Whole-brain white matter tracts deviation and idiosyncrasy from normative development in autism, ADHD and their unaffected siblings link with dimensions of psychopathology and cognition

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Online Supplementary Materials

Supplementary Methods

a. Participants, Procedures, and Diagnosis

People with attention-deficit hyperactivity disorder (ADHD) or autism spectrum disorder (ASD) and their unaffected siblings were recruited from the Department of Psychiatry at National Taiwan University Hospital, Taipei, Taiwan, from 2010 to 2018 (Table.1). All participants received clinical screenings and were diagnosed by senior child psychiatrists, who are experienced in mental health issues of neurodevelopmental disorders across the life span based on the DSM-IV-TR. In Taiwan, the system and culture of mental health services are somewhat different from those in North America, UK, and Europe. Namely, we do not have rigorous regulations on the patient's age limit, which is allowed to be seen by child psychiatrists. Therefore, a substantial proportion of patients, who had seen a child psychiatrist since childhood or adolescence, tend to be followed up by the same child psychiatrist if possible when they are grown up. Moreover, in Taiwan, not many adult psychiatrists, who did not have additional fellowship training in child and adolescent psychiatry, would feel confident to take care of patients diagnosed with neurodevelopmental disorders. As a result, a substantial proportion of patients diagnosed with neurodevelopmental disorders would be referred to psychiatrists who have received subspecialty training in child and adolescent psychiatry.

Their clinical diagnosis of ASD was confirmed by using the interviews with the Autism Diagnostic Observation Scale and Autism Diagnostic Interview-Revised (1) for ASD diagnosis. Notably, we did not further administer the Autism Diagnostic Observation Schedule, which is widely viewed as the gold standard for quantification of current ASD symptoms, at this cross-sectional study but at the follow-up study of this ASD cohort, an ongoing research. The diagnosis of ADHD and other mental health issues were confirmed by the Chinese version of the Kiddie-Schedule for Affective Disorders and Schizophrenia-Epidemiologic Version (*K-SADS-E*) (2) for ADHD and other psychiatric diagnoses. Three individuals with ADHD and 32 individuals with ASD were noted to take medication (mainly methylphenidate, 3 took antidepressant) 3 months before or at the time of the MRI scan, respectively. We excluded people with histories of other psychiatric disorders, intellectual disabilities, substance-induced psychotic disorders, or substance abuse. ASD-related symptoms were assessed with parent's reports of Autism Spectrum Quotient (AQ) (3) and Social Responsiveness Scale (SRS) (4). ADHD-related symptoms were evaluated with parents' reports of Swanson, Nolan, and Pelham, Version IV Scale (SNAP-IV) (5). Details of the Autism Spectrum Quotient and SNAP-IV are presented in the next section. To assess attention and cognitive functions, we used the neuropsychological test of Conners' continuous performance test (CCPT) (6) and the Cambridge Neuropsychological Test Automated Battery (CANTAB) (7), respectively.

Details are provided in the neuropsychological assessment section. Typically developing controls for developing normative models were recruited from schools by teachers' referrals, and the community by using posters as well as Internet advertising. All typically developing controls were first clinically evaluated by psychiatrists, then the K-SADS-E (2) were administered for youths, and Diagnostic Interview for Genetic Studies (8) were administered to adults. They were confirmed to be free of mental illnesses, intellectual disability, substance abuse, neurological disorders, major systemic disorders, and family histories of psychiatric disorders. The intellectual function was assessed by the Wechsler Intelligence Scale for Children-Third Edition (WISC-III) for participants under age 16 years or by the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) for those aged above 16 years. For comparison between children and adults, each participant under age 16 years are included in children group, and those aged above 16 years are included in adult group (Table S5). The reasons of selecting 16 years as a cutoff are because Wechsler intelligence scale, autism spectrum quotient (9, 10), and ADHD diagnostic criteria in DSM-5 (11) set 16 years old to divide children and adults. The study was approved by the Research Ethics Committee of National Taiwan University Hospital, Taipei, Taiwan, and informed consent was obtained from all participants.

K-SADS-E

The K-SADS-E is a semi-structured interview scale for the systematic assessment of mental disorders in children and adolescents. The development of the Chinese K-SADS-E was completed by the Child Psychiatry Research Group in Taiwan (12). This included a two-stage translation and modification of several items with psycholinguistic equivalents relevant to the Taiwanese culture and further modification to meet the DSM-IV diagnostic criteria (2). Previous studies have shown that the Chinese K-SADS-E is a reliable and valid instrument to assess DSM-IV child and adolescent psychiatric disorders (2) and has been extensively used in a variety of clinical studies, e.g., clinical (13), epidemiological (14), neuropsychological (15), and neuroimage (16) investigations. The K-SADS-E interview training has been described in detail elsewhere (17).

ADI-R

ADI-R (18) is a standard, comprehensive, semi-structured interview for child's caregivers and administered by well-trained interviewers. The ADI-R is designed to interview caregivers of children with mental ages, reaching 18 months into adulthood. The caregivers were asked to recall the child's current performance and the performance when the child was 4-5 years old. The coding of some items is converted to numeric scores "0" if no evidence of abnormality exists, "1" if some evidence of abnormality exists, and "2" if evidence of marked abnormality. Higher scores mean more severe clinical deficits. The algorithm focuses on three domains, which are based on ICD-10 and DSM-IV diagnostic criteria, including reciprocal social interaction, verbal and non-verbal

communication, and restricted, repetitive and stereotyped patterns of behaviors. The Chinese version of the ADI-R, translated into Chinese by Gau and colleagues (1, 4, 19), has been approved by Western Psychological Services in 2007, and widely used in ASD research (20-40) in Taiwan.

b. Symptom assessment

Autism Spectrum Quotient

The Autism Spectrum Quotient is a 50-item questionnaire originally designed to assess autistic traits in adults with normal intelligence (10); versions for assessing adolescents (9) and children (41) have been developed with similar structures for completion by a parent. The Autism Spectrum Quotient consists of the five subscales of social skills, communication, attention-switching, attention to detail, and imagination (10). The Autism Spectrum Quotient was prepared with culture-relevant colloquial expressions, and two-way translation was performed after obtaining permission. The translation has a good test and retest reliability and is therapeutically informative and robust to cultural differences (3). Each statement is rated on a four-point scale, with answer categories ‘‘definitely agree’’, ‘‘slightly agree’’, ‘‘slightly disagree’’ and ‘‘definitely disagree’’. Respondents rate to what extent they agree or disagree with each of the statements on a four-point scale (1=definitely disagree, 4=definitely agree) for items portraying autistic features and inverted for the reversal items, where a higher score depicts the autistic end of the continuum (42-44). Therefore, the total score of the Autism Spectrum Quotient ranges from 50 to 200. The scale of the Autism Spectrum Quotient scores could be converted to the original dichotomous scale. Every response that indicates the autistic feature is scored ‘1’ if ‘‘definitely agree’’ or ‘‘slightly agree’’, and otherwise ‘0’ if ‘‘slightly disagree’’ or ‘‘definitely disagree’’ leading to the total score of the Autism Spectrum Quotient ranges from 0 to 50 where higher score depicts the autistic end of the continuum. However, to obtain a better approximate of continuous distribution to quantify autistic traits, we employed an ordinal (4-point Likert) scale (ranging from 1 to 4 for items portraying autistic feature, and inverted for the reversal items) (42-44) instead of the original dichotomous scale for responses to the Autism Spectrum Quotient. It has been widely used in ASD studies in Taiwan and some ethnic Chinese populations (37, 45-48).

SNAP-IV

SNAP-IV (49) consists of the DSM-IV symptoms for inattention and hyperactivity/ impulsivity ADHD criteria as well as oppositional symptoms in oppositional defiant disorder. The 26-item SNAP-IV was prepared with culture-specific colloquial expressions and underwent a two-way translation. It demonstrated high test-retest reliability, internal consistency, and discriminant validity (5). The norm and psychometric properties of the parent (50) and teacher reports (51) on

the Chinese version of the SNAP-IV have been established in Taiwan. The Chinese SNAP-IV has been widely used in clinical and research settings in Taiwan regarding treatment studies (52-54), epidemiological studies (29, 30, 47, 50, 51, 55), and clinical studies (16, 34, 47, 56-64).

SRS

The SRS is a 65-item rating scale with 4-point Likert-type questionnaire (65). It is a parent-scored tool for autistic symptom assessment, including social communication, social cognition, social motivation, social awareness, and autistic mannerisms. The cross-cultural validity and convergent validity with the Autism Diagnostic Observation Schedule, as well as the Autism Diagnostic Interview-Revised, were well-confirmed (65, 66). The Chinese version of SRS has been well established with a stable 4-factor structure of psychometric properties, including social communication, social awareness, social emotion, and unique mannerism (4).

c. Neuropsychological assessment

Conners' CPT

Conners' CPT (6, 67) is a visual-motor task that evaluates attention problems in participants aged 6 years or older. The 14-minute computer test requires tapping the spacebar when any character except "X" appears on the screen. The test contains 6 blocks, each with 3 subblocks containing 20 letter presentations, for a total of 360 trials. The subblocks differ in interstimulus intervals of 1, 2, and 4 seconds, which occur randomly. The assessment includes detectability (the ability to distinguish targets from nontargets), hit reaction time (mean response speed), omission errors (missed targets), and commission errors (false positive responses to nontargets). The complete list is presented in Table S3.

CANTAB

CANTAB is a computerized neuropsychological assessment battery that includes measures of working memory, planning, motor skills, visual attention, and visual memory. All tasks are nonverbal, including delayed matching to sample, motor screening, pattern recognition memory, paired-associates learning, and spatial recognition memory. The complete list is presented in Table S4. CANTAB has high validity for assessing the brain-behavior relationship in adults (68-70) and neuropsychological function in pediatric populations (7, 71, 72). This battery can be used without modification to assess cognitive functions in people aged 4–90 years (7).

d. Image acquisition

Magnetic resonance imaging (MRI) was performed on the same MRI machine with a 3-Tesla MRI system (TIM Trio, Siemens, Erlangen, Germany) with a 32-channel phased-array head coil. The most recent major software and hardware update was in 2009, which was before this study began. MRI images were acquired from 2010 to 2018. The quality of MRI images is stable across years (Table S8). Diffusion-weighted imaging was acquired using a single-shot spin-echo echo-planar imaging sequence with twice-refocused diffusion-sensitive gradients to reduce distortion caused by eddy currents (73). The diffusion acquisition scheme was performed in accordance with optimal diffusion spectrum imaging (DSI) protocol at 3T, which used 102 diffusion-encoding directions with a maximal b value of 4000 s/mm^2, corresponding to 102 Cartesian grid points in the diffusion-encoding space or q-space (74). The diffusion-weighted images were acquired with the following imaging parameters: repetition time (TR)/echo time (TE) = 9600 ms/130 ms, field of view (FOV) = 200 × 200 mm^2, flip angle = 90°, matrix = 80 x 80, number of slices = 56, slice thickness = 2.5 mm. The total scanning time was within 20 minutes. T1-weighted images were acquired using a three-dimensional magnetization-prepared rapid gradient-echo sequence with the following parameters: TR/TE = 2000 ms/3 ms, flip angle = 9°, FOV = 256 x 192 x 208 mm^3, and matrix = 256 x 192 x 208.

e. Image quality assurance

Image quality control (Figure S1, S5, S6, S12, S13) is vital before analysis to prevent spurious results and false conclusions. One of the most crucial sources of signal dropout is head motion during image acquisition that causes spurious group differences (75). For long-range motion (i.e., between-volume motion) correction, each diffusion-weighted image was first spatially registered to the base image (b = 0) with linear affine transformation. For short-range motion (i.e., within-volume motion), we postulate that in the presence of strong diffusion-sensitive gradients, especially those with high b-values, a sudden head motion within a TR period mainly manifests in the signal loss in the diffusion-weighted images. Thus, dealing with the signal dropout induced by the head motion can be regarded as part of our quality control procedure of motion artifact in diffusion MRI. Also, during the scan, all participants lied on the examination table with a head surrounded by expandable foam cushions to restrict movements. Furthermore, DSI data sets were discarded if they had more than 60 slices with signal dropout (60 slices correspond to 1% of slices in 102 gradient x 58), a proxy of in-scanner motion. The QA criterion of the DWI signal dropout is defined as to discard the data of subjects whose DWI data sets are with more than 60 wrecked slices. The reason behind the criterion based on the slices instead of volumes is that the signal drop usually occurs randomly over a participant's entire data set, seldom limited within several volumes. Additionally, even though the signal drop only occurs in slices of few volumes, we still tended to

exclude this subject to get rid of any unexpected bias, which might confound the subsequent results. As a result, all images included in this study are guaranteed with high SNR and less than 60 wrecked slices. Eddy current is detrimental to diffusion imaging quality, and echo-planar imaging sequence is particularly susceptible due to long readout times. To minimize the effect of eddy current, which is induced by gradient switch, we utilized the twice-refocused spin-echo sequence, which has been proven to greatly reduce eddy distortion compared with the Stejskal-Tanner spin echo sequence (73). The diffusion gradient is split into two smaller sets of bipolar lobes, with the radiofrequency refocusing pulses dividing each bipolar pair. Thus, the initial and final ramps cancel each other out in close temporal proximity (76). In addition, diffusion data sets with signal-to-noise ratios (SNRs) of less than 20 were discarded. The SNR was calculated as the ratio of the mean signal in the center of the image to the standard deviation of the background signal and was corrected with a factor derived from the Rayleigh distribution (77). Diffusion MRI images in this study are acquired from a single MRI machine from 2010 to 2018. There was no software update during this period, and the SNR was stable in each year (Table S6). Taken together, the artifact induced by motion or eddy current in the diffusion-weighted images was minimized in this study. Consequently, MRI data of 58 people with ASD and 27 of their siblings, 183 people with ADHD and 14 of their siblings, as well as 96 people of typically developed controls were discarded because of unsatisfactory image quality, and these participants were thus excluded from the further analyses. After image quality assessment, 281 people with ADHD and 124 of their siblings and 175 people with ASD and 72 of their siblings were included in the study (Table 1).

f. Reconstruction of diffusion MRI data

We used the mean apparent propagator (MAP)-MRI algorithm (78-80) to calculate diffusion indices for each individual. The algorithm describes the magnetic resonance signals in the q-space in terms of a linear combination of Hermite functions, which form an orthonormal and complete basis to approximate all types of diffusion signal profiles. MAP-MRI is an extension of diffusion tensor imaging (DTI) because zero-order Hermite functions are Gaussian functions. By contrast, higher-order terms, which are orthogonal corrections to the Gaussian approximation, account for the non-Gaussian components of diffusion signals. In addition, the Fourier transforms of Hermite functions are Hermite functions. Therefore, the diffusion propagator and orientation distribution function could be easily reconstructed from the coefficients, which were estimated by fitting the diffusion signals with Hermite functions. By using the orientation distribution function, we calculated the generalized fractional anisotropy (GFA) (81), which is analogous to the fractional anisotropy in DTI. GFA was calculated with MAP models (78, 80), whereas conventional diffusion indices, mean diffusivity (MD), radial diffusivity (RD), and axial diffusivity (AD) were

calculated using the DTI model. GFA, MD, RD, and AD, represent the diffusion profiles, namely white matter microstructural properties, of each white matter tract. These indices have strong relationships with microstructural properties, as evidenced by mouse demyelination models and ex vivo and postmortem human brain histology studies (82, 83). In brief, a decreased GFA is considered to be associated with impaired microstructural integrity of white matter fibers, but the marker is nonspecific and should be supplemented by other diffusion indices (82, 83). MD increases with reduced axon density and is an inverse measure of membrane density. RD increases with demyelination or dysmyelination. AD decreases with acute axonal injury but becomes unclear in the chronic and repair stages (82-85). Therefore, GFA, MD, RD, and AD were regarded as surrogate markers indicating different microstructural properties of white-matter tracts.

g. White matter tract-specific analysis of diffusion indices

The white matter tract-specific analysis was performed to sample the diffusion indices from 45 predefined major fiber tract bundles over the whole brain. For the DSI dataset, the 45 major white matter tracts (Table S1) were built in an open-sourced DSI template (86) through deterministic streamline-based tractography (87) with multiple regions of interest defined in the automated anatomical labeling atlas (88). The sampling coordinates of the 45 tracts (Table S1) were transformed from the template to individual DSI datasets with the corresponding deformation maps. The deformation maps were obtained through two-step registration, which included anatomical information provided by the T1-weighted images (89) and microstructural information provided by DSI datasets (86). The sampling coordinates were aligned with the proceeding direction of each fiber tract bundle, and diffusion indices were sampled in the native space along the sampling coordinates normalized and divided into 100 steps. Finally, for each participant, we obtained a 3D array (1-axis: 100 steps along with sampling coordinates; 2-axis: 45 white matter tract bundles; 3-axis: diffusion indices). The axis of 100 steps of the array was then averaged to obtain a matrix (1-axis: 45 white matter tract bundles; 2-axis: diffusion indices) (90-92). In this study, the primary interest is GFA, and other diffusivity measures, MD, RD, and AD, were included in the supplementary analysis.

h. Normative modeling

We utilized moving averages to obtain unbiased mean and variance estimates of diffusion indices in each age range from the 626 typically developed control cohort (Male/Female: 376/250; age: 5-

40/20.16±8.5yrs). Normative models for each diffusion indices (GFA, MD, RD, AD) of 45 main tracts (Table S1) were developed separately for men and women (Figure S2). The age-range window was between 1 and 5 years, depending on data point density. We used a minimum of 30 data points to derive means and standard deviations. Diffusion indices for each participant were transformed into Z-scores, resulting in individualized tract-alteration profiles (Figure S3). The Z-scores were statistically free of age or sex confounders; there was neither a significant correlation between Z-scores and age nor a difference in sex after statistical testing for typically developed controls. There was also no correlation between Z-scores and image quality, assessed by SNR and signal dropout counts (Figure S5&6). The moving average method was compared with other approaches, including linear, quadratic, Gaussian process regression (GPR) with a radial basis function kernel, GPR with a Matern kernel, and locally weighted scatterplot smoothing. Each model was fitted for people without ADHD or ASD with 10-fold cross-validation, and the average R^2 and root mean square errors (RMSEs) of white matter tracts were acquired (Table S2A). Because no theoretical evidence has been presented regarding how GFA or other diffusion indices change with age, we used the nonparametric estimation of normative models. In addition, our moving average approach had the most suitable fit, according to R^2 (Table S2B) and RMSE (Table S2C) in nearly every white matter tract. Statistical analysis and visualization were performed using Python packages (93-99) and R software libraries (100).

i. Canonical correlation analysis

The multivariate analyses of brain-behavior relationships were done with canonical correlation analysis (CCA), which considers the fact that multiple variables actually interact with one another. CCA identifies "modes" of population covariation between diffusion indices and clinical measures (101); each mode includes a linear combination of tract diffusion indices and a discrete combination of non-imaging measures with the highest correlations. The relative "importance" of each original variable in a mode is reflected by the canonical loadings (Figure 4, Figure S18 & S19), which is the linear correlation between the canonical variate and the original variables in this set. The canonical loading shows the relative contribution of each variable in deriving the canonical variate, reflecting the variance that the observed variable shares with the canonical variate. The derived modes, or canonical variates, are orthogonal to each other, reflecting a multi-dimensional brain-behavior relationship. The CCA analysis was done by R package "CCA" and "CCP" (102-104). The first part of the analysis illustrates the relationship between tract GFA Z-score and behavioral measures, including Autism Spectrum Quotient, SRS, and SNAP IV (Figure 3A). Because these questionnaires were not available for all the participants, so the subjects included in the analysis were 354 (ADHD: 71, ADHD sibling: 47, ASD: 167; ASD sibling: 69).

