.04	5805	0.16 (0.008 to 0.31)
Parietopontine tract (left)	0.001	0.0006	1.57	0.12	5812	0.12 (-0.03 to 0.28)
Parietopontine tract (right)	0.0009	0.0007	1.25	0.21	5804	0.097 (-0.06 to 0.25)
Superior cerebellar peduncle	0.00009	0.0009	0.11	0.92	5793	0.008 (-0.14 to 0.16)
Superior longitudinal fasciculus (left)	0.001	0.0008	1.49	0.14	5813	0.12 (-0.04 to 0.27)
Superior longitudinal fasciculus (right)	0.0008	0.0008	1.09	0.28	5811	0.09 (-0.07 to 0.24)
Spinothalamic tract (left)	0.001	0.0007	2.07	0.04	5790	0.16 (0.008 to 0.32)
Spinothalamic tract (right)	0.001	0.0007	2.08	0.04	5790	0.16 (0.009 to 0.32)
Uncinate fasciculus (left)	0.002	0.0009	2.12	0.03	5812	0.17 (0.01 to 0.312)
Uncinate fasciculus (right)	0.007	0.001	0.77	0.44	5810	0.06 (-0.09 to 0.21)
Ventral occipital fasciculus (left)	0.003	0.001	2.80	0.01	5816	0.22 (0.07 to 0.37)
Ventral occipital fasciculus (right)	0.002	0.001	2.03	0.04	5815	0.16 (0.005 to 0.31)

Supplemental Table 22. Coordinates for top 2 clusters in voxelwise analysis for associations between attention problems and fractional anisotropy of the white matter tracts. Each voxel is 1.5x1.5x1.5mm. Coordinates given in LPI orientation.

Cluster	Volume (in voxels)	P-value	Center of Mass		
			X	Y	Z
Left frontopontine tract	41	0.02	99.8	129.6	129.3
Middle cerebellar peduncle	28	0.04	125.6	118.9	95.4

30



Supplementary Figure 3. Location of top 2 voxel clusters for association between attention problems and FA.

Supplementary References

1. Casey BJ, Cannonier T, Conley MI, et al. The adolescent brain cognitive development (ABCD) study: imaging acquisition across 21 sites. *Developmental cognitive neuroscience*. 2018;32:43-54.

2. Hagler Jr DJ, Hatton S, Cornejo MD, et al. Image processing and analysis methods for the Adolescent Brain Cognitive Development Study. *Neuroimage*. 2019;202:116091.

3. Feczko E, Conan G, Marek S, et al. Adolescent Brain Cognitive Development (ABCD) Community MRI Collection and Utilities. *bioRxiv*. Published online 2021.

4. Townsend L, Kobak K, Kearney C, et al. Development of three web-based computerized versions of the Kiddie Schedule for affective disorders and schizophrenia child psychiatric diagnostic interview: preliminary validity data. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2020;59(2):309-325.

5. Cordova M, Antovich DM, Ryabinin P, et al. ADHD: Restricted Phenotypes Prevalence, Comorbidity, and Polygenic Risk Sensitivity in ABCD Baseline Cohort. Published online 2021.

6. Bellec P, Chu C, Chouinard-Decorte F, Benhajali Y, Margulies DS, Craddock RC. The neuro bureau ADHD-200 preprocessed repository. *Neuroimage*. 2017;144:275-286.

7. Milham MP, Fair D, Mennes M, Mostofsky SH. The ADHD-200 consortium: a model to advance the translational potential of neuroimaging in clinical neuroscience. *Frontiers in systems neuroscience*. 2012;6:62.

8. Alexander LM, Escalera J, Ai L, et al. An open resource for transdiagnostic research in pediatric mental health and learning disorders. *Scientific data*. 2017;4(1):1-26.

9. Somerville LH, Bookheimer SY, Buckner RL, et al. The Lifespan Human Connectome Project in Development: A large-scale study of brain connectivity development in 5–21 year olds. *Neuroimage*. 2018;183:456-468.

10. Harms MP, Somerville LH, Ances BM, et al. Extending the Human Connectome Project across ages: Imaging protocols for the Lifespan Development and Aging projects. *Neuroimage*. 2018;183:972-984.