The second part of the analysis demonstrates the association between tract GFA Z-score and neuropsychological tests, including CANTAB (Table S4) and CCPT (Table S3) (Figure 3B). Again, not all the participants received CANTAB and CCPT, so the final analysis included 595 participants (ADHD: 273, ADHD sibling: 117; ASD: 142; ASD sibling: 63). Each significant mode ($p < 0.05$; $Corr > 0.4$) accounts for orthogonal dimensions of relationship. To investigate which variable contributes most to the canonical variate, variables with large loadings (with cutoffs of ± 0.2) were selected (Figure 4) for interpretations. There is currently no consensus on the cutoff threshold for the definition of "large loadings." For additional analysis, MD Z-score, RD Z-score, and AD Z-score was respectively correlated with symptom scores and neuropsychological tests (Figure S24-27). As each index represents distinct histological changes (82-85), these additional analyses provide different white matter tract markers indicating different aspects of the brain-behavior relationship.

j. Data distribution and the rationale for the appropriate statistical test selection

The central limit theorem has established that when independent random variables (independent and identically distributed (i.i.d.) random variables) are sampled, their normalized sum, aka sampling distributions, tends toward a normal distribution even if the original variables themselves are not normally distributed. Practically, sample sizes equal to or greater than 30 are considered sufficient for the central limit theorem to hold. Thus, for clinical group except for girls with ASD, have sample size larger than 30, so the "sampling distribution" approximate normal distribution regardless of whether white matter tract data (GFA Z-score) are normally distributed, making parametric test (t-test) the best choice in contrast to non-parametric test (ex. Mann-Whitney test). For girls with ASD (n=17), we applied the Kolmogorov-Smirnov test, and no white matter tracts showed GFA Z-scores that deviate from the normal distribution. Thus, the sampling distribution approximates normal distribution, and t-test is the best choice. Thus, we derive a deviation pattern with a one-sample t-test to check if GFA Z-score mean deviated significantly from zero and idiosyncrasy pattern with F-test to check if GFA Z-score variance deviated significantly from the normal population.

Clinical group	Sex	N	Central limit theorem
ADHD	Male	205	V
ADHD	Female	74	V
ADHD siblings	Male	56	V
ADHD siblings	Female	65	V
ASD	Male	158	V

ASD	Female	17	Normal distribution (Kolmogorov-Smirnov test)
ASD siblings	Male	38	V
ASD siblings	Female	34	V

The derived deviation pattern and idiosyncrasy pattern consist of effect size and F-ratio of each white matter tract for each clinical group, respectively. Deviation patterns (or idiosyncrasy pattern) contain 45 values, which correspond to 45 white matter tracts. For example, Result S1-1 includes deviation pattern of people with ADHD. The p-value for each tract is the statistical significance of a one-sample t-test of "whether people with ADHD present GFA Z-score deviated from zero" for each tract. The null hypothesis is "people with ADHD present GFA Z-score at average 0", aka no difference from the norm. The test is done "separately" for each tract, with the testing space of 45 tracts, and with the correction for multiple comparisons. The derived "effect size," or Cohen's d, of 45 tracts constitute the deviation pattern for average ADHD. This deviation pattern could be thought of as sampling the GFA-Z score from the average ADHD brain in the predefined 45 region-of-interest (ROI), rather than sampling from people with ADHD.

Thus, those values were not independent of each other, and the central limit theorem does not apply. Recall that the prerequisite is to draw a sequence of independent and identically distributed (i.i.d.) random variables. Clearly, neither the deviation pattern nor the idiosyncrasy pattern of 45 tracts conforms to this prerequisite. Thus, we need to specifically test for the normality of deviation and idiosyncrasy. After applying the Kolmogorov-Smirnov test, all of the patterns deviate significantly from the normal distributions for each clinical group. Thus, using Spearman's correlation would be more appropriate than Pearson's correlation.

Supplementary Tables

Table S1. Atlas of 45 white-matter fiber tracts: tract names, connected brain regions, and references.

Tract Name	Abbrev.	ROI 1	ROI 2
Association tracts			
Arcuate Fasciculus (105)	AF	Inferior frontal gyrus (VLPFC)	Superior temporal gyrus
Superior Longitudinal Fasciculus I (106, 107)	SLF1	Superior parietal lobe	Superior frontal gyrus
Superior Longitudinal Fasciculus II (106, 107)	SLF2	Angular gyrus	DLPFC
Superior Longitudinal Fasciculus III (106, 107)	SLF3	Supramarginal gyrus	Pars opercularis
Frontal Aslant Tract (108)	FAT	Supplementary motor area	Inferior frontal gyrus
Perpendicular Fasciculus (109)	PF	Angular gyrus	Fusiform, inferior temporal
Cingulum, body (110)	CGB	Cingulate gyrus (anterior)	Cingulate gyrus (posterior)
Cingulum, Hippocampus (110)	CGH	Cingulate gyrus (posterior)	Hippocampus
Fornix (111)	FX	Mammillary body	hippocampus
Stria Terminalis (112)	ST	Septal nuclei	Amygdala
Uncinate Fasciculus (113, 114)	UF	Orbitofrontal gyrus	Superior temporal pole
Inferior Fronto-Occipital Fasciculus (115)	IFOF	Orbitofrontal gyrus	Occipital lobe
Inferior Longitudinal Fasciculus (116)	ILF	Temporal gyrus	Occipital lobe
Projection tracts			
Frontostriatal circuit (Prefrontal) (117)	FS_PFC	Prefrontal cortex	Rostral caudate nucleus, putamen
Frontostriatal circuit (Motor) (117)	FS_M	premotor, motor	Putamen
Thalamocortical Radiation (Prefrontal) (118, 119)	TR_PFC	Thalamus	Prefrontal cortex

Thalamocortical Radiation (Sensorimotor) (118, 119)	TR_SM	Thalamus	Postcentral gyrus, precentral gyrus
Thalamocortical Radiation (Auditory) (118, 119)	TR_aud	Medial geniculate body	Heschl's gyrus
Thalamocortical Radiation (Optic Radiation) (118, 119)	TR_opt	Lateral geniculate body	Visual cortex
Corticospinal Tract (118)	CST	Primary motor cortex	Brainstem
Corpus callosum			
Corpus callosum (genu; Prefrontal) (118)	CC_PFC	Prefrontal cortex	Prefrontal cortex
Corpus callosum (Sensorimotor) (118)	CC_SM	Sensorimotor cortex	Sensorimotor cortex
Corpus callosum (Parietal) (118)	CC_pariet	Posterior Parietal cortex	Posterior Parietal cortex
Corpus callosum (Temporal) (118)	CC_temp	Temporal cortex	Temporal cortex
Corpus callosum (Splenium; Occipital) (118)	CC_splen	Visual cortex	Visual cortex

Table S2. Comparison of normative models.

(A) The whole-brain average summary score of R^2, root mean square error (RMSE), and mean square error for several normative model methods, including our moving average method (Moving_Avg), linear and quadratic methods, Gaussian process regression (GPR) with radial basis function kernel (GPR_RBF), GPR with Matern kernel (GPR_Matern), and locally weighted scatterplot smoothing (LOWESS). Moving average models are the fittest, with the highest R^2, lower RMSE, and MSE. All the evaluation metrics were acquired for each white matter tracts and averaged to get a whole-brain average summary score.

	R^2	MSE	RMSE
Moving_Avg	2.45E-01	8.64E-04	2.88E-02
Linear	4.73E-02	1.08E-03	3.23E-02
Quadratic	2.22E-01	8.92E-04	2.92E-02
GPR_RBF	1.84E-01	9.35E-04	3.00E-02
GPR_Matern	2.17E-01	8.96E-04	2.93E-02
LOWESS	2.13E-01	9.01E-04	2.94E-02

(B) R^2 of 45 tracts for each model. Moving average presents the highest R2 in nearly every white matter tract. LOWESS model, quadratic model, and GPR model with Matern kernel (GPR_Matern) also perform well. The linear model fits worse with the data.

tract	**Moving_Avg**	**Linear**	**Quadratic**	**GPR_RBF**	**GPR_Matern**	**LOWESS**
AF_L	3.11E-01	3.26E-03	2.76E-01	2.11E-01	2.76E-01	2.60E-01
AF_R	2.67E-01	3.69E-03	2.35E-01	1.79E-01	2.33E-01	2.18E-01
SLF1_L	2.21E-01	1.22E-02	1.84E-01	1.61E-01	1.95E-01	1.97E-01
SLF1_R	2.23E-01	3.57E-02	2.21E-01	1.90E-01	2.20E-01	1.92E-01
SLF2_L	2.64E-01	2.58E-02	2.31E-01	1.79E-01	2.25E-01	2.08E-01
SLF2_R	2.41E-01	2.44E-02	1.88E-01	1.53E-01	1.94E-01	1.95E-01
SLF3_L	2.52E-01	2.39E-02	2.21E-01	1.72E-01	2.16E-01	1.98E-01
SLF3_R	1.92E-01	3.83E-02	1.50E-01	1.22E-01	1.49E-01	1.49E-01
FAT_L	2.49E-01	6.10E-03	2.31E-01	1.78E-01	2.27E-01	2.09E-01
FAT_R	2.56E-01	1.28E-01	2.46E-01	2.22E-01	2.37E-01	2.34E-01
PF_L	1.43E-01	1.82E-03	1.17E-01	8.77E-02	1.10E-01	1.18E-01
PF_R	1.38E-01	2.81E-04	1.19E-01	9.07E-02	1.11E-01	1.12E-01
CGB_L	2.38E-01	1.01E-01	2.01E-01	1.80E-01	2.10E-01	2.22E-01

CGB_R	3.23E-01	1.72E-01	2.92E-01	2.64E-01	2.93E-01	2.94E-01
CGH_L	3.69E-01	1.17E-01	3.20E-01	2.51E-01	3.12E-01	3.32E-01
CGH_R	3.45E-01	6.49E-02	2.75E-01	2.23E-01	2.84E-01	3.01E-01
FX_L	3.06E-01	2.68E-01	3.05E-01	2.96E-01	2.94E-01	3.03E-01
FX_R	3.43E-01	2.09E-01	3.33E-01	3.11E-01	3.28E-01	3.28E-01
ST_L	1.71E-01	1.50E-01	1.77E-01	1.61E-01	1.47E-01	1.73E-01
ST_R	4.72E-02	2.82E-02	5.89E-02	4.44E-02	3.05E-02	5.80E-02
UF_L	2.08E-01	5.34E-03	1.60E-01	1.17E-01	1.59E-01	1.80E-01
UF_R	1.89E-01	2.61E-03	1.64E-01	1.19E-01	1.56E-01	1.63E-01
IFOF_L	3.47E-01	5.04E-03	3.13E-01	2.40E-01	3.12E-01	2.83E-01
IFOF_R	3.28E-01	2.88E-04	3.04E-01	2.30E-01	2.98E-01	2.77E-01
ILF_L	5.50E-02	2.25E-04	4.54E-02	3.96E-02	4.31E-02	4.47E-02
ILF_R	6.74E-02	1.55E-04	3.70E-02	3.32E-02	3.84E-02	5.29E-02
FS_PFC_L	2.83E-01	3.05E-03	2.79E-01	1.99E-01	2.63E-01	2.47E-01
FS_PFC_R	3.02E-01	1.58E-03	3.08E-01	2.13E-01	2.88E-01	2.64E-01
FS_M_L	2.92E-01	4.62E-03	2.55E-01	1.95E-01	2.57E-01	2.42E-01
FS_M_R	2.82E-01	2.31E-02	2.44E-01	1.88E-01	2.46E-01	2.48E-01
TR_PFC_L	2.87E-01	1.72E-03	2.84E-01	2.24E-01	2.77E-01	2.50E-01
TR_PFC_R	2.83E-01	8.85E-04	2.85E-01	2.26E-01	2.76E-01	2.40E-01
TR_SM_L	1.55E-01	7.18E-03	1.42E-01	1.33E-01	1.38E-01	1.34E-01
TR_SM_R	1.66E-01	3.07E-03	1.41E-01	1.33E-01	1.40E-01	1.36E-01
TR_aud_L	4.03E-01	1.44E-01	3.76E-01	2.98E-01	3.50E-01	3.71E-01
TR_aud_R	3.42E-01	1.70E-01	3.17E-01	2.77E-01	2.96E-01	3.08E-01
TR_opt_L	2.60E-01	8.40E-02	2.51E-01	2.26E-01	2.49E-01	2.16E-01
TR_opt_R	1.92E-01	2.86E-02	1.85E-01	1.62E-01	1.83E-01	1.48E-01
CST_L	1.77E-01	9.91E-04	1.49E-01	1.40E-01	1.39E-01	1.49E-01
CST_R	1.76E-01	4.14E-03	1.38E-01	1.25E-01	1.27E-01	1.43E-01
CC_PFC	3.37E-01	1.10E-01	3.37E-01	2.87E-01	3.33E-01	3.13E-01
CC_SM	3.59E-01	4.33E-02	3.25E-01	2.80E-01	3.37E-01	3.15E-01
CC_pariet	2.33E-01	1.88E-02	2.20E-01	1.91E-01	2.20E-01	2.01E-01
CC_temp	2.83E-01	4.90E-02	2.52E-01	2.24E-01	2.57E-01	2.55E-01
CC_splen	1.40E-01	2.18E-03	1.07E-01	9.03E-02	1.12E-01	1.08E-01

Abbreviation: R= Right; L=Left.

(C) RMSE of 45 tracts for each model.

Moving average presents the lowest RMSE in nearly every white matter tract. LOWESS model, quadratic model, and GPR model with Matern kernel (GPR_Matern) also perform well. The linear model fits worse with the data.

tract	**Moving_Avg**	**Linear**	**Quadratic**	**GPR_RBF**	**GPR_Matern**	**LOWESS**
AF_L	2.62E-02	3.16E-02	2.69E-02	2.81E-02	2.69E-02	2.72E-02
AF_R	2.87E-02	3.34E-02	2.93E-02	3.03E-02	2.93E-02	2.96E-02
SLF1_L	2.91E-02	3.28E-02	2.98E-02	3.02E-02	2.96E-02	2.95E-02
SLF1_R	3.28E-02	3.66E-02	3.29E-02	3.35E-02	3.29E-02	3.35E-02
SLF2_L	3.12E-02	3.59E-02	3.19E-02	3.29E-02	3.20E-02	3.23E-02
SLF2_R	3.14E-02	3.56E-02	3.25E-02	3.32E-02	3.24E-02	3.23E-02
SLF3_L	3.40E-02	3.88E-02	3.47E-02	3.57E-02	3.48E-02	3.52E-02
SLF3_R	3.81E-02	4.15E-02	3.91E-02	3.97E-02	3.91E-02	3.91E-02
FAT_L	3.17E-02	3.64E-02	3.20E-02	3.31E-02	3.21E-02	3.25E-02
FAT_R	2.94E-02	3.18E-02	2.96E-02	3.00E-02	2.97E-02	2.98E-02
PF_L	2.83E-02	3.06E-02	2.88E-02	2.92E-02	2.89E-02	2.87E-02
PF_R	2.79E-02	3.01E-02	2.82E-02	2.87E-02	2.84E-02	2.83E-02
CGB_L	4.39E-02	4.77E-02	4.49E-02	4.55E-02	4.47E-02	4.44E-02
CGB_R	4.43E-02	4.89E-02	4.53E-02	4.61E-02	4.52E-02	4.52E-02
CGH_L	2.92E-02	3.46E-02	3.03E-02	3.19E-02	3.05E-02	3.01E-02
CGH_R	2.79E-02	3.34E-02	2.94E-02	3.04E-02	2.92E-02	2.88E-02
FX_L	2.80E-02	2.88E-02	2.80E-02	2.82E-02	2.82E-02	2.81E-02
FX_R	2.33E-02	2.56E-02	2.35E-02	2.39E-02	2.36E-02	2.36E-02
ST_L	2.30E-02	2.33E-02	2.30E-02	2.32E-02	2.34E-02	2.30E-02
ST_R	2.43E-02	2.46E-02	2.42E-02	2.44E-02	2.45E-02	2.42E-02
UF_L	2.71E-02	3.03E-02	2.79E-02	2.86E-02	2.79E-02	2.75E-02
UF_R	2.71E-02	3.01E-02	2.75E-02	2.83E-02	2.77E-02	2.76E-02
IFOF_L	2.51E-02	3.09E-02	2.57E-02	2.70E-02	2.57E-02	2.63E-02
IFOF_R	2.35E-02	2.86E-02	2.39E-02	2.51E-02	2.40E-02	2.43E-02
ILF_L	4.14E-02	4.26E-02	4.16E-02	4.17E-02	4.17E-02	4.16E-02
ILF_R	3.86E-02	3.99E-02	3.92E-02	3.93E-02	3.92E-02	3.89E-02
FS_PFC_L	2.61E-02	3.08E-02	2.62E-02	2.76E-02	2.64E-02	2.67E-02
FS_PFC_R	2.59E-02	3.10E-02	2.58E-02	2.75E-02	2.62E-02	2.66E-02
FS_M_L	2.89E-02	3.43E-02	2.96E-02	3.08E-02	2.96E-02	2.99E-02
FS_M_R	3.02E-02	3.52E-02	3.10E-02	3.21E-02	3.09E-02	3.09E-02

TR_PFC_L	2.53E-02	2.99E-02	2.53E-02	2.64E-02	2.55E-02	2.59E-02
TR_PFC_R	2.47E-02	2.92E-02	2.47E-02	2.57E-02	2.48E-02	2.54E-02
TR_SM_L	2.56E-02	2.77E-02	2.58E-02	2.59E-02	2.58E-02	2.59E-02
TR_SM_R	2.57E-02	2.81E-02	2.61E-02	2.62E-02	2.61E-02	2.62E-02
TR_aud_L	2.01E-02	2.40E-02	2.05E-02	2.18E-02	2.09E-02	2.06E-02
TR_aud_R	2.14E-02	2.40E-02	2.18E-02	2.24E-02	2.21E-02	2.19E-02
TR_opt_L	2.87E-02	3.19E-02	2.89E-02	2.94E-02	2.89E-02	2.96E-02
TR_opt_R	3.01E-02	3.30E-02	3.02E-02	3.07E-02	3.03E-02	3.09E-02
CST_L	2.00E-02	2.20E-02	2.03E-02	2.04E-02	2.04E-02	2.03E-02
CST_R	1.94E-02	2.13E-02	1.99E-02	2.00E-02	2.00E-02	1.98E-02
CC_PFC	2.96E-02	3.43E-02	2.96E-02	3.07E-02	2.97E-02	3.01E-02
CC_SM	2.69E-02	3.28E-02	2.76E-02	2.85E-02	2.73E-02	2.78E-02
CC_pariet	2.81E-02	3.18E-02	2.84E-02	2.89E-02	2.84E-02	2.87E-02
CC_temp	2.15E-02	2.47E-02	2.19E-02	2.23E-02	2.19E-02	2.19E-02
CC_splen	4.16E-02	4.48E-02	4.24E-02	4.28E-02	4.23E-02	4.24E-02

Abbreviation: R= Right; L=Left.

(D) MSE of 45 tracts for each model.

Moving average presents the lowest MSE in nearly every white matter tract. LOWESS model, quadratic model, and GPR model with Matern kernel (GPR_Matern) also perform well. The linear model fits worse with the data.

tract	**Moving_Avg**	**Linear**	**Quadratic**	**GPR_RBF**	**GPR_Matern**	**LOWESS**
AF_L	6.89E-04	9.97E-04	7.24E-04	7.89E-04	7.24E-04	7.40E-04
AF_R	8.21E-04	1.12E-03	8.57E-04	9.20E-04	8.59E-04	8.76E-04
SLF1_L	8.47E-04	1.07E-03	8.88E-04	9.12E-04	8.75E-04	8.73E-04
SLF1_R	1.08E-03	1.34E-03	1.08E-03	1.12E-03	1.08E-03	1.12E-03
SLF2_L	9.72E-04	1.29E-03	1.02E-03	1.08E-03	1.02E-03	1.05E-03
SLF2_R	9.87E-04	1.27E-03	1.06E-03	1.10E-03	1.05E-03	1.05E-03
SLF3_L	1.15E-03	1.51E-03	1.20E-03	1.28E-03	1.21E-03	1.24E-03
SLF3_R	1.45E-03	1.73E-03	1.53E-03	1.58E-03	1.53E-03	1.53E-03
FAT_L	1.00E-03	1.33E-03	1.03E-03	1.10E-03	1.03E-03	1.06E-03
FAT_R	8.62E-04	1.01E-03	8.74E-04	9.02E-04	8.84E-04	8.87E-04
PF_L	8.02E-04	9.35E-04	8.27E-04	8.54E-04	8.33E-04	8.26E-04
PF_R	7.79E-04	9.04E-04	7.96E-04	8.22E-04	8.04E-04	8.03E-04

CGB_L	1.93E-03	2.27E-03	2.02E-03	2.07E-03	2.00E-03	1.97E-03
CGB_R	1.96E-03	2.40E-03	2.05E-03	2.13E-03	2.04E-03	2.04E-03
CGH_L	8.55E-04	1.20E-03	9.21E-04	1.01E-03	9.32E-04	9.04E-04
CGH_R	7.79E-04	1.11E-03	8.62E-04	9.24E-04	8.51E-04	8.31E-04
FX_L	7.83E-04	8.27E-04	7.85E-04	7.95E-04	7.97E-04	7.87E-04
FX_R	5.45E-04	6.56E-04	5.53E-04	5.72E-04	5.57E-04	5.58E-04
ST_L	5.30E-04	5.44E-04	5.27E-04	5.37E-04	5.46E-04	5.30E-04
ST_R	5.91E-04	6.03E-04	5.84E-04	5.93E-04	6.02E-04	5.85E-04
UF_L	7.32E-04	9.19E-04	7.76E-04	8.16E-04	7.78E-04	7.58E-04
UF_R	7.37E-04	9.06E-04	7.59E-04	8.00E-04	7.66E-04	7.60E-04
IFOF_L	6.28E-04	9.56E-04	6.60E-04	7.31E-04	6.61E-04	6.89E-04
IFOF_R	5.50E-04	8.19E-04	5.70E-04	6.31E-04	5.75E-04	5.93E-04
ILF_L	1.71E-03	1.81E-03	1.73E-03	1.74E-03	1.74E-03	1.73E-03
ILF_R	1.49E-03	1.60E-03	1.54E-03	1.54E-03	1.53E-03	1.51E-03
FS_PFC_L	6.80E-04	9.46E-04	6.84E-04	7.60E-04	6.99E-04	7.14E-04
FS_PFC_R	6.72E-04	9.61E-04	6.66E-04	7.57E-04	6.85E-04	7.08E-04
FS_M_L	8.34E-04	1.17E-03	8.79E-04	9.49E-04	8.76E-04	8.94E-04
FS_M_R	9.12E-04	1.24E-03	9.60E-04	1.03E-03	9.57E-04	9.54E-04
TR_PFC_L	6.38E-04	8.94E-04	6.41E-04	6.95E-04	6.48E-04	6.72E-04
TR_PFC_R	6.12E-04	8.52E-04	6.09E-04	6.60E-04	6.17E-04	6.48E-04
TR_SM_L	6.54E-04	7.69E-04	6.65E-04	6.72E-04	6.67E-04	6.71E-04
TR_SM_R	6.62E-04	7.92E-04	6.82E-04	6.89E-04	6.83E-04	6.86E-04
TR_aud_L	4.03E-04	5.77E-04	4.21E-04	4.73E-04	4.38E-04	4.24E-04
TR_aud_R	4.56E-04	5.76E-04	4.74E-04	5.02E-04	4.88E-04	4.80E-04
TR_opt_L	8.24E-04	1.02E-03	8.34E-04	8.63E-04	8.37E-04	8.74E-04
TR_opt_R	9.07E-04	1.09E-03	9.14E-04	9.40E-04	9.17E-04	9.56E-04
CST_L	4.00E-04	4.85E-04	4.14E-04	4.18E-04	4.18E-04	4.14E-04
CST_R	3.77E-04	4.55E-04	3.94E-04	4.00E-04	3.99E-04	3.92E-04
CC_PFC	8.74E-04	1.17E-03	8.74E-04	9.40E-04	8.79E-04	9.06E-04
CC_SM	7.22E-04	1.08E-03	7.60E-04	8.11E-04	7.47E-04	7.72E-04
CC_pariet	7.92E-04	1.01E-03	8.05E-04	8.35E-04	8.05E-04	8.25E-04
CC_temp	4.61E-04	6.12E-04	4.81E-04	4.99E-04	4.78E-04	4.79E-04
CC_splen	1.73E-03	2.01E-03	1.80E-03	1.83E-03	1.79E-03	1.80E-03

Abbreviation: R= Right; L=Left.

Table S3. Conners' continuous performance test (CCPT).

Item	***Abbrev.***	***Description***
Attention		
Omission errors	omis	The failure to respond to target letters (missed targets)
Hit RT Std. Error	rtsd	Consistency of hit response speed
Variability	var	Intra-individual variability in hit RT. the amount of variability the individual shows in separate segments of the test in relation to his or her own overall standard error
Detectability (d')	detect	The ability to distinguish targets from nontargets
Response Style	rpsty	The ratio of hit the target to hit nontarget stimuli; the tendency to avoid commission errors
Hit RT ISI Change	rtisi	Whether hit RT performance changes with longer ISIs (inter-stimulus intervals)
Hit SE ISI Change	seisi	Whether performance becomes more variable (change in the standard error of reaction times) with longer ISIs
Response inhibition/impulsivity		
Commission errors	comis	False-positive response to non-targets
Hit RT	rt	Hit reaction time: mean response speed of correct responses
Perseverations	per	Hit RT less than 100 ms constitutes a perseverative response
Vigilance		
Hit RT Block Change	rtbc	The slope of change in hit RT across blocks of the test. High values indicate a significant slowing down in reaction

Hit SE Block Change	sebc	Standard errors of Hit RT changed by blocks. High values indicate a loss of consistency as the test proceeds. Low values indicate sustained or improved response consistency

Table S4. Cambridge Neuropsychological Testing Automated Battery.

Item	***Abbrev.***	***Description***
Processing speed		
Motor Screening	MOT	A series of crosses are shown in different locations on the screen, and the participants should point to the crosses. Latency is defined as the time taken for the participant to touch the cross after it appeared. The value is the motor screening mean latencies of the ten crosses presented correctly responded to (71).
Reaction Time	RTI	one of five possible different stimuli have been presented, and the participant must touch the screen when a yellow dot is displayed. RTI movement time latency is usually normally distributed for correct responses.
Big/ Little Circle	BLC	The participant is presented with a series of pairs of circles, one large and one small. The participant is instructed first to point to the smaller of the two circles, and then, after 20 trials, to point to the larger circle. This measures the speed of response, i.e., how quickly the subject touched the correct stimulus. Latency is measured in milliseconds. The test value is the mean correct latency.
Executive function		
Stocking of Cambridge	SOC	SOC test requires participants to plan and execute a set of movements to replicate a goal arrangement of balls. SOC problems solved in minimum moves represents the number of problems solved in the specified minimum number of moves (120).
Spatial Working Memory	SWM	SWM measures working memory for spatial stimuli. When a token is found inside a square, the subject must select. The square then closes. When the participant begins to search for other tokens, he/she should ignore squares where tokens have been found (71). Total errors were reported.
Intradimension/ Extradimension Shift	IED	This test assesses the ability to maintain attention to different stimuli within a dimension (ex. Within the line dimension) (intra-dimensional shift, IDS) and then shift attention to another dimension (e.g., Line dimension to shape dimension) (extra-dimensional shift, EDS). The test was terminated if the participant failed to learn the response criterion on any stage after 50 trials. IED completed stage error represents the errors

		made on stages successfully completed. Subjects failing at any stage of the ID/ED shift will have less opportunity to make errors than those who finish, or get closer to finishing, the task (71, 72).
Visual memory		
Pattern Recognition Memory	PRM	This test measures recognition memory for visual patterns and spatial locations. The number of correct responses is expressed as a percentage (accuracy) (71).
Paired Associates Learning	PAL	PAL assesses the participant's ability to form visuospatial association. The participant is presented with several boxes opening in a randomized order. One or more of them will contain a pattern. When all the boxes are open, the participant must touch the boxes where the pattern was originally located. PAL stages completed is an indicator of the overall success of how many stages were successfully completed. The test gradually increases in difficulty (121).
Delayed Matching to Sample	DMS	A series of abstract patterns are displayed on a computer screen. Then pairs of stimuli were shown, one of which was previously displayed and one of which is new. Participants should select the stimulus that was previously seen (72).
Spatial Recognition Memory	SRM	A white square is shown sequentially in five different locations on the screen, then, the participant is presented with a series of five pairs of squares, one of which is in a place previously seen, and one of which is a distracter. The five squares are shown in reverse order. SRMcP is the precentage of correct responses.
Spatial Span	SSP	SSP measures spatial short-term memory, the ability to remember the order in which visual stimuli are presented. Participants view a color-changing sequence and must reproduce the sequence by pointing to the boxes in the same order that they originally changed color. The test began with 2-box problems, and then up to 9-box problems. SSP span length is the longest sequence successfully recalled by the subject (72, 120).
Attention		
Rapid Visual Information Processing	RVP	A measure of sustained attention, including a 4-min visual continuous performance task (CPT). Digits (ranging from 2 to 9) appeared one at a time (100 digits/min) on the screen in random order. Participants were asked to press a response pad when they detected any one of three number sequences (3–5–7, 2–4–6, 4–6–8).

Matching to Sample Visual Searching	MTS	The participants will observe an abstract pattern composed of four colored elements. After a brief period, a number of similar patterns are shown in a circle of boxes around the edge of the screen. Only one of these matches the pattern in the center of the screen, and the subject must specify which it is by touching it. The number of patterns in the circle may be 1, 2, 4, or 8, and the incorrect patterns are composed of juggled elements of the sample pattern or juggled distracter elements. MTS percent correct is the percentage of correct responses. As this task includes speed and accuracy demands, subjects may trade-off speed of response in favor of accuracy, or vice versa.

Table S5. Child-adult comparison of people with ADHD and people with ASD.

(Mean ± SD)	**ADHD children** (N=147)	**ADHD adults** (N=132)	**ASD children** (N=104)	**ASD adults** (N=71)
Age (years)	11.2 ± 2.4 (range: 7-16)	25.6 ± 5.5 (range: 17-38)	13.6 ± 1.9 (range: 9-16)	20.4 ± 3.2 (range: 17-35)
Sex (M/F)	121/26	85/49	97/7	61/10
SNR	27.1 ± 3.1	27.3 ± 2.6	27.8 ± 3.3	26.9 ± 3.4
Signal dropout counts	14.5 ± 14.6	3.2 ± 6.5	13.7 ± 17.8	7.2 ± 10.4

Table S6. Signal-to-noise (SNR) of the MRI machine used in the study.

Diffusion MRI images in this study are acquired from a single MRI machine from 2010 to 2018. There was no software update during this period. The SNR was stable in each year. The table summarizes the quality assurance data from other projects.

MRI Year	Mean ± std
2010 (n=119)	27.4 ± 3.0 (range: 20.5-36.4)
2011 (n=182)	28.4 ± 3.0 (range: 21.6-35.3)
2012 (n=61)	26.3 ± 3.0 (range: 20.4-33.5)
2013 (n=238)	27.6 ± 3.0 (range: 20.4-34.2)
2014 (n=324)	27.2 ± 2.9 (range: 20.7-36.0)
2015 (n=361)	26.5 ± 2.8 (range: 20.1-34.9)
2016 (n=263)	27.0 ± 3.1 (range: 20.1-36.2)
2017 (n=192)	26.2 ± 3.5 (range: 20.4-35.9)
2018 (n=193)	25.1 ± 2.5 (range: 20.2-33.4)

Table S7. Clusters derived from symptom-based hierarchical clustering.

Ward's hierarchical clustering is based on symptom scales (SRS, Autism Spectrum Quotient, SNAP-IV), resulting in two clusters. The optimal number of clustering were confirmed by Silhouette's width (Figure S17A&B). The cluster 1 consisted of ADHD: 156/53 (M/F); ADHD sibling: 40/53; ASD: 84/6; ASD sib: 36/34; cluster 2 consisted of ADHD: 49/21; ADHD sibling: 16/12; ASD: 74/11; ASD sib: 2/0).

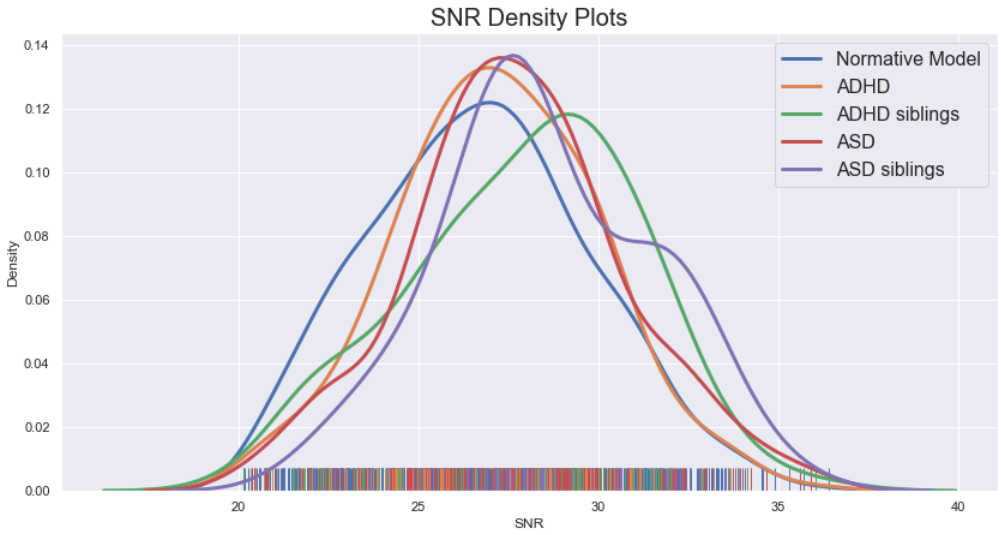
(Mean ± SD)	**Cluster 1 (N=462)**	**Cluster 2 (N=185)**
Age	17.13 ± 7.1 (range: 6-40)	18.35 ± 6.9 (range: 7-38)
Sex (M/F)	316/146	141/44
SNAP-IV		
Inattentive	12.2 ± 7.8	16.4 ± 6.5
Hyperactive/Impulsivity	8.3 ± 6.9	10.4 ± 7.2
Oppositionality	7.9 ± 6.0	10.0 ± 5.8
Total score	20.5 ± 13.7	26.8 ± 12.1
Autism Spectrum Quotient (4-point Likert scale)		
Social Skill	22.6 ± 6.1	30.8 ± 5.1
Attention Switching	23.9 ± 4.5	30.0 ± 4.0
Attention to Details	23.6 ± 4.4	25.6 ± 5.2
Communication	21.6 ± 6.2	31.0 ± 3.4
Imagination	22.0 ± 4.9	27.8 ± 5.0
Total score	113.7 ± 19.1	145.1 ± 13.3
Autism Spectrum Quotient (Dichotomous scale)		
Social Skill	3.9 ± 2.9	7.3 ± 2.3
Attention Switching	4.6 ± 2.2	7.3 ± 1.7
Attention to Details	4.5 ± 2.2	5.5 ± 2.3
Communication	3.5 ± 2.8	7.6 ± 1.5
Imagination	3.6 ± 2.2	6.3 ± 2.2
Total score	20.2 ± 8.6	34.0 ± 5.9
Social Response Scale		
Social communication	16.6 ± 12.1	46.7 ± 10.7
Stereotyped behaviors	8.2 ± 6.4	24.5 ± 6.8
Social awareness	15.7 ± 6.9	21.8 ± 4.5
Social emotion	5.8 ± 3.9	14.7 ± 3.8

Total scores	46.3 ± 25.6	107.7 ± 20.0
Intelligence Test		
Verbal IQ	106.4 ± 13.2	103.0 ± 14.5
Performance IQ	106.3 ± 14.8	104.2 ± 15.7
Full IQ	106.2 ± 13.6	103.4 ± 15.2
SNR	27.7 ± 3.0	27.4 ± 2.9
Signal dropout counts	8.8 ± 12.5	9.6 ± 3.2

Supplementary Figures

Figure S1: SNR and Signal Dropout of DSI datasets.

DSI datasets were subject to stringent quality control. DSI data sets were discarded if they had more than 60 slices with signal dropout (60 slices correspond to 1% of slices in 102 gradient x 58), a proxy of in-scanner motion. In addition, diffusion data sets with signal-to-noise ratios (SNRs) of less than 20 were discarded. The following figures showed the SNR distributions and signal dropout counts distributions for people with ADHD and their unaffected siblings, people with ASD and their unaffected siblings, and typically developed control participants for normative model, respectively.



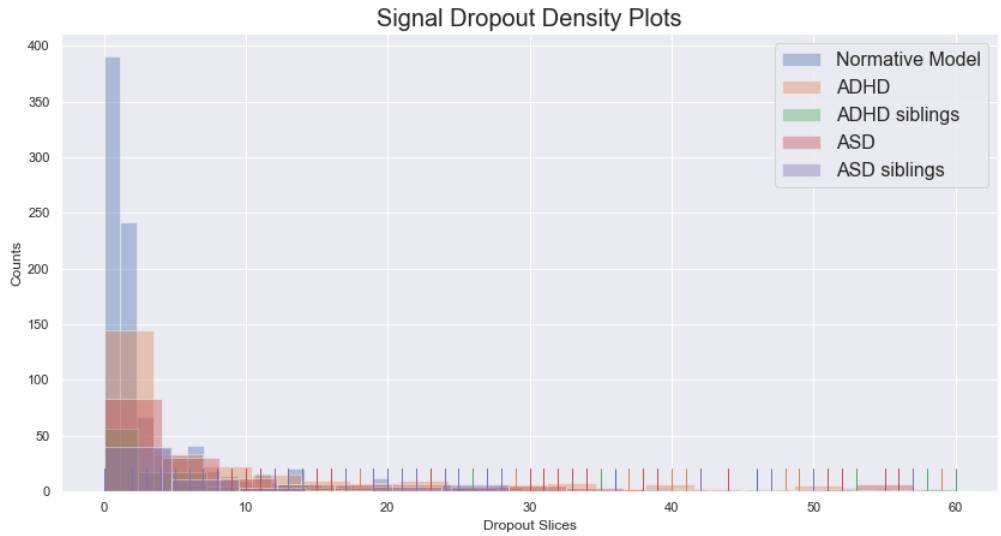


Figure S2. Sex-specific normative models of white matter tracts relative to the age norm.

Sex-specific normative models were built separately for each white matter tract. The orange curve represents the trajectory of mean GFA/MD/RD/AD values of the controls with age. The pink-shaded area encompasses the width of ± 1.96 standard deviations from the mean. Colored dots represent different patient groups. By using the normative models, diffusion indices can be transformed into Z-scores, yielding individualized white matter tract alteration profiles (Figure S4). Each white matter tract could be transformed and represented by a 4-numbered tuple (GFA Z-score, MD Z-score, RD Z-score, AD Z-score). Here we used left arcuate fasciculus as an example to illustrate the sex-specific normative model for each white matter metric.