11. Norman LJ, Sudre G, Bouyssi-Kobar M, Sharp W, Shaw P. A Longitudinal Study of Resting-State Connectivity and Response to Psychostimulant Treatment in ADHD. *American Journal of Psychiatry*. Published online 2021:appi. ajp. 2021.20091342.

12. Norman LJ, Sudre G, Bouyssi-Kobar M, Sharp W, Shaw P. An examination of the relationships between attention/deficit hyperactivity disorder symptoms and functional connectivity over time. *Neuropsychopharmacology*. Published online 2021:1-7.

13. Shaw P, Weingart D, Bonner T, et al. Defining the neuroanatomic basis of motor coordination in children and its relationship with symptoms of attention-deficit/hyperactivity disorder. *Psychological medicine*. 2016;46(11):2363-2373.

14. Sudre G, Sharp W, Kundzicz P, et al. Predicting the course of ADHD symptoms through the integration of childhood genomic, neural, and cognitive features. *Molecular psychiatry*. 2021;26(8):4046-4054.

15. Sudre G, Bouyssi-Kobar M, Norman L, Sharp W, Choudhury S, Shaw P. Estimating the Heritability of Developmental Change in Neural Connectivity, and Its Association With Changing Symptoms of Attention-Deficit/Hyperactivity Disorder. *Biological Psychiatry*. 2021;89(5):443-450.

16. Sudre G, Choudhuri S, Szekely E, et al. Estimating the heritability of structural and functional brain connectivity in families affected by attention-deficit/hyperactivity disorder. *JAMA psychiatry*. 2017;74(1):76-84.

17. Reich W. Diagnostic interview for children and adolescents (DICA). *Journal of the American Academy of Child & Adolescent Psychiatry*. 2000;39(1):59-66.

18. Brown SA, Brumback T, Tomlinson K, et al. The National Consortium on Alcohol and NeuroDevelopment in Adolescence (NCANDA): a multisite study of adolescent development and substance use. *Journal of studies on alcohol and drugs*. 2015;76(6):895-908.

19. Pfefferbaum A, Rohlfing T, Pohl KM, et al. Adolescent development of cortical and white matter structure in the NCANDA sample: role of sex, ethnicity, puberty, and alcohol drinking. *Cerebral cortex*. 2016;26(10):4101-4121.

20. Zhao Q, Sullivan EV, Honnorat N, et al. Association of heavy drinking with deviant fiber tract development in frontal brain systems in adolescents. *JAMA psychiatry*. 2021;78(4):407-415.

21. Müller-Oehring EM, Kwon D, Nagel BJ, et al. Influences of age, sex, and moderate alcohol drinking on the intrinsic functional architecture of adolescent brains. *Cerebral Cortex*. 2018;28(3):1049-1063.

22. Pohl KM, Sullivan EV, Pfefferbaum A. The NCANDA_PUBLIC_BASE_RESTINGSTATE_V01 Data Release of the National Consortium on Alcohol and NeuroDevelopment in Adolescence (NCANDA). *Sage Bionetworks Synapse*. Published online 2017. Accessed September 9, 2021. https://dx.doi.org/10.7303/syn11605291

23. Pohl KM, Sullivan EV, Pfefferbaum A. The NCANDA_PUBLIC_BASE_STRUCTURAL_V01 Data Release of the National Consortium on Alcohol and NeuroDevelopment in Adolescence (NCANDA). *Sage Bionetworks Synapse*. Published online 2017.

24. Hesselbrock M, Easton C, Bucholz KK, Schuckit M, Hesselbrock V. A validity study of the SSAGA-a comparison with the SCAN. *Addiction*. 1999;94(9):1361-1370.

25. Du Rietz E, Kuja-Halkola R, Brikell I, et al. Predictive validity of parent-and self-rated ADHD symptoms in adolescence on adverse socioeconomic and health outcomes. *European child & adolescent psychiatry*. 2017;26(7):857-867.

26. Du Rietz E, Cheung CH, McLoughlin G, et al. Self-report of ADHD shows limited agreement with objective markers of persistence and remittance. *Journal of Psychiatric Research*. 2016;82:91-99.