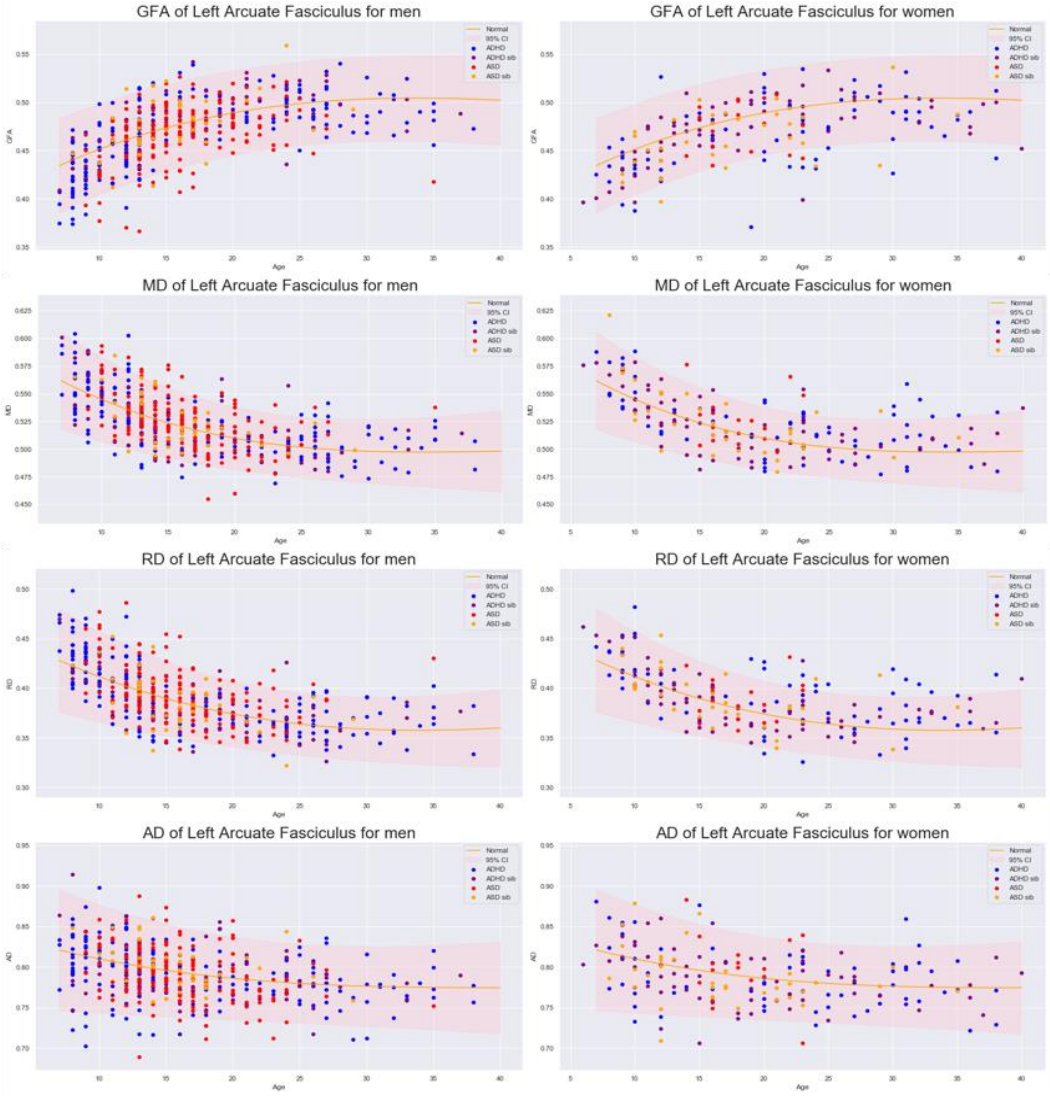


Figure S3. Age distribution of normative models of white matter tracts.

The age bins of the normative model for (A) male and (B) female participants. (C) The age distributions of probands, siblings, and typically developing control participants. (D) The GFA scatter plot of left arcuate fasciculus for typically developing controls and the resulting normative model.

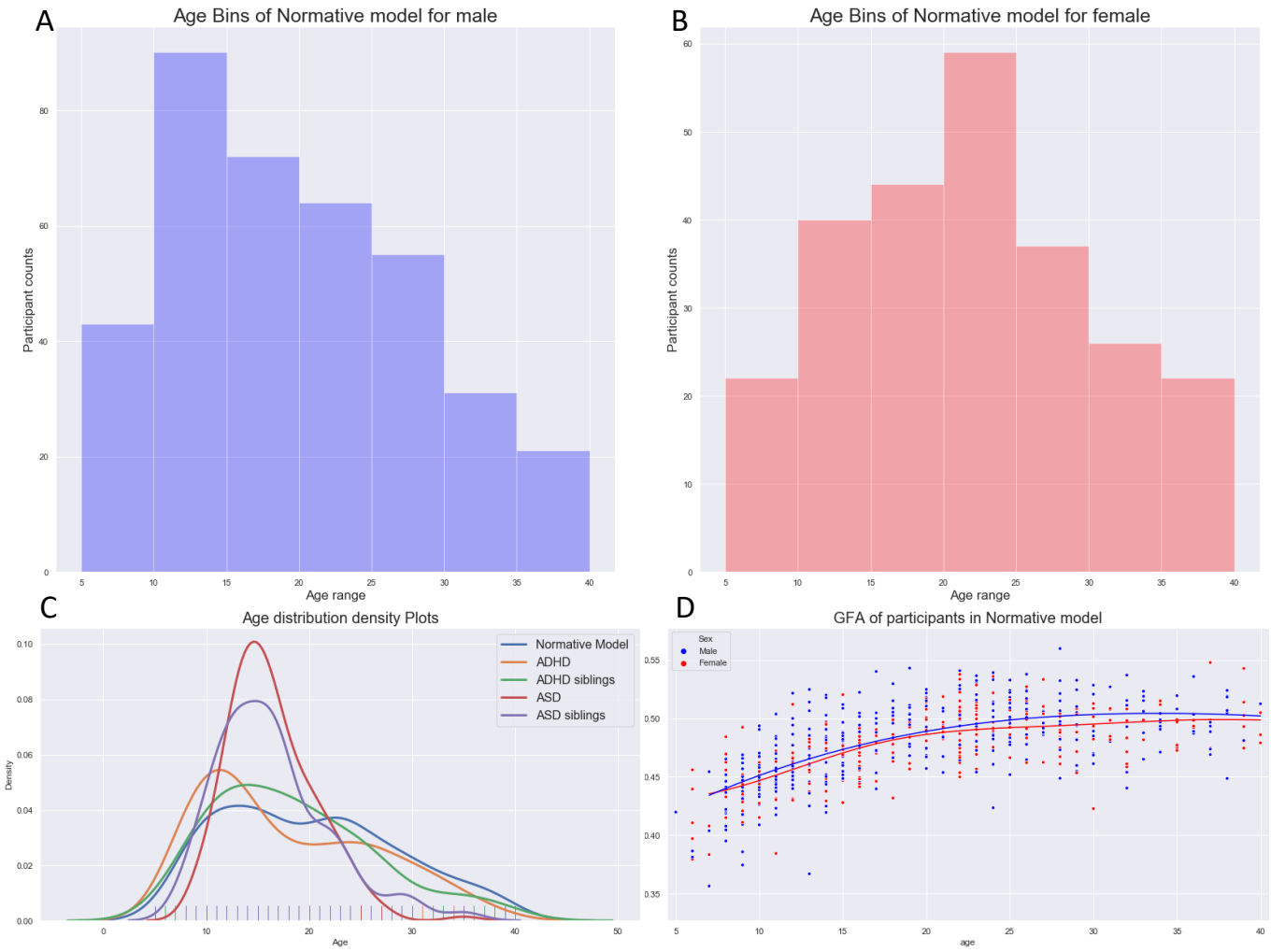


Figure S4. Individualized white matter tract alteration (deviation) profiles.

Individualized white matter-tract-alteration profiles for people with **(A)** attention-deficit hyperactivity disorder (ADHD) and **(B)** autism spectrum disorder (ASD). Colors are coded with generalized fractional anisotropy GFA Z-scores. The y-axis represents different individuals, while the x-axis represents 45 main white matter tracts. The white matter status of each person could be represented by a 45-numbered tuple, and each entry corresponds to GFA Z-score for each white matter tract. This plot demonstrates high heterogeneity among tract alterations. Each patient with ADHD or patient with ASD present idiosyncratic white matter alterations. For complete tract names, please refer to Table S1.

(A) Individualized white matter tract alteration (deviation) profiles for ADHD

(B) Individualized white matter tract alteration (deviation) profiles for ASD

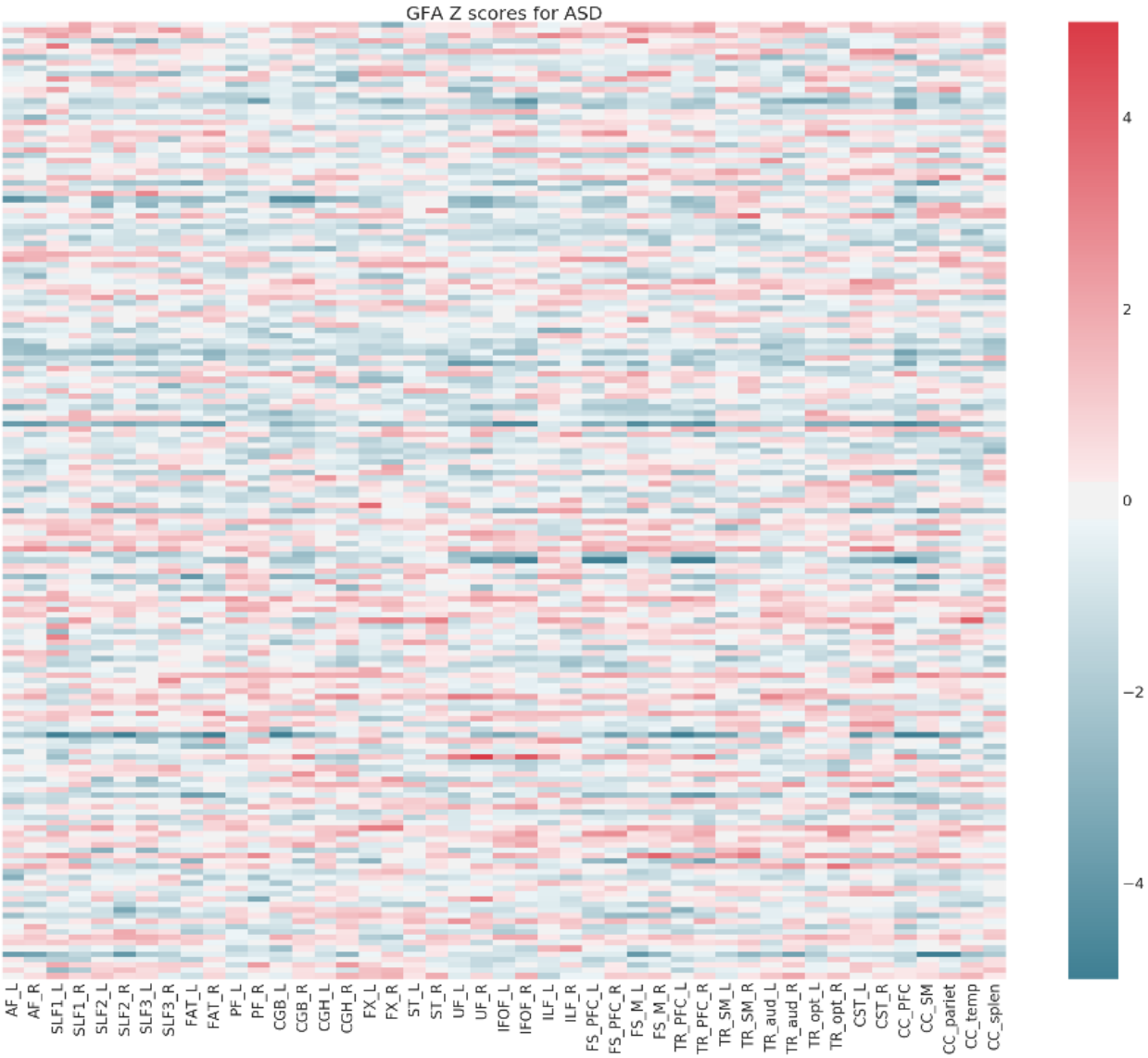


Figure S5. SNR and signal dropout counts were plotted on the normative models.

Sex-specific normative models of left arcuate fasciculus are shown. The pink-shaded area encompasses the width of ± 1.96 standard deviations from the mean. Colored dots represent different patient groups. In the way of "the larger size, the larger value," the sizes of the dots reflect the MRI image SNR values (the lower values, the worse data quality) (A&B) or signal dropout counts (the higher value, the worse data quality) (C&D).

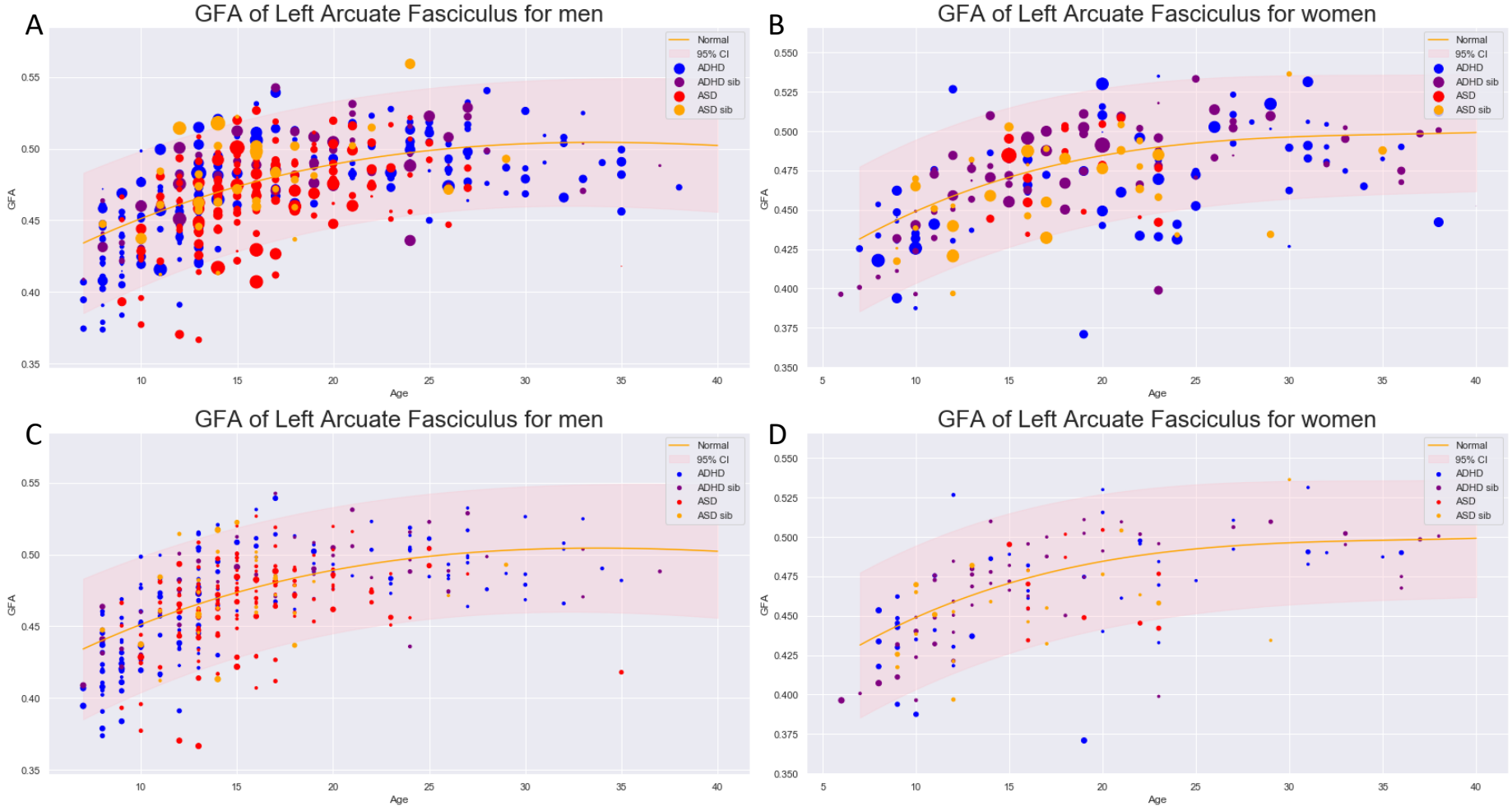
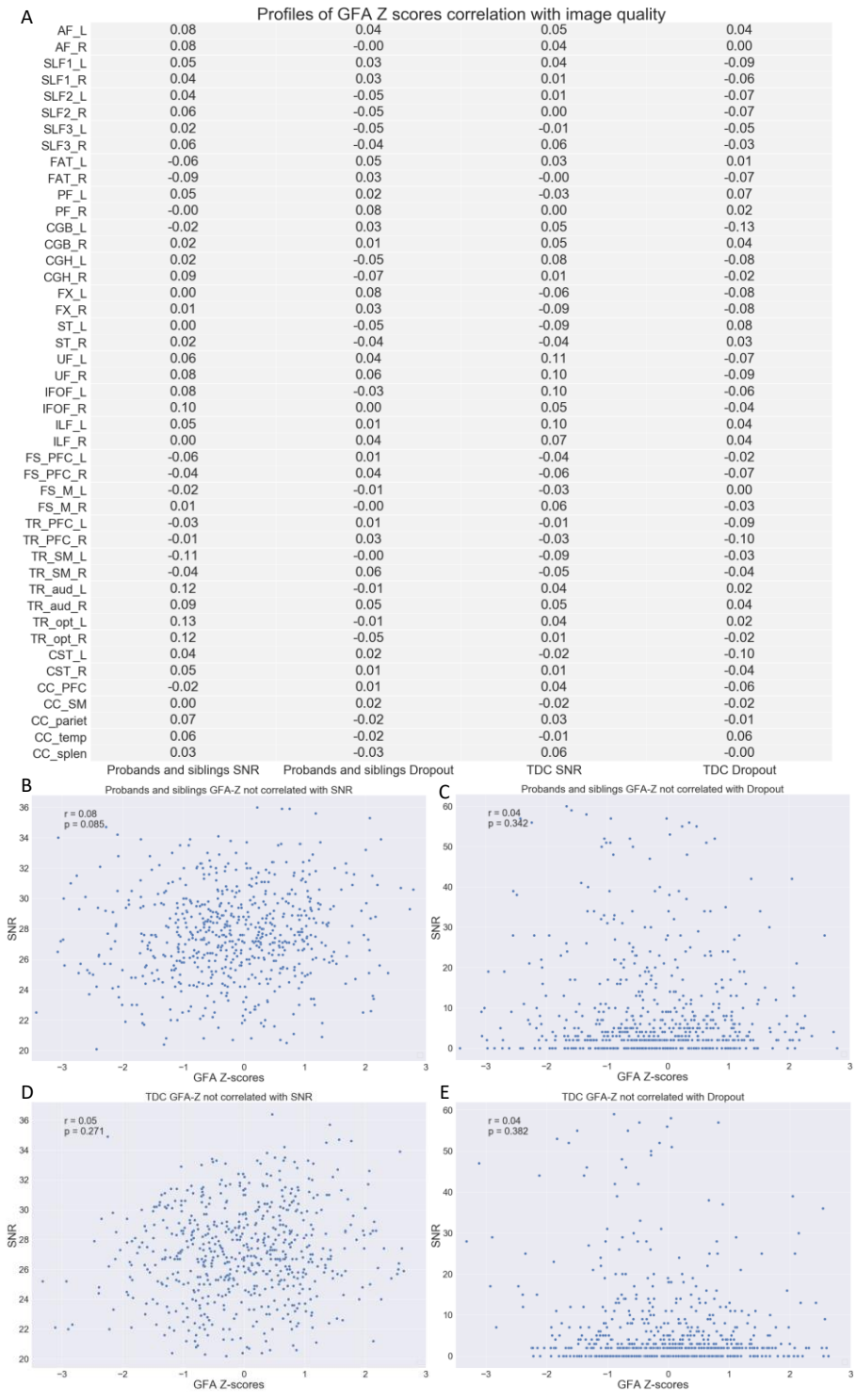


Figure S6. The impact of image quality, signal-to-noise ratio (SNR) and signal dropout counts on the results



	Probands and siblings SNR	Probands and siblings Dropout	TDC SNR	TDC Dropout
AF_L	0.08	0.04	0.05	0.04
AF_R	0.08	-0.00	0.04	0.00
SLF1_L	0.05	0.03	0.04	-0.09
SLF1_R	0.04	0.03	0.01	-0.06
SLF2_L	0.04	-0.05	0.01	-0.07
SLF2_R	0.06	-0.05	0.00	-0.07
SLF3_L	0.02	-0.05	-0.01	-0.05
SLF3_R	0.06	-0.04	0.06	-0.03
FAT_L	-0.06	0.05	0.03	0.01
FAT_R	-0.09	0.03	-0.00	-0.07
PF_L	0.05	0.02	-0.03	0.07
PF_R	-0.00	0.08	0.00	0.02
CGB_L	-0.02	0.03	0.05	-0.13
CGB_R	0.02	0.01	0.05	0.04
CGH_L	0.02	-0.05	0.08	-0.08
CGH_R	0.09	-0.07	0.01	-0.02
FX_L	0.00	0.08	-0.06	-0.08
FX_R	0.01	0.03	-0.09	-0.08
ST_L	0.00	-0.05	-0.09	0.08
ST_R	0.02	-0.04	-0.04	0.03
UF_L	0.06	0.04	0.11	-0.07
UF_R	0.08	0.06	0.10	-0.09
IFOF_L	0.08	-0.03	0.10	-0.06
IFOF_R	0.10	0.00	0.05	-0.04
ILF_L	0.05	0.01	0.10	0.04
ILF_R	0.00	0.04	0.07	0.04
FS_PFC_L	-0.06	0.01	-0.04	-0.02
FS_PFC_R	-0.04	0.04	-0.06	-0.07
FS_M_L	-0.02	-0.01	-0.03	0.00
FS_M_R	0.01	-0.00	0.06	-0.03
TR_PFC_L	-0.03	0.01	-0.01	-0.09
TR_PFC_R	-0.01	0.03	-0.03	-0.10
TR_SM_L	-0.11	-0.00	-0.09	-0.03
TR_SM_R	-0.04	0.06	-0.05	-0.04
TR_aud_L	0.12	-0.01	0.04	0.02
TR_aud_R	0.09	0.05	0.05	0.04
TR_opt_L	0.13	-0.01	0.04	0.02
TR_opt_R	0.12	-0.05	0.01	-0.02
CST_L	0.04	0.02	-0.02	-0.10
CST_R	0.05	0.01	0.01	-0.04
CC_PFC	-0.02	0.01	0.04	-0.06
CC_SM	0.00	0.02	-0.02	-0.02
CC_pariet	0.07	-0.02	0.03	-0.01
CC_temp	0.06	-0.02	-0.01	0.06
CC_splen	0.03	-0.03	0.06	-0.00

The image quality does not correlate with GFA Z-scores. (A) In both typically developed controls and clinical groups, the correlation between GFA Z-scores and image quality measures, SNR and signal dropout counts, were insignificant. (B-E) The scatter plot of image quality and GFA Z-scores of left arcuate fasciculus for example. SNR and Signal dropout counts are not correlated with GFA Z-scores in probands and siblings (B-C) or typically developed controls (D-E).

Figure S7. GFA Z-score deviation profiles of people with attention-deficit/hyperactivity disorder, autism spectrum disorder, and their unaffected siblings.

Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes Z-score effect size; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1.

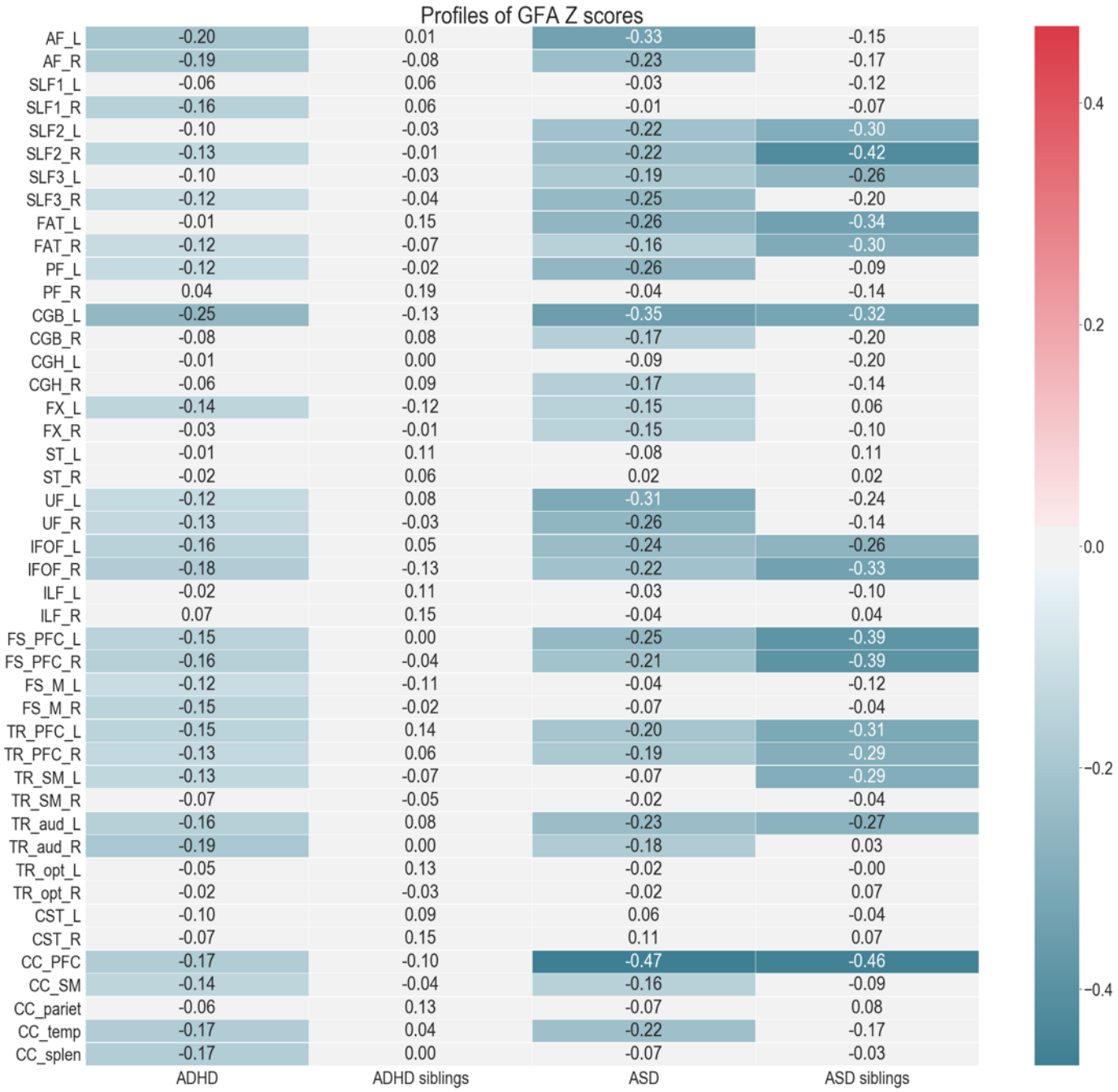


Figure S8. GFA Z-score deviation profiles of children and adults with attention-deficit/hyperactivity disorder or autism spectrum disorder.

Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes the Z-score effect size; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1.

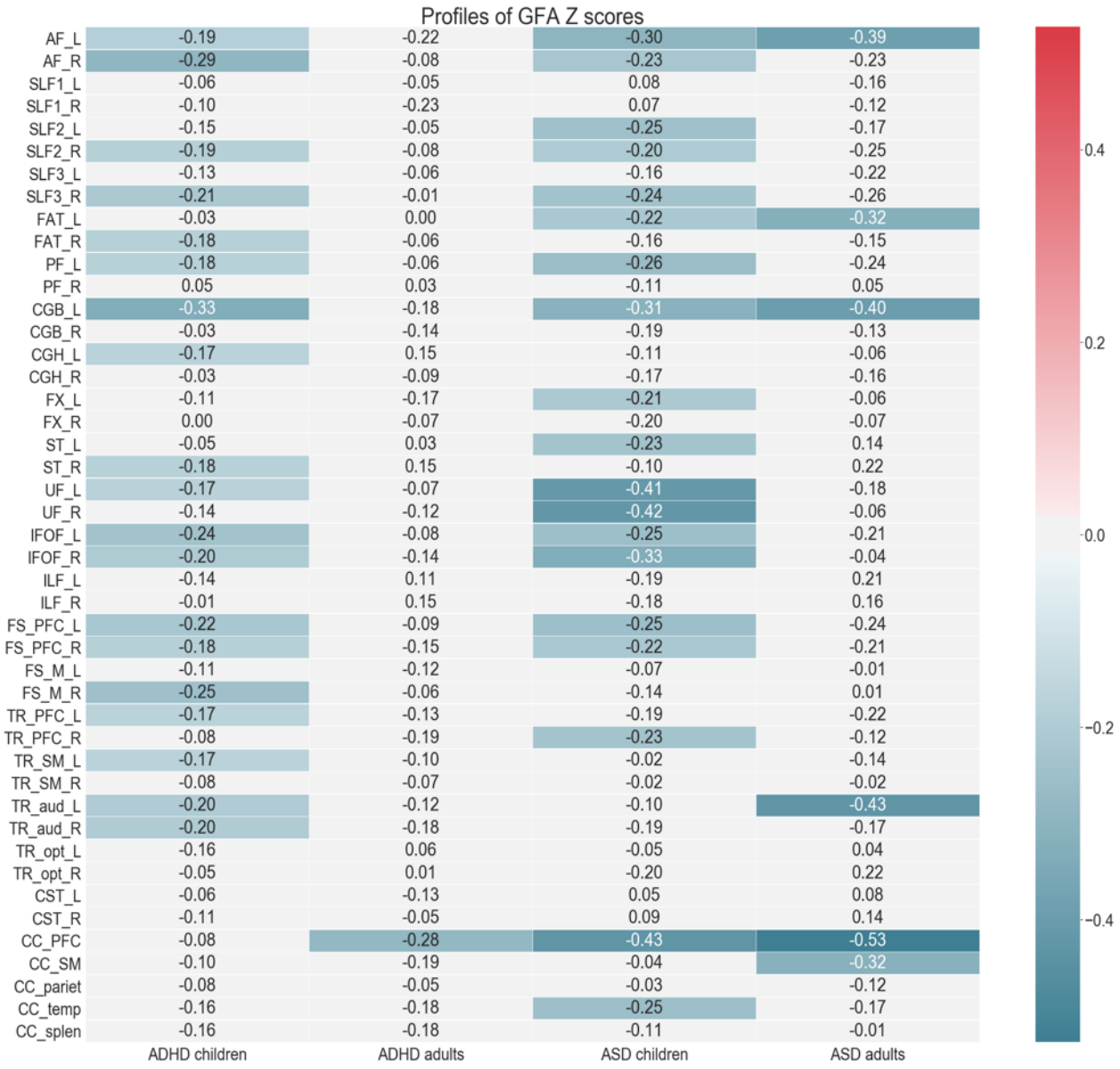
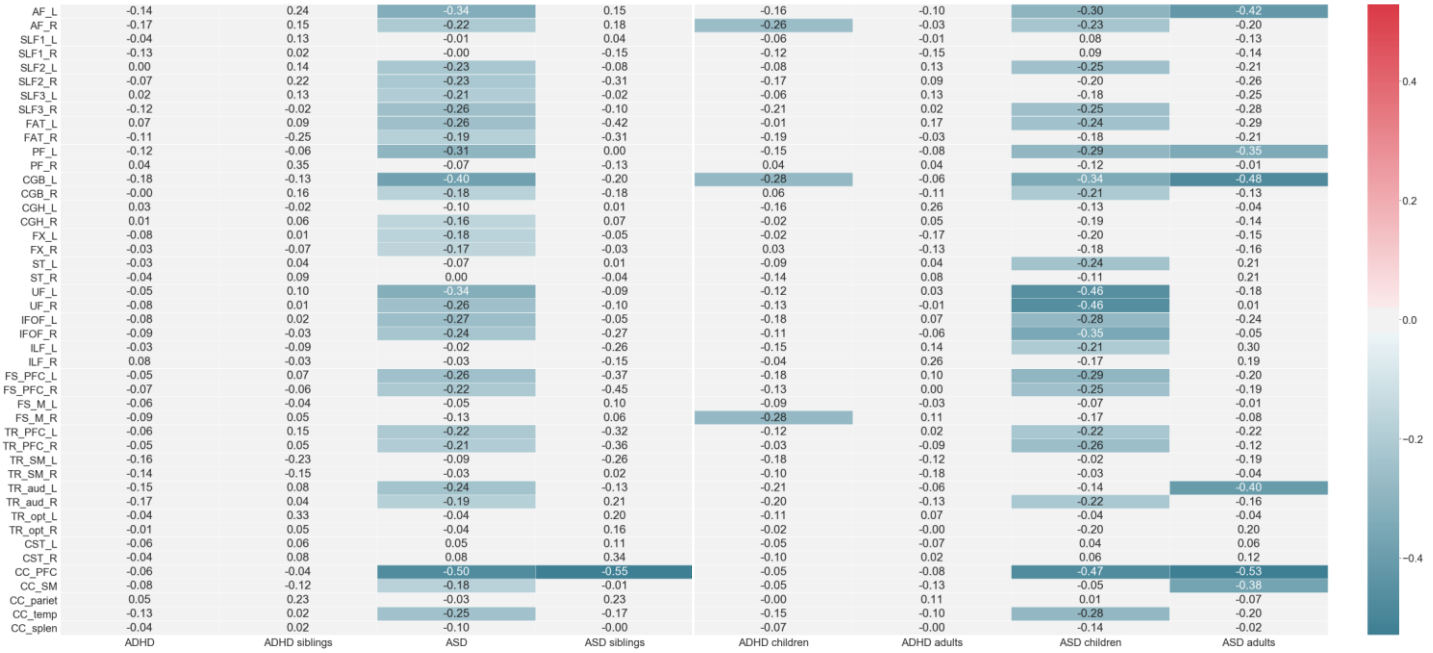


Figure S9. Sex-specific GFA Z-score deviation profiles.

Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes the Z-score effect size; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1. (A) GFA Z-scores for male participants (B) GFA Z-scores for female participants.

A. Profiles of GFA Z scores for male



B. Profiles of GFA Z scores for female

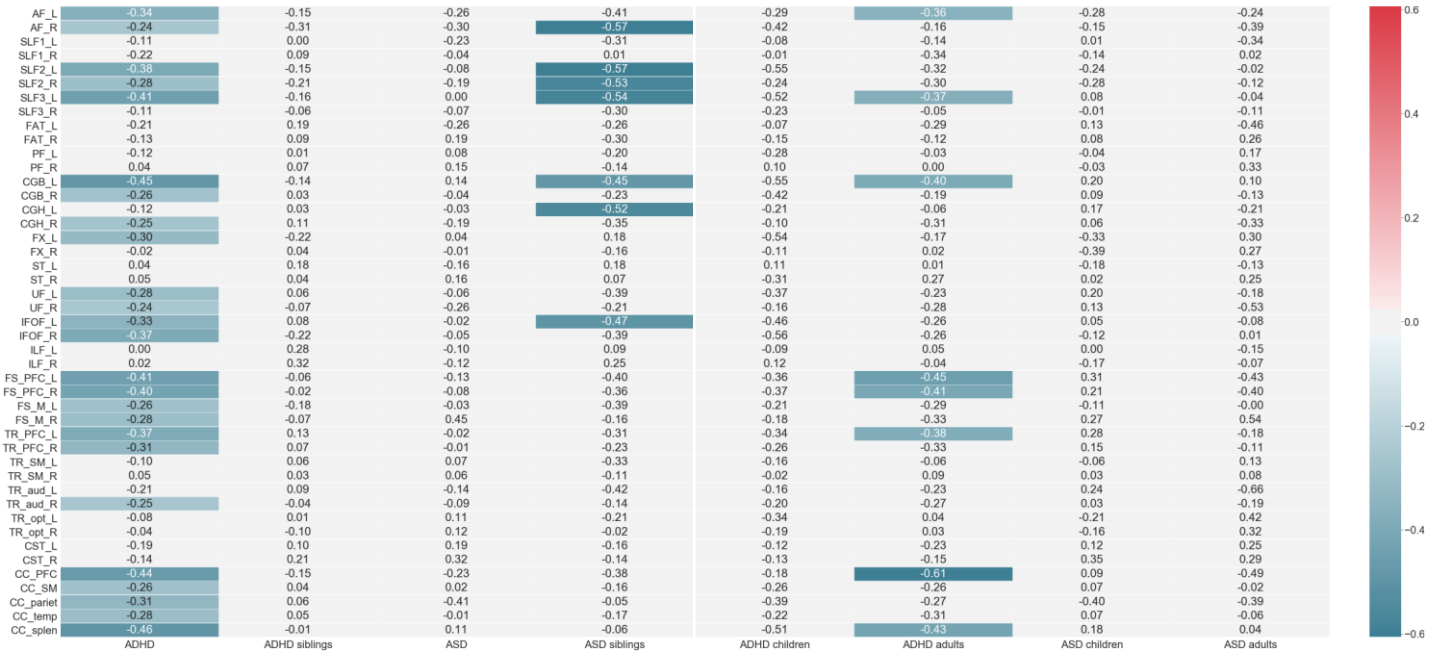
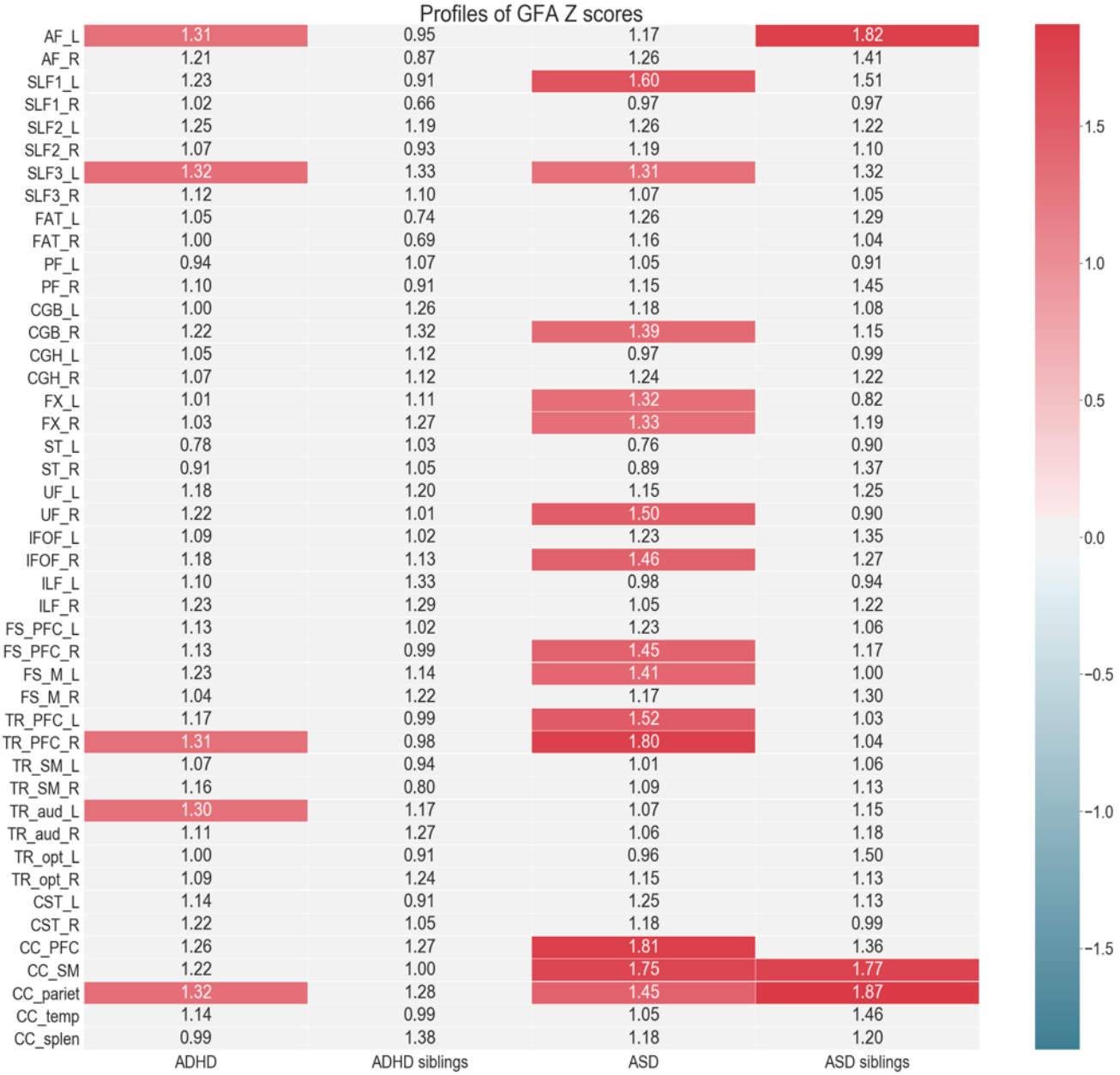


Figure S10. GFA Z-score idiosyncrasy profiles of people with attention-deficit/hyperactivity disorder, autism spectrum disorder, and their unaffected siblings.

Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes Z-score variance ratio of the clinical group over typically developed controls; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1.



	ADHD	ADHD siblings	ASD	ASD siblings
AF_L	1.31	0.95	1.17	1.82
AF_R	1.21	0.87	1.26	1.41
SLF1_L	1.23	0.91	1.60	1.51
SLF1_R	1.02	0.66	0.97	0.97
SLF2_L	1.25	1.19	1.26	1.22
SLF2_R	1.07	0.93	1.19	1.10
SLF3_L	1.32	1.33	1.31	1.32
SLF3_R	1.12	1.10	1.07	1.05
FAT_L	1.05	0.74	1.26	1.29
FAT_R	1.00	0.69	1.16	1.04
PF_L	0.94	1.07	1.05	0.91
PF_R	1.10	0.91	1.15	1.45
CGB_L	1.00	1.26	1.18	1.08
CGB_R	1.22	1.32	1.39	1.15
CGH_L	1.05	1.12	0.97	0.99
CGH_R	1.07	1.12	1.24	1.22
FX_L	1.01	1.11	1.32	0.82
FX_R	1.03	1.27	1.33	1.19
ST_L	0.78	1.03	0.76	0.90
ST_R	0.91	1.05	0.89	1.37
UF_L	1.18	1.20	1.15	1.25
UF_R	1.22	1.01	1.50	0.90
IFOF_L	1.09	1.02	1.23	1.35
IFOF_R	1.18	1.13	1.46	1.27
ILF_L	1.10	1.33	0.98	0.94
ILF_R	1.23	1.29	1.05	1.22
FS_PFC_L	1.13	1.02	1.23	1.06
FS_PFC_R	1.13	0.99	1.45	1.17
FS_M_L	1.23	1.14	1.41	1.00
FS_M_R	1.04	1.22	1.17	1.30
TR_PFC_L	1.17	0.99	1.52	1.03
TR_PFC_R	1.31	0.98	1.80	1.04
TR_SM_L	1.07	0.94	1.01	1.06
TR_SM_R	1.16	0.80	1.09	1.13
TR_aud_L	1.30	1.17	1.07	1.15
TR_aud_R	1.11	1.27	1.06	1.18
TR_opt_L	1.00	0.91	0.96	1.50
TR_opt_R	1.09	1.24	1.15	1.13
CST_L	1.14	0.91	1.25	1.13
CST_R	1.22	1.05	1.18	0.99
CC_PFC	1.26	1.27	1.81	1.36
CC_SM	1.22	1.00	1.75	1.77
CC_pariet	1.32	1.28	1.45	1.87
CC_temp	1.14	0.99	1.05	1.46
CC_splen	0.99	1.38	1.18	1.20

Figure S11. GFA Z-score idiosyncrasy profiles of children and adults with attention-deficit/hyperactivity disorder or autism spectrum disorder.

Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes Z-score variance ratio of clinical group over typically developed controls; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1.

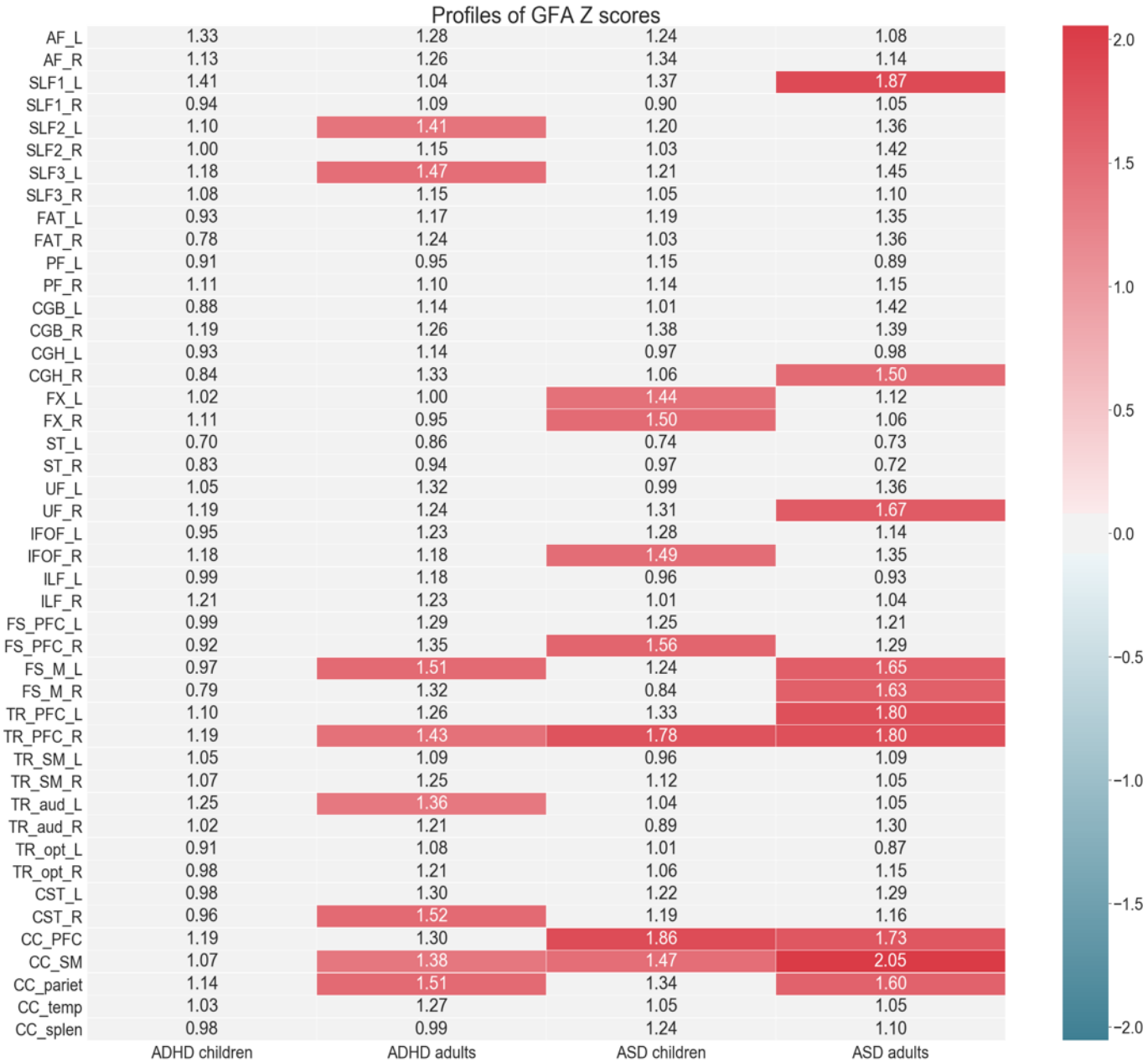
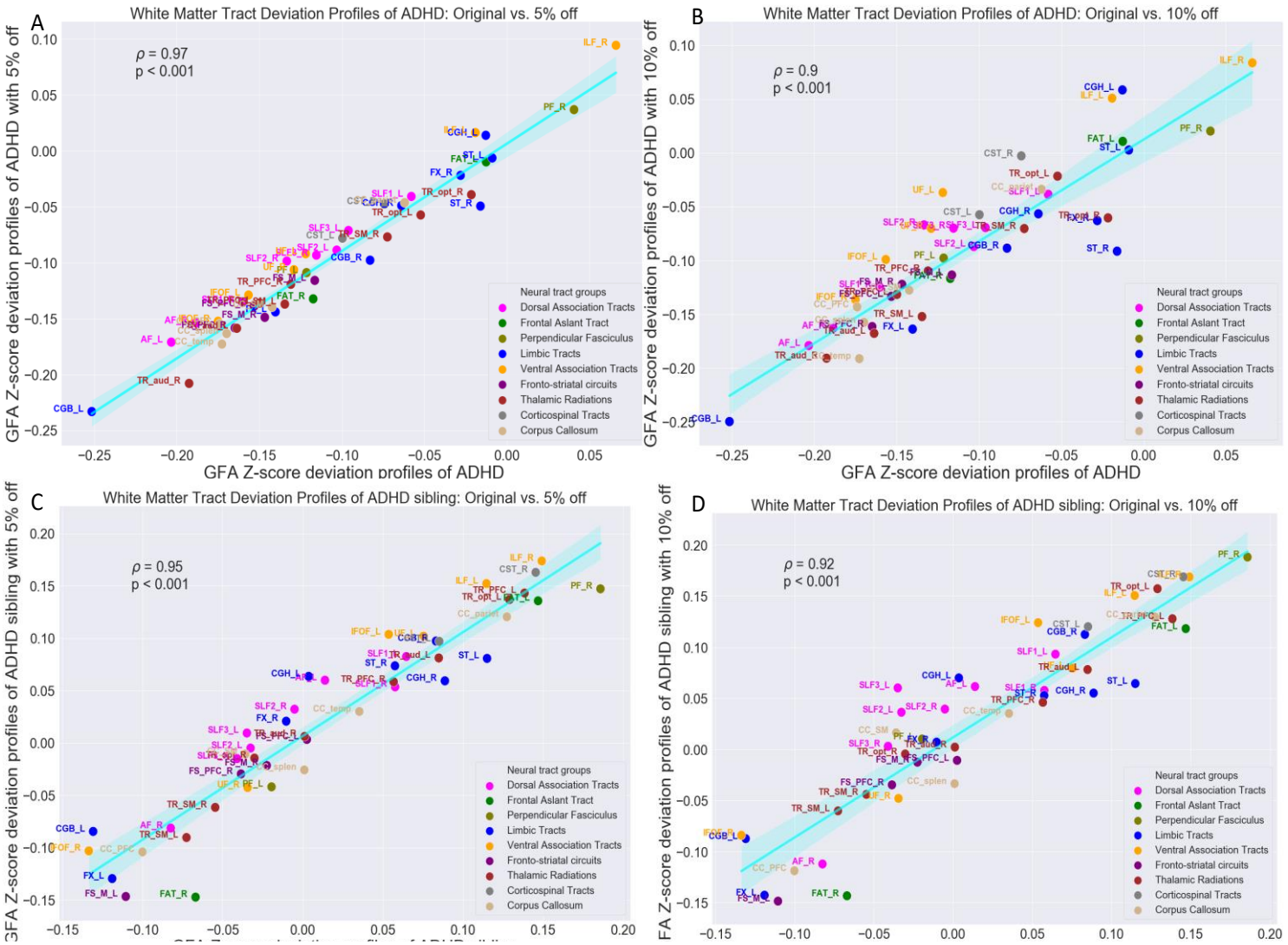


Figure S12. The impact of image quality on the deviation pattern

All images included in the analysis have passed the stringent quality control procedure in this study. Of those images which passed quality assurance, the 5% and 10% images with the worst quality (lowest SNR or largest signal dropout counts) were removed. The Z-score mean deviation pattern was calculated for each clinical group and compared with the original values calculated with the full sample. The results were highly correlated with the original ones with a correlation of over 0.90.



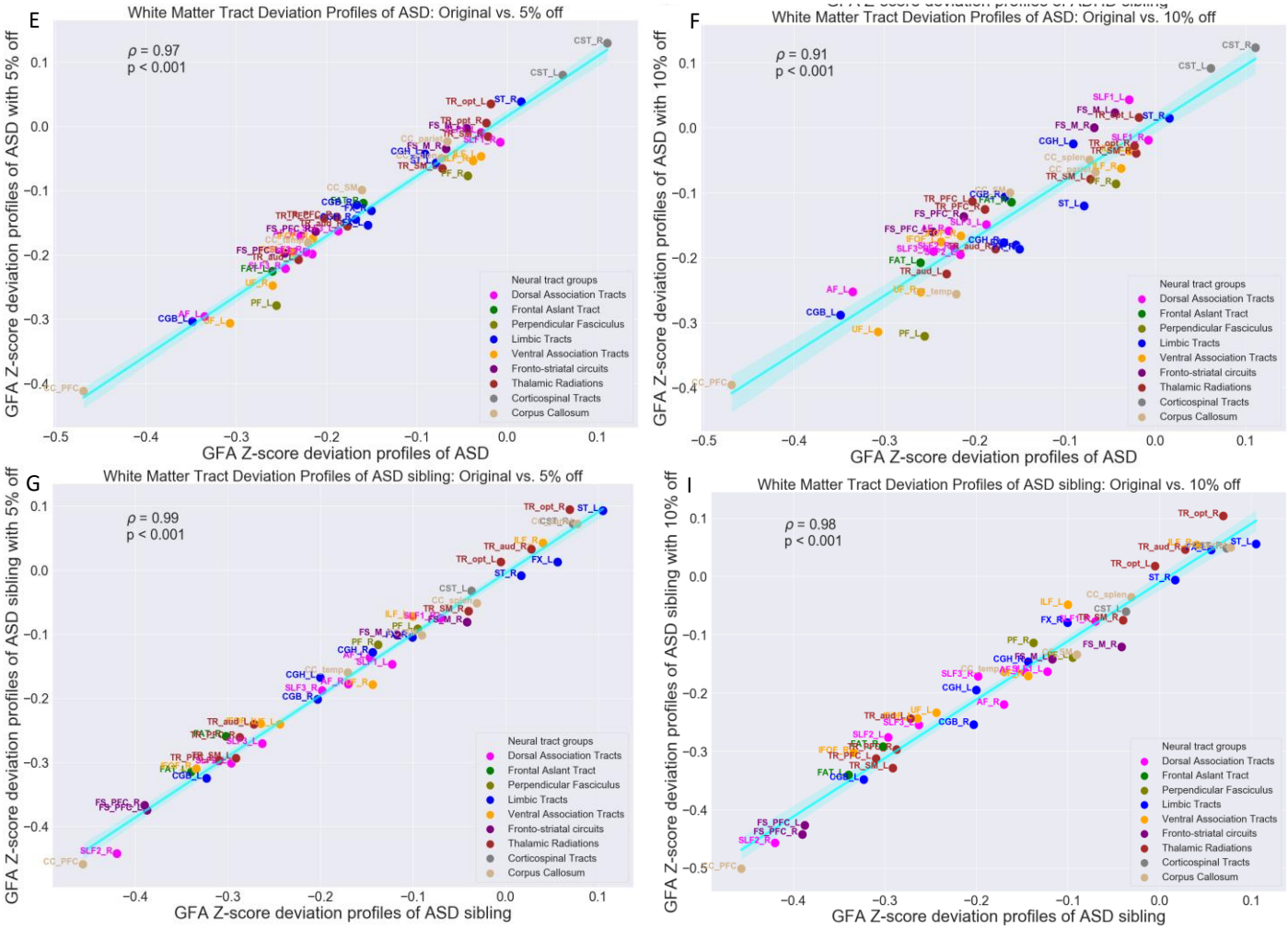
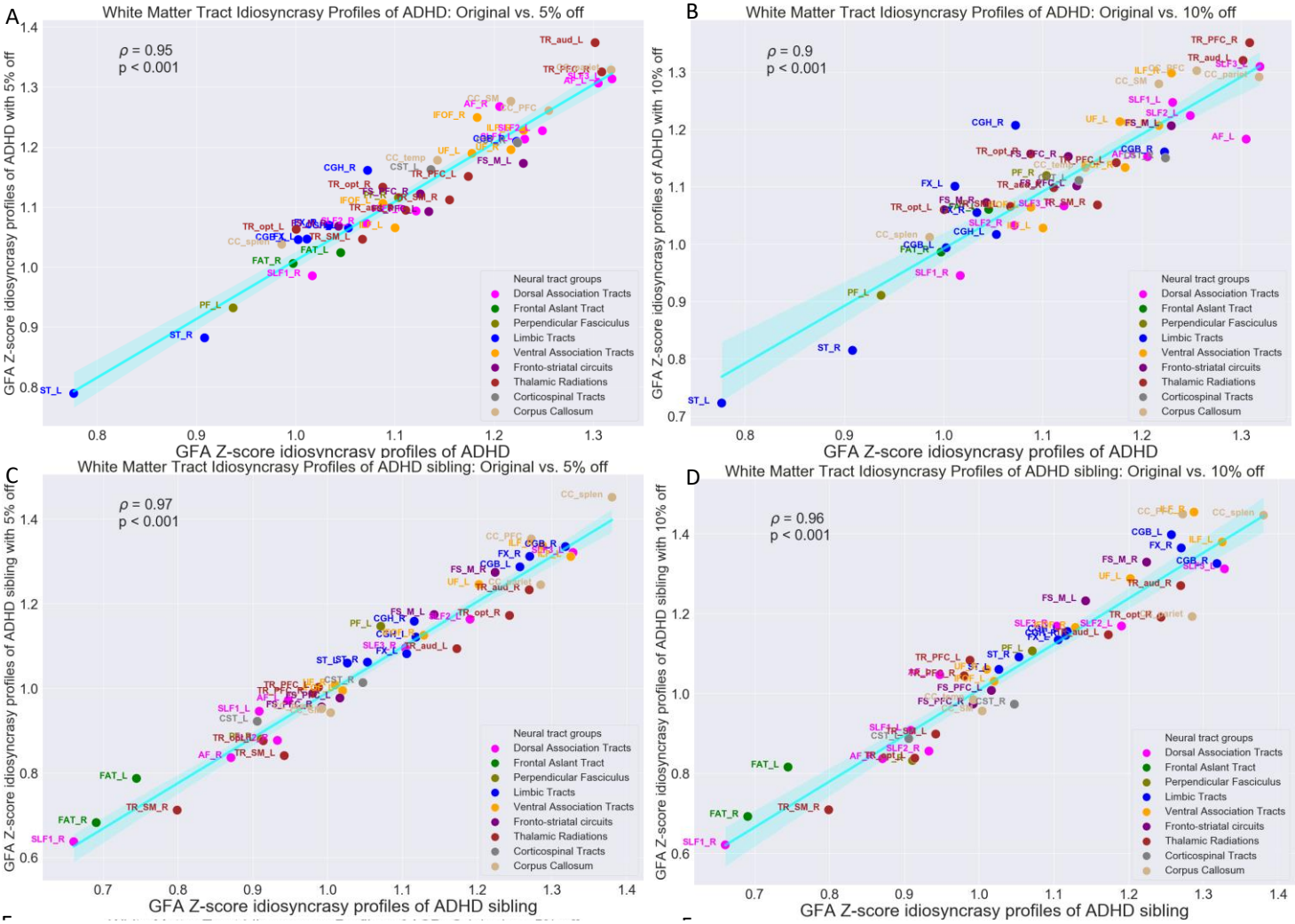
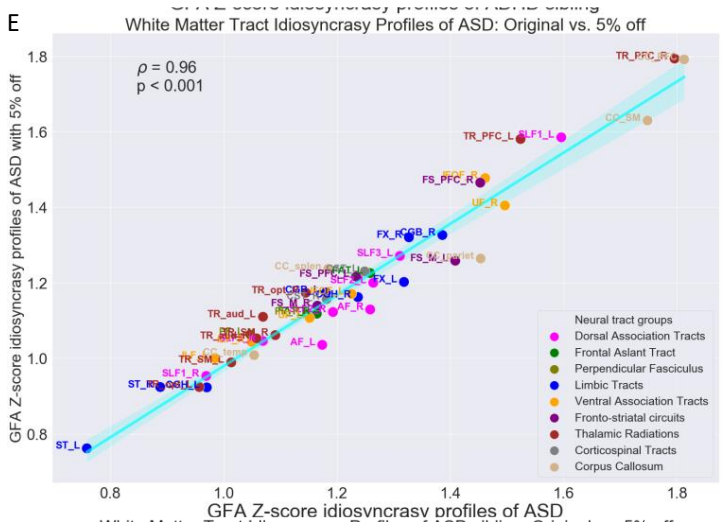
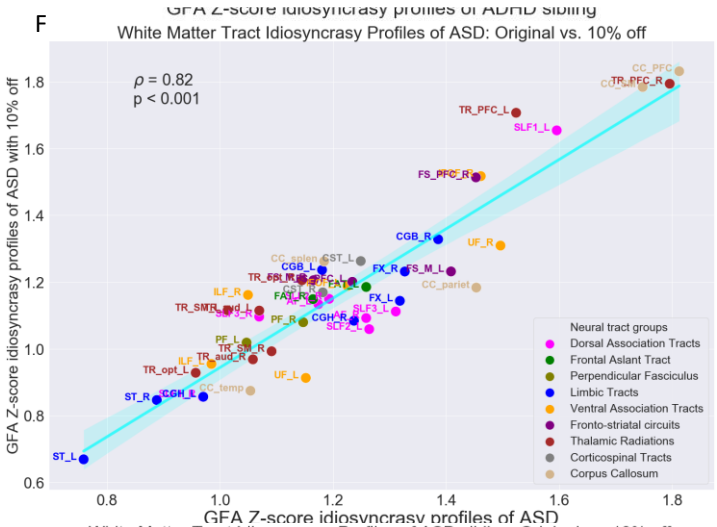