27. Ai L, Craddock RC, Tottenham N, et al. Is it time to switch your T1W sequence? Assessing the impact of prospective motion correction on the reliability and quality of structural imaging. *NeuroImage*. 2021;226:117585.

28. Esteban O, Markiewicz CJ, Blair RW, et al. fMRIPrep: a robust preprocessing pipeline for functional MRI. *Nature methods*. 2019;16(1):111-116.

29. Gorgolewski K, Burns CD, Madison C, et al. Nipype: a flexible, lightweight and extensible neuroimaging data processing framework in python. *Frontiers in neuroinformatics*. 2011;5:13.

30. Tustison NJ, Avants BB, Cook PA, et al. N4ITK: improved N3 bias correction. *IEEE transactions on medical imaging*. 2010;29(6):1310-1320.

31. Jenkinson M, Bannister P, Brady M, Smith S. Improved optimization for the robust and accurate linear registration and motion correction of brain images. *Neuroimage*. 2002;17(2):825-841.

32. Ciric R, Wolf DH, Power JD, et al. Benchmarking of participant-level confound regression strategies for the control of motion artifact in studies of functional connectivity. *Neuroimage*. 2017;154:174-187. doi:10.1016/j.neuroimage.2017.03.020

33. Ciric R, Rosen AFG, Erus G, et al. Mitigating head motion artifact in functional connectivity MRI. *Nat Protoc*. 2018;13(12):2801-2826. doi:10.1038/s41596-018-0065-y

34. Gur RE, Moore TM, Rosen AFG, et al. Burden of Environmental Adversity Associated With Psychopathology, Maturation, and Brain Behavior Parameters in Youths. *JAMA Psychiatry*. 2019;76(9):966-975. doi:10.1001/jamapsychiatry.2019.0943

35. Cui Z, Li H, Xia CH, et al. Individual variation in functional topography of association networks in youth. *Neuron*. Published online 2020.

36. Gu S, Xia CH, Ciric R, et al. Unifying the Notions of Modularity and Core–Periphery Structure in Functional Brain Networks during Youth. *Cerebral Cortex*. 2020;30(3):1087-1102.

37. Cox RW. AFNI: software for analysis and visualization of functional magnetic resonance neuroimages. *Computers and Biomedical research*. 1996;29(3):162-173.

38. Hallquist MN, Hwang K, Luna B. The nuisance of nuisance regression: spectral misspecification in a common approach to resting-state fMRI preprocessing reintroduces noise and obscures functional connectivity. *Neuroimage*. 2013;82:208-225. doi:10.1016/j.neuroimage.2013.05.116

39. Jenkinson M, Beckmann CF, Behrens TE, Woolrich MW, Smith SM. Fsl. *Neuroimage*. 2012;62(2):782-790.

40. Cho JW, Korchmaros A, Vogelstein JT, Milham MP, Xu T. Impact of concatenating fMRI data on reliability for functional connectomics. *Neuroimage*. 2021;226:117549.

41. Pruim RH, Beckmann CF, Oldehinkel M, et al. An integrated analysis of neural network correlates of categorical and dimensional models of attention-deficit/hyperactivity disorder. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*. 2019;4(5):472-483.

42. Von Rhein D, Oldehinkel M, Beckmann CF, et al. Aberrant local striatal functional connectivity in attention-deficit/hyperactivity disorder. *Journal of Child Psychology and Psychiatry*. 2016;57(6):697-705.

43. Ciric R, Rosen AF, Erus G, et al. Mitigating head motion artifact in functional connectivity MRI. *Nature protocols*. 2018;13(12):2801-2826.

44. Ciric R, Wolf DH, Power JD, et al. Benchmarking of participant-level confound regression strategies for the control of motion artifact in studies of functional connectivity. *Neuroimage*. 2017;154:174-187.

45. Di Martino A, Scheres A, Margulies DS, et al. Functional connectivity of human striatum: a resting state FMRI study. *Cerebral cortex*. 2008;18(12):2735-2747.