E
White Matter Tract Deviation Profiles of ASD: Original vs. 5% off
ρ = 0.97
p < 0.001
GFA Z-score deviation profiles of ASD with 5% off
GFA Z-score deviation profiles of ASD
F
White Matter Tract Deviation Profiles of ASD: Original vs. 10% off
ρ = 0.91
p < 0.001
GFA Z-score deviation profiles of ASD with 10% off
GFA Z-score deviation profiles of ASD
G
White Matter Tract Deviation Profiles of ASD sibling: Original vs. 5% off
ρ = 0.99
p < 0.001
GFA Z-score deviation profiles of ASD sibling with 5% off
GFA Z-score deviation profiles of ASD sibling
I
White Matter Tract Deviation Profiles of ASD sibling: Original vs. 10% off
ρ = 0.98
p < 0.001
GFA Z-score deviation profiles of ASD sibling with 10% off
GFA Z-score deviation profiles of ASD sibling
Neural tract groups
Dorsal Association Tracts
Frontal Aslant Tract
Perpendicular Fasciculus
Limbic Tracts
Ventral Association Tracts
Fronto-striatal circuits
Thalamic Radiations
Corticospinal Tracts
Corpus Callosum

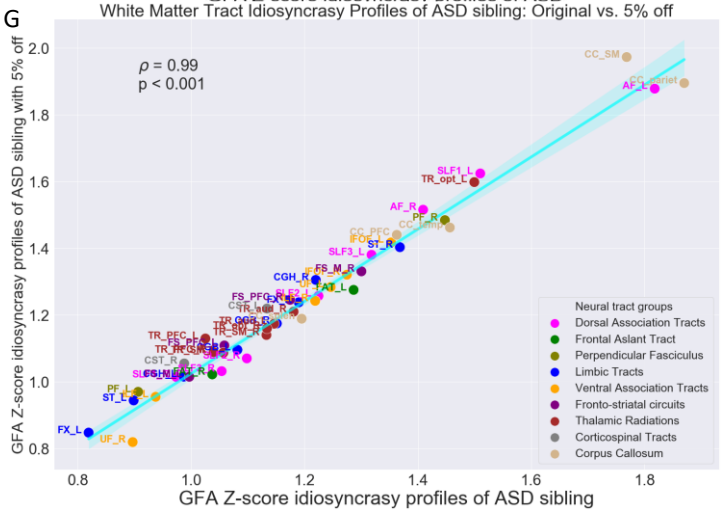
Figure S13. The impact of image quality on the idiosyncrasy pattern

All images included in the analysis have passed the stringent quality control procedure in this study. Of those images which passed quality assurance, the 5% and 10% images with the worst quality (lowest SNR or largest signal dropout counts) were removed. The Z-score idiosyncrasy pattern was calculated for each clinical group and compared with the original values calculated with the full sample. The results were highly correlated with the original ones with a correlation of over 0.80.




E
White Matter Tract Idiosyncrasy Profiles of ASD: Original vs. 5% off
ρ = 0.96
p < 0.001
GFA Z-score idiosyncrasy profiles of ASD with 5% off
GFA Z-score idiosyncrasy profiles of ASD
Neural tract groups
Dorsal Association Tracts
Frontal Aslant Tract
Perpendicular Fasciculus
Limbic Tracts
Ventral Association Tracts
Fronto-striatal circuits
Thalamic Radiations
Corticospinal Tracts
Corpus Callosum


F
White Matter Tract Idiosyncrasy Profiles of ASD: Original vs. 10% off
ρ = 0.82
p < 0.001
GFA Z-score idiosyncrasy profiles of ASD with 10% off
GFA Z-score idiosyncrasy profiles of ASD
Neural tract groups
Dorsal Association Tracts
Frontal Aslant Tract
Perpendicular Fasciculus
Limbic Tracts
Ventral Association Tracts
Fronto-striatal circuits
Thalamic Radiations
Corticospinal Tracts
Corpus Callosum


G
White Matter Tract Idiosyncrasy Profiles of ASD sibling: Original vs. 5% off
ρ = 0.99
p < 0.001
GFA Z-score idiosyncrasy profiles of ASD sibling with 5% off
GFA Z-score idiosyncrasy profiles of ASD sibling
Neural tract groups
Dorsal Association Tracts
Frontal Aslant Tract
Perpendicular Fasciculus
Limbic Tracts
Ventral Association Tracts
Fronto-striatal circuits
Thalamic Radiations
Corticospinal Tracts
Corpus Callosum

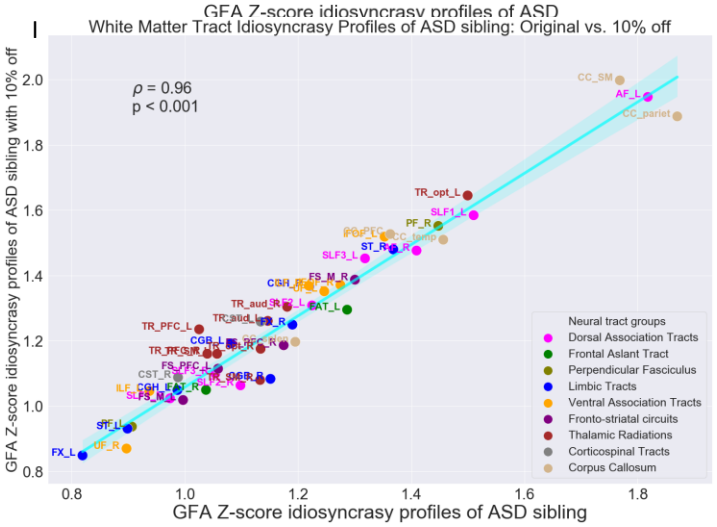

I
White Matter Tract Idiosyncrasy Profiles of ASD sibling: Original vs. 10% off
ρ = 0.96
p < 0.001
GFA Z-score idiosyncrasy profiles of ASD sibling with 10% off
GFA Z-score idiosyncrasy profiles of ASD sibling
Neural tract groups
Dorsal Association Tracts
Frontal Aslant Tract
Perpendicular Fasciculus
Limbic Tracts
Ventral Association Tracts
Fronto-striatal circuits
Thalamic Radiations
Corticospinal Tracts
Corpus Callosum

Figure S14. GFA Z-score deviation profiles of people with autism spectrum disorder with or without comorbid attention-deficit/hyperactivity disorder.

Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes Z-score effect size; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1.

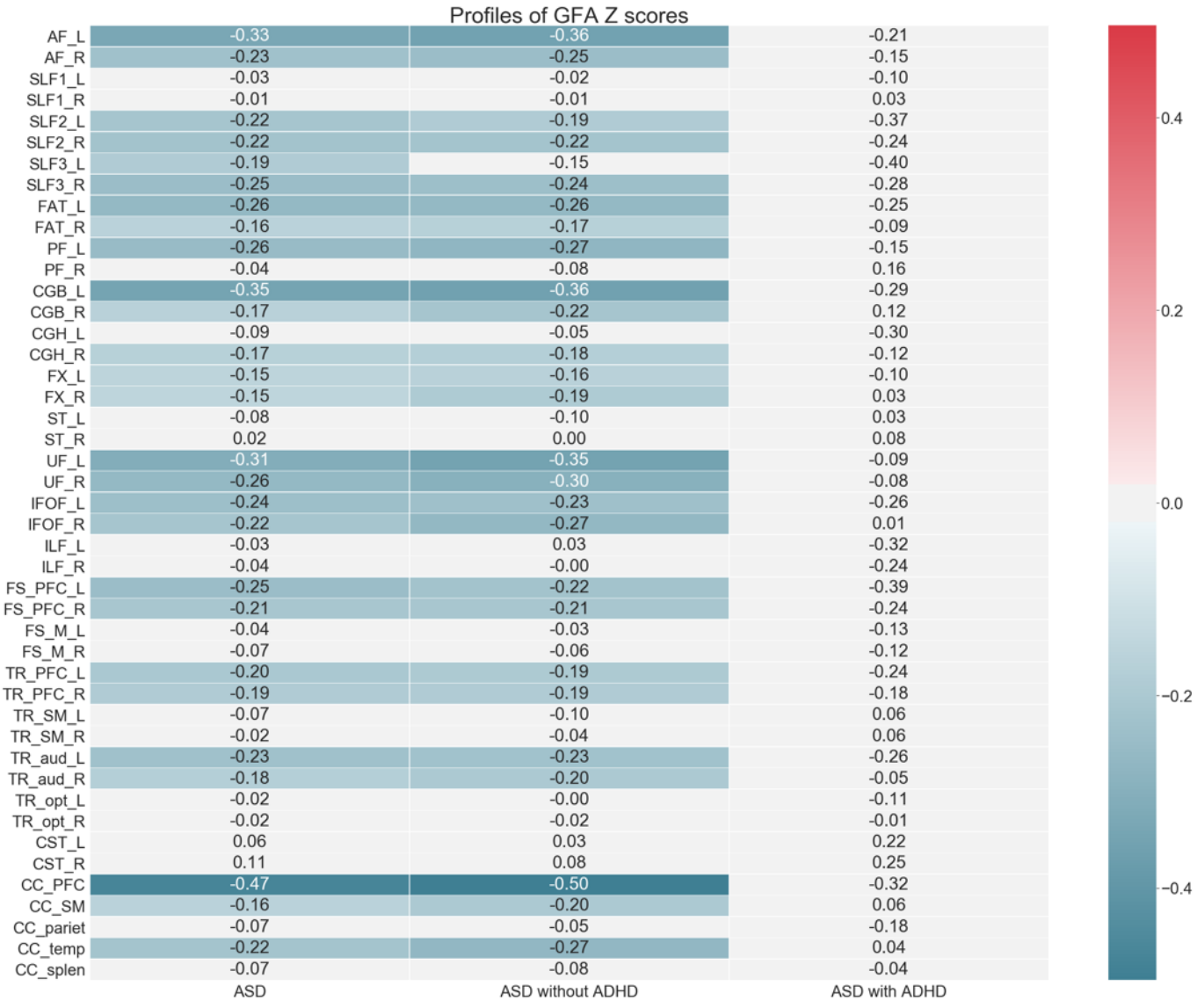


Figure S15. GFA Z-score idiosyncrasy profiles of people with autism spectrum disorder with or without comorbid attention-deficit/hyperactivity disorder.

Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes Z-score effect size; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1.

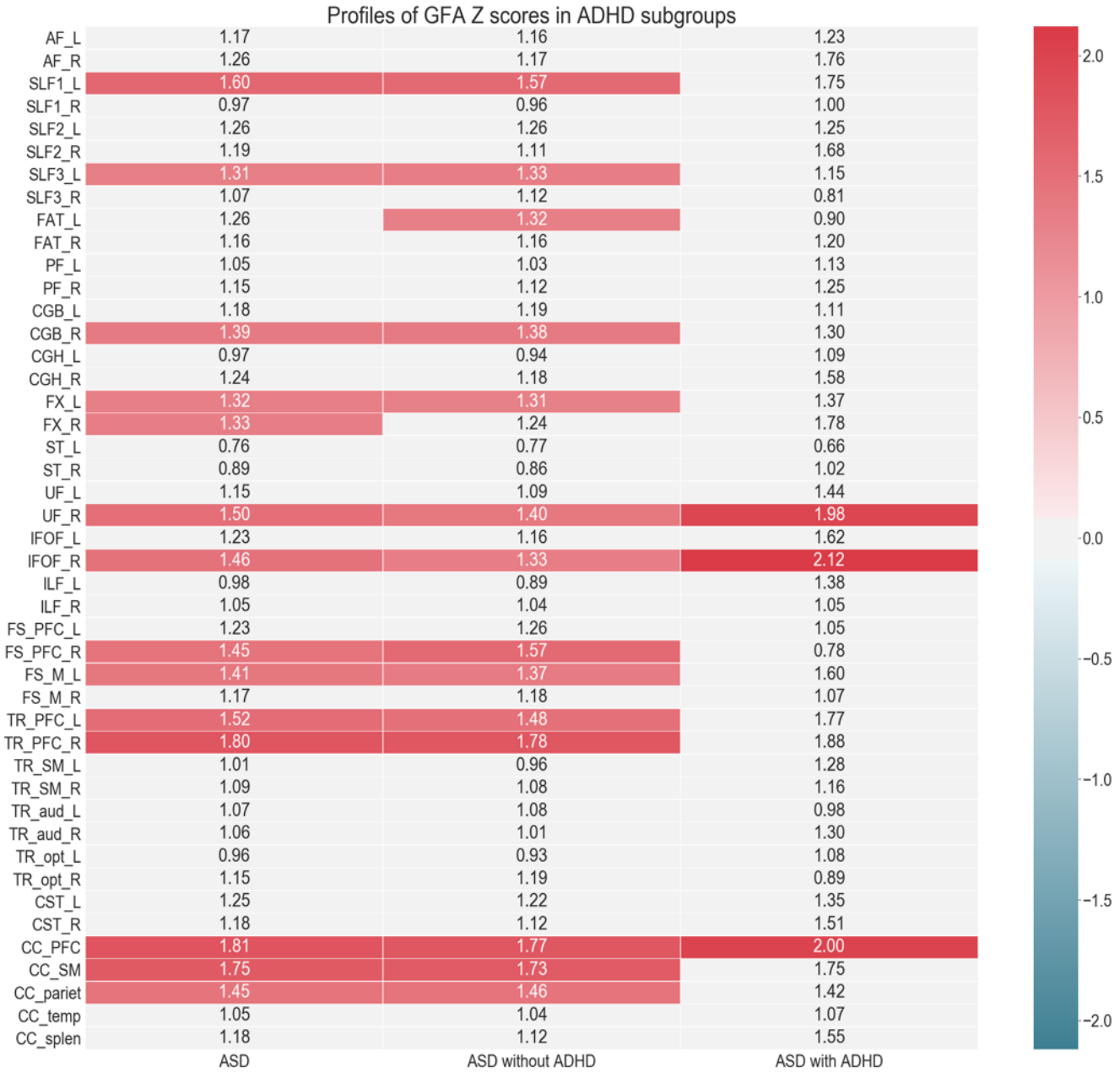


Figure S16. High correlation between people with autism spectrum disorder with or without comorbid attention-deficit/hyperactivity disorder in terms of GFA Z-score deviation and idiosyncrasy profile.

A high correlation between all people with ASD and those with comorbid ADHD in terms of (A) deviation profile (ρ=0.54) and (B) idiosyncrasy profile (ρ=0.66). A very high correlation between all people with ASD and those without comorbid ADHD in terms of (C) deviation profile (ρ=0.96) and (D) idiosyncrasy profile (ρ=0.96). A high correlation between people with ASD with and without comorbid ADHD in terms of (E) deviation profile (ρ=0.31) and (F) idiosyncrasy profile (ρ=0.48).

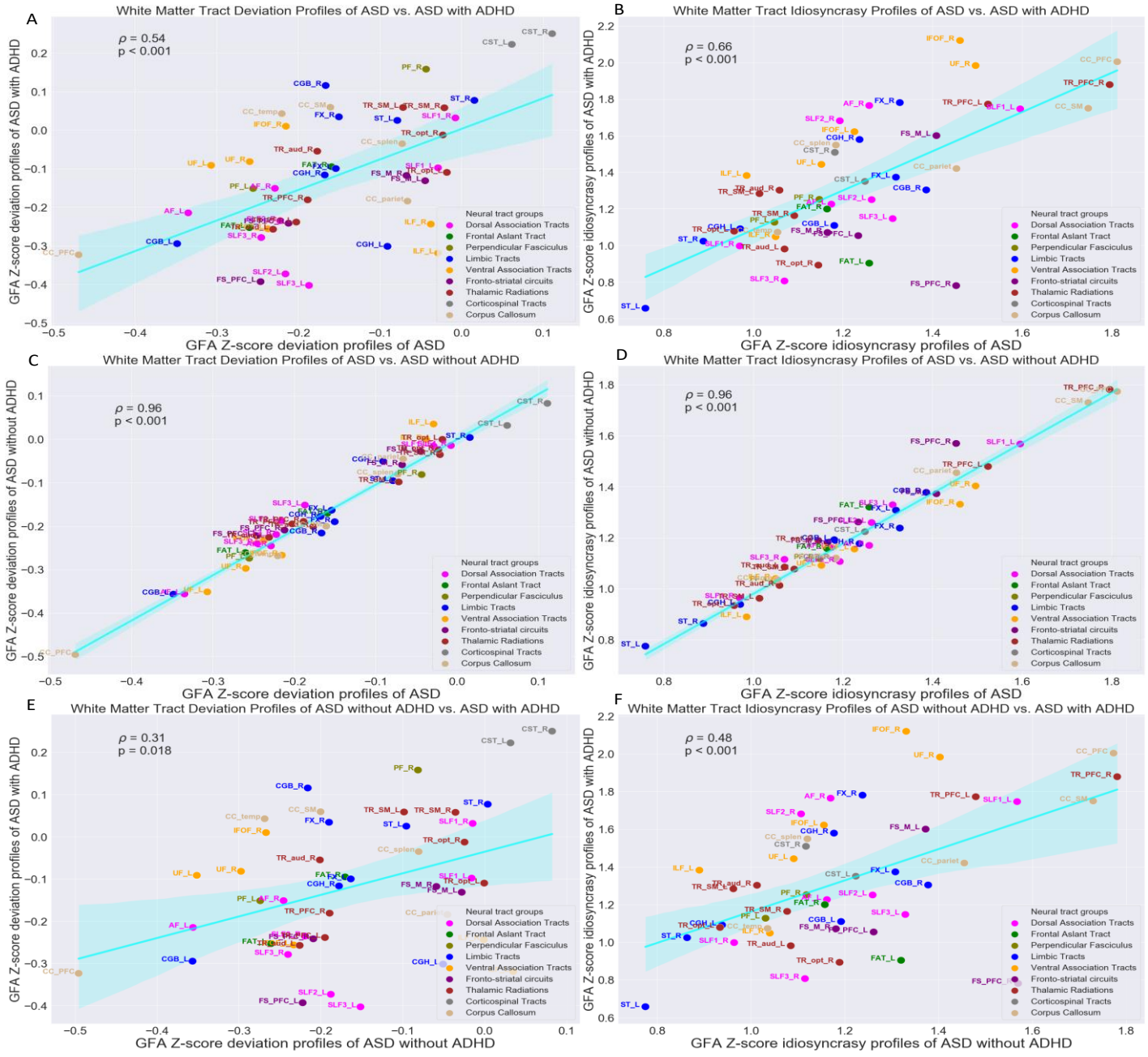


Figure S17. Symptom-based clustering of probands and siblings.

(A) Ward's hierarchical clustering yield two clusters, cluster 1 (M/F) (ADHD: 156/53; ADHD sibling: 40/53; ASD: 84/6; ASD sib: 36/34) and cluster 2 (M/F) (ADHD: 49/21; ADHD sibling: 16/12; ASD: 74/11; ASD sib: 2/0). (B) The optimal number of clusters has been validated by Silhouette's width. Silhouette's width of K-means, K-medoids also indicate 2 as the optimal cluster number. (C) The deviation profile and (D) idiosyncrasy profile of the two clusters. High correlation between the two clusters in terms of (E) the deviation profile (ρ=0.68) and (F) idiosyncrasy profile (ρ=0.49).