46. Fitzgerald KD, Welsh RC, Stern ER, et al. Developmental alterations of frontal-striatal-thalamic connectivity in obsessive-compulsive disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2011;50(9):938-948. e3.

47. Hyde LW, Gorka A, Manuck SB, Hariri AR. Perceived social support moderates the link between threat-related amygdala reactivity and trait anxiety. *Neuropsychologia*. 2011;49(4):651-656.

48. Becker HC, Norman LJ, Yang H, et al. Disorder-specific cingulo-opercular network hyperconnectivity in pediatric OCD relative to pediatric anxiety. *Psychological Medicine*. Published online 2021:1-11.

49. Norman L, Lawrence N, Iles A, Benattayallah A, Karl A. Attachment-security priming attenuates amygdala activation to social and linguistic threat. *Social Cognitive and Affective Neuroscience*. 2015;10(6):832-839.

50. Schaefer A, Kong R, Gordon EM, et al. Local-global parcellation of the human cerebral cortex from intrinsic functional connectivity MRI. *Cerebral cortex*. 2018;28(9):3095-3114.

51. Thomas Yeo BT, Krienen FM, Sepulcre J, et al. The organization of the human cerebral cortex estimated by intrinsic functional connectivity. *Journal of neurophysiology*. 2011;106(3):1125-1165.

52. Ho D, Imai K, King G, Stuart E, Whitworth A. *Package 'MatchIt.'* Version; 2018.

53. Kuznetsova A, Brockhoff PB, Christensen RH. lmerTest package: kutests in linear mixed effects models. *Journal of statistical software*. 2017;82(1):1-26.

54.Danielson ML, Bitsko RH, Ghandour RM, Holbrook JR, Kogan MD, Blumberg SJ (2018): Prevalence of parent-reported ADHD diagnosis and associated treatment among US children and adolescents, 2016. *Journal of Clinical Child & Adolescent Psychology*. 47:199-212.

55.Cordova MM, Antovich DM, Ryabinin P, Neighbor C, Mooney MA, Dieckmann NF, et al. (2022): Attention-Deficit/Hyperactivity Disorder: Restricted Phenotypes Prevalence, Comorbidity, and Polygenic Risk Sensitivity in the ABCD Baseline Cohort. *Journal of the American Academy of Child & Adolescent Psychiatry*.

56.Cieslak M, Cook PA, He X, Yeh F-C, Dhollander T, Adebimpe A, et al. (2021): QSIPrep: an integrative platform for preprocessing and reconstructing diffusion MRI data. *Nature methods*. 18:775-778.

57. Iglesias JE, Billot B, Balbastre Y, Tabari A, Conklin J, González RG, et al. (2021): Joint super-resolution and synthesis of 1 mm isotropic MP-RAGE volumes from clinical MRI exams with scans of different orientation, resolution and contrast. *Neuroimage*. 237:118206.

58. Zhang S, Arfanakis K (2018): Evaluation of standardized and study-specific diffusion tensor imaging templates of the adult human brain: Template characteristics, spatial normalization accuracy, and detection of small inter-group FA differences. *Neuroimage*. 172:40-50.

59. Zhang H, Avants BB, Yushkevich PA, Woo JH, Sumei W, McCluskey LF, et al. (2007): High-Dimensional Spatial Normalization of Diffusion Tensor Images Improves the Detection of White Matter Differences: An Example Study Using Amyotrophic Lateral Sclerosis. *Medical Imaging, IEEE Transactions on*. 26:1585-1597.

60. Zhang H, Yushkevich PA, Alexander DC, Gee JC (2006): Deformable registration of diffusion tensor MR images with explicit orientation optimization. *Medical image analysis*. 10:764-785.

61. Iacono WG, Heath AC, Hewitt JK, Neale MC, Banich MT, Luciana MM, et al. (2018): The utility of twins in developmental cognitive neuroscience research: How twins strengthen the ABCD research design. *Dev Cogn Neurosci*. 32:30-42.

62. Heeringa SG, Berglund PA (2020): A guide for population-based analysis of the Adolescent Brain Cognitive Development (ABCD) Study baseline data. *BioRxiv*.