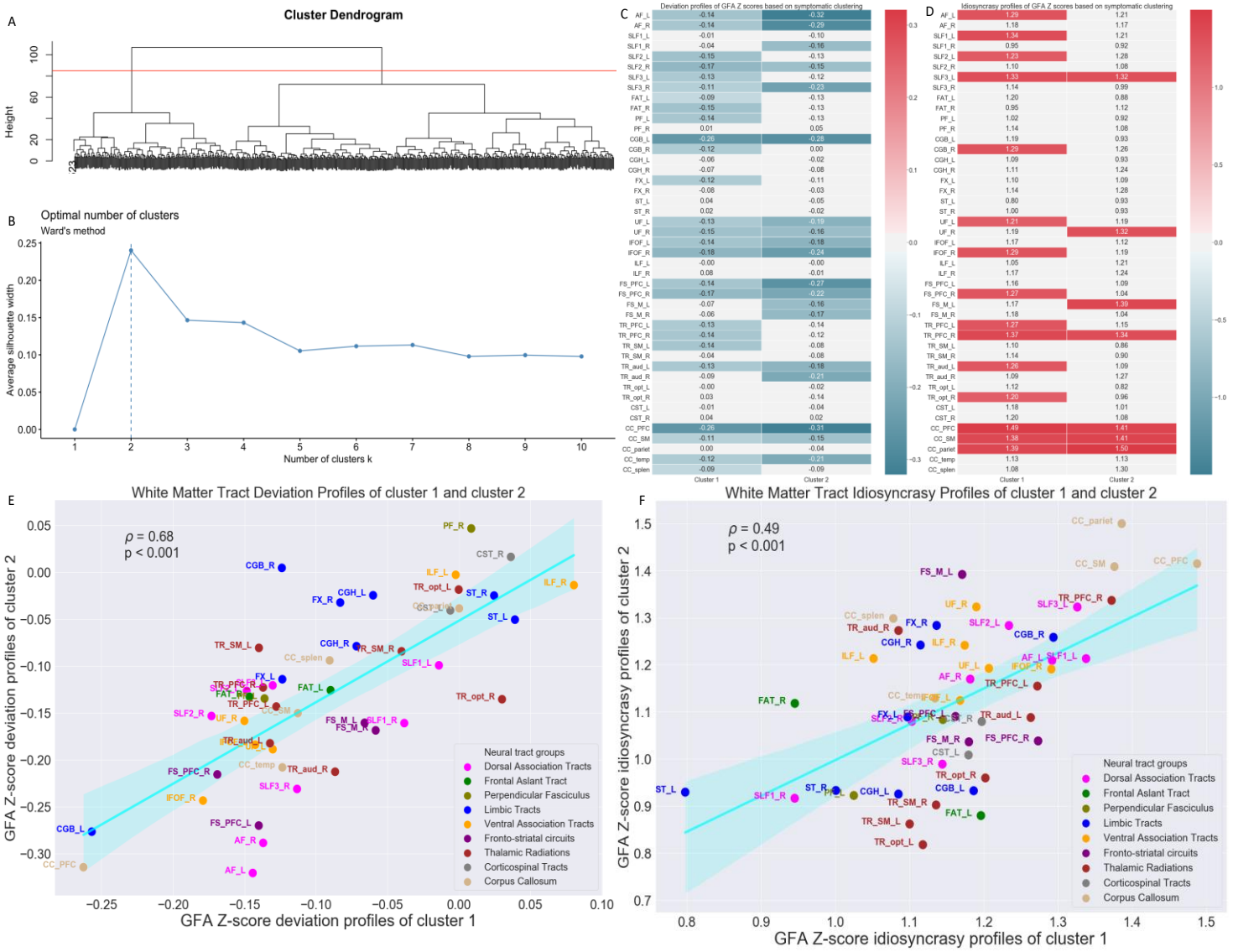


Figure S18. Canonical correlation analysis (CCA) between GFA Z-scores and symptom assessment (2nd mode; 1st mode in Figure 3A)

Canonical correlation analysis (CCA) between GFA Z-scores and symptom assessment, including Autism Spectrum Quotient (AQ), Social Response Scale (SRS), and the Swanson, Nolan, and Pelham Teacher and Parent Rating Scale-IV (SNAP-IV). For complete white matter tract names, please refer to Table S1.

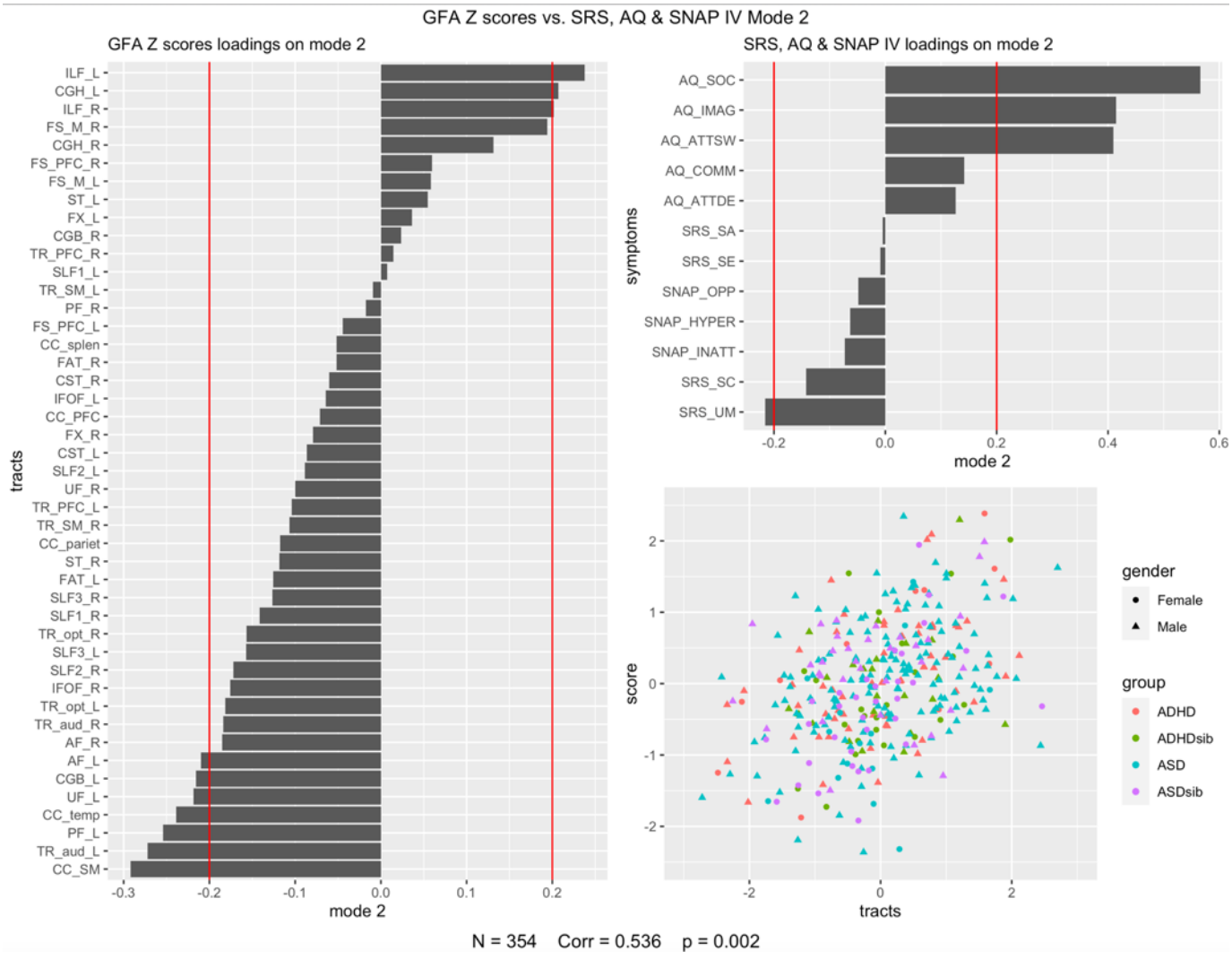


Figure S19. Canonical correlation analysis (CCA) between GFA Z-scores and neuropsychological assessment (the remaining 4 modes in addition to the 1st mode shown in Figure 3B).

Canonical correlation analysis (CCA) between diffusion indices Z-scores and neuropsychological assessment, including Cambridge Neuropsychological Test Automated Battery (CANTAB) and Conner's continuous performance test (CCPT). Wechsler Intelligence Scales were also included. Because of the orthogonality of CCA, each mode exhibited a distinct correlation with different cognitive aspects and white matter tracts. For complete white matter tract names, please refer to Table S1. For a complete list of CCPT and CANTAB items, please refer to Table S3 and Table S4, respectively.

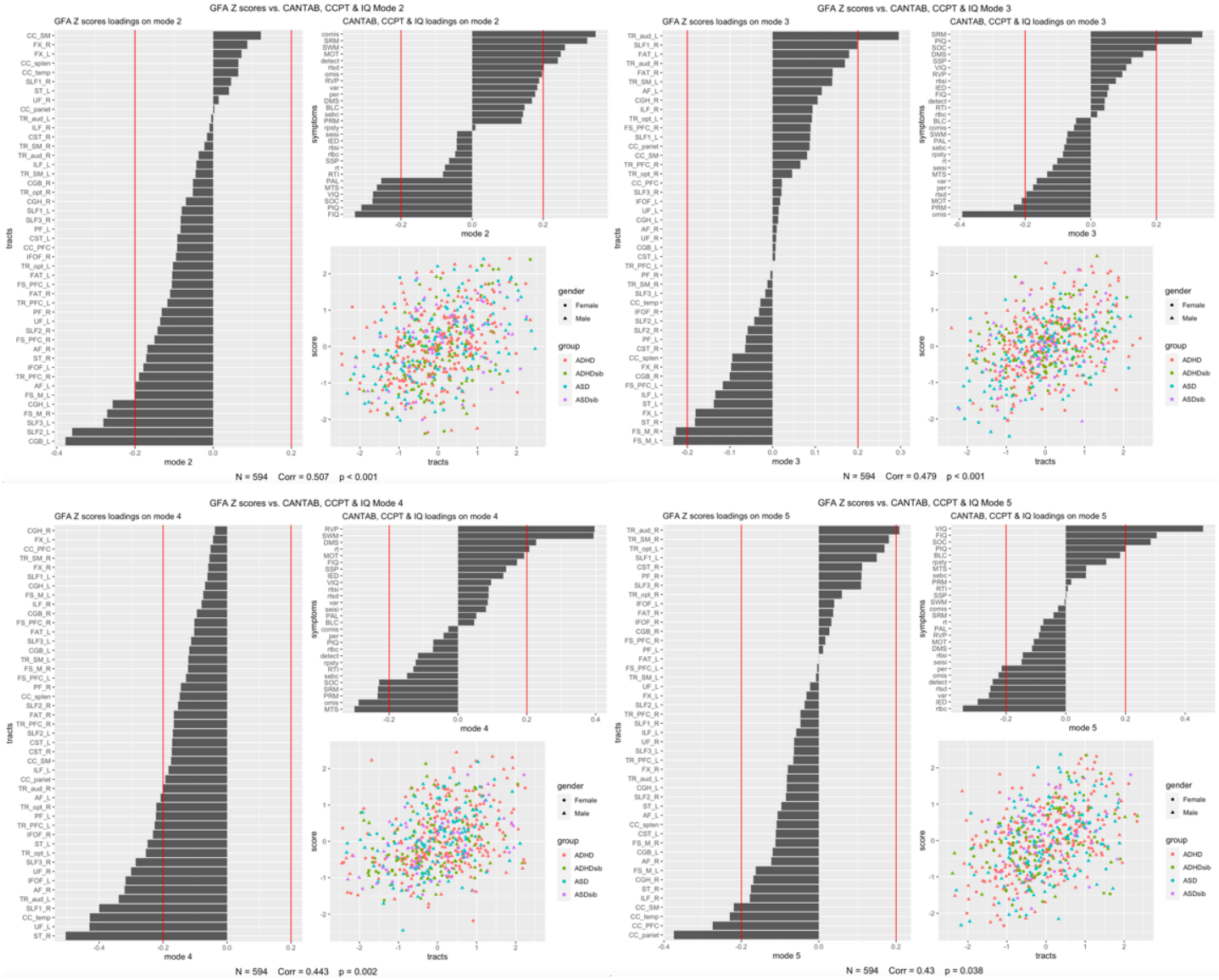
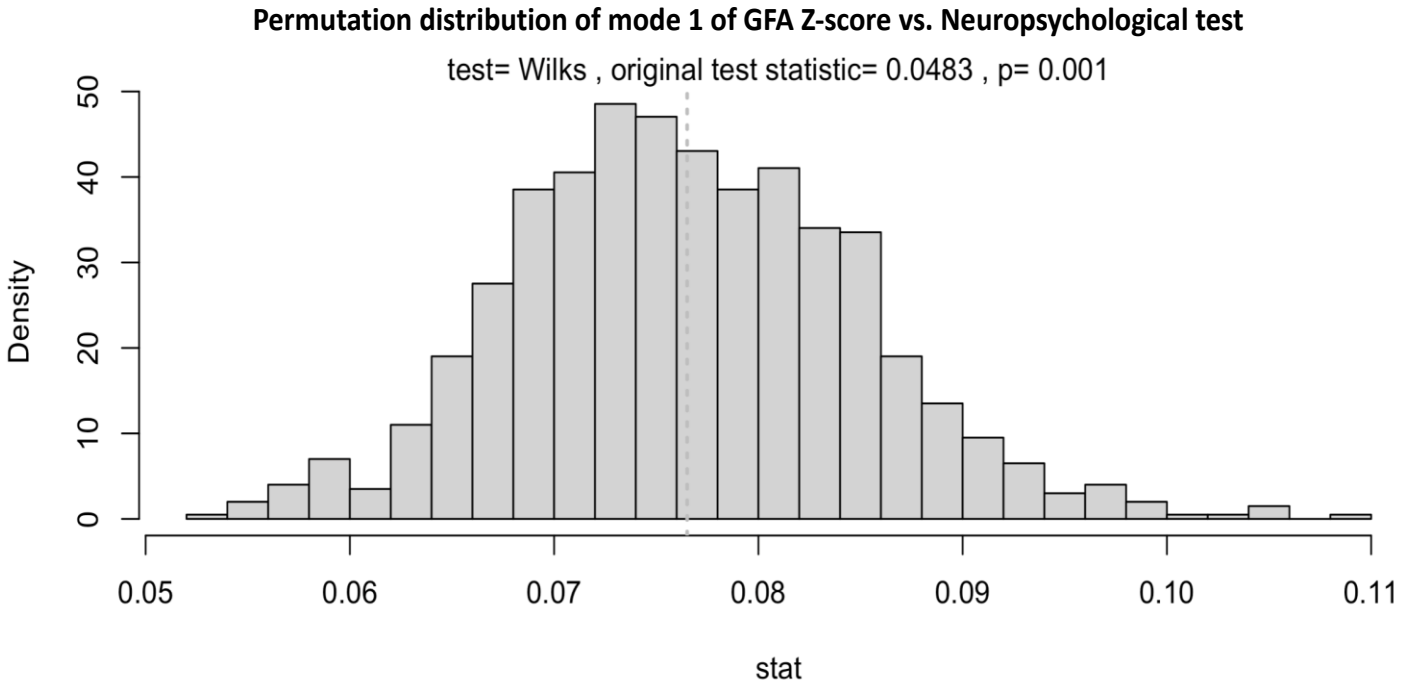


Figure S20. Permutation test of each mode in canonical correlation analysis.

The parametric test for significance of CCA modes with Wilks' lambda (122), and checked with permutation tests as your suggestion (123). We used a strict policy for determining the significance that each mode should pass both parametric and permutation significance tests. The permutation test was done with 999 permutations, and the p-value was determined by (number of permutation more significant than real value + 1) / (999 + 1). A p-value of 0.001 means that no permutation was more significant than the real value.

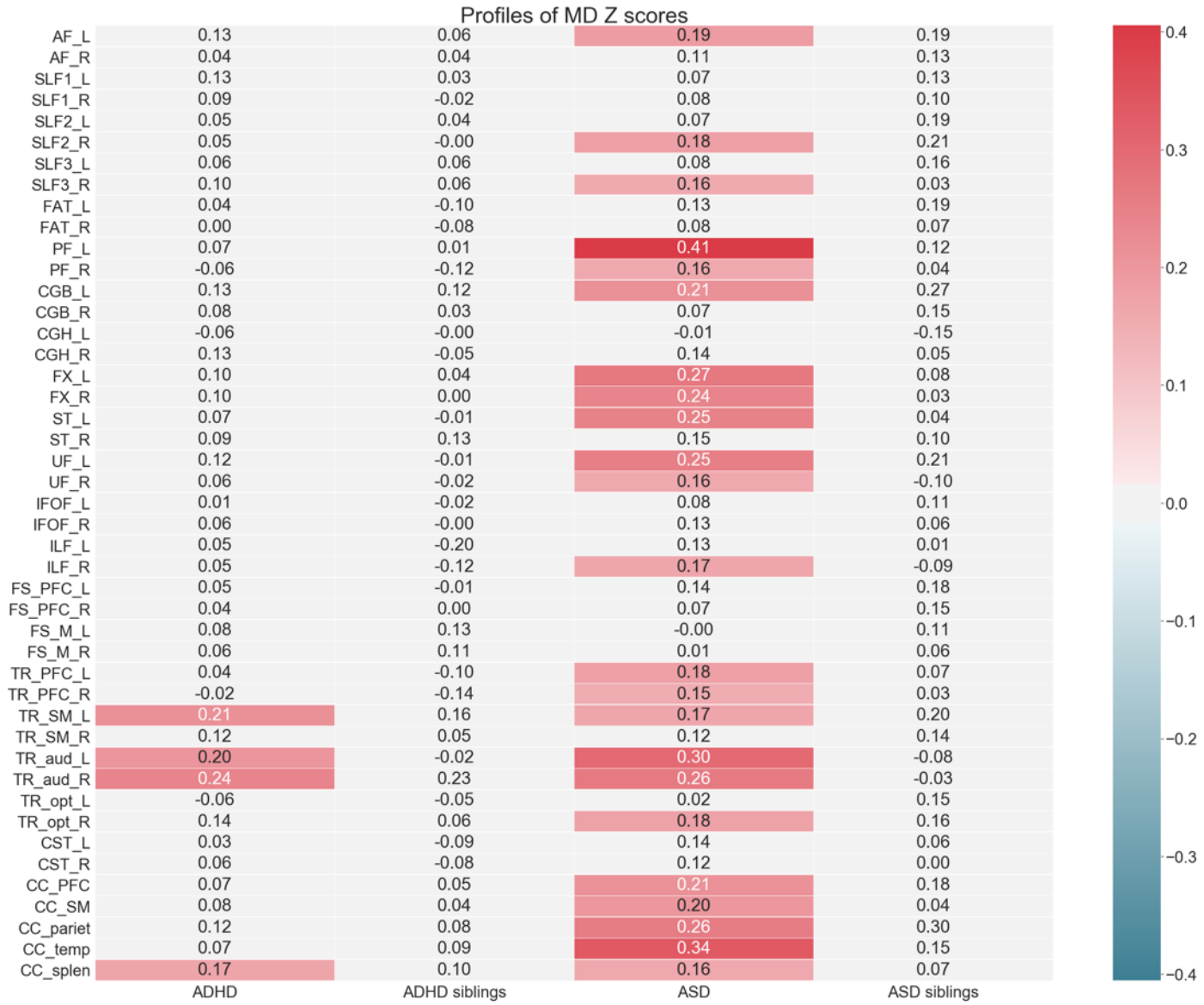


Symptoms or NPT	Mode	P-value	Permutation p-value
Symptoms	1	<0.001	0.003
Symptoms	2	0.002	0.004
NPT	1	<0.001	0.001
NPT	2	<0.001	0.001
NPT	3	<0.001	0.001
NPT	4	0.002	0.001
NPT	5	0.038	0.001

Figure S21. Diffusion indices Z-score profiles of people with attention-deficit/hyperactivity disorder, autism spectrum disorder, and their unaffected siblings.

(A) mean diffusivity (MD), **(B)** radial diffusivity (RD), and **(C)** axial diffusivity (AD). Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes Z-score effect size; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1

(A) MD Z-score profiles



(B) RD Z-score profiles

(C) AD Z-score profiles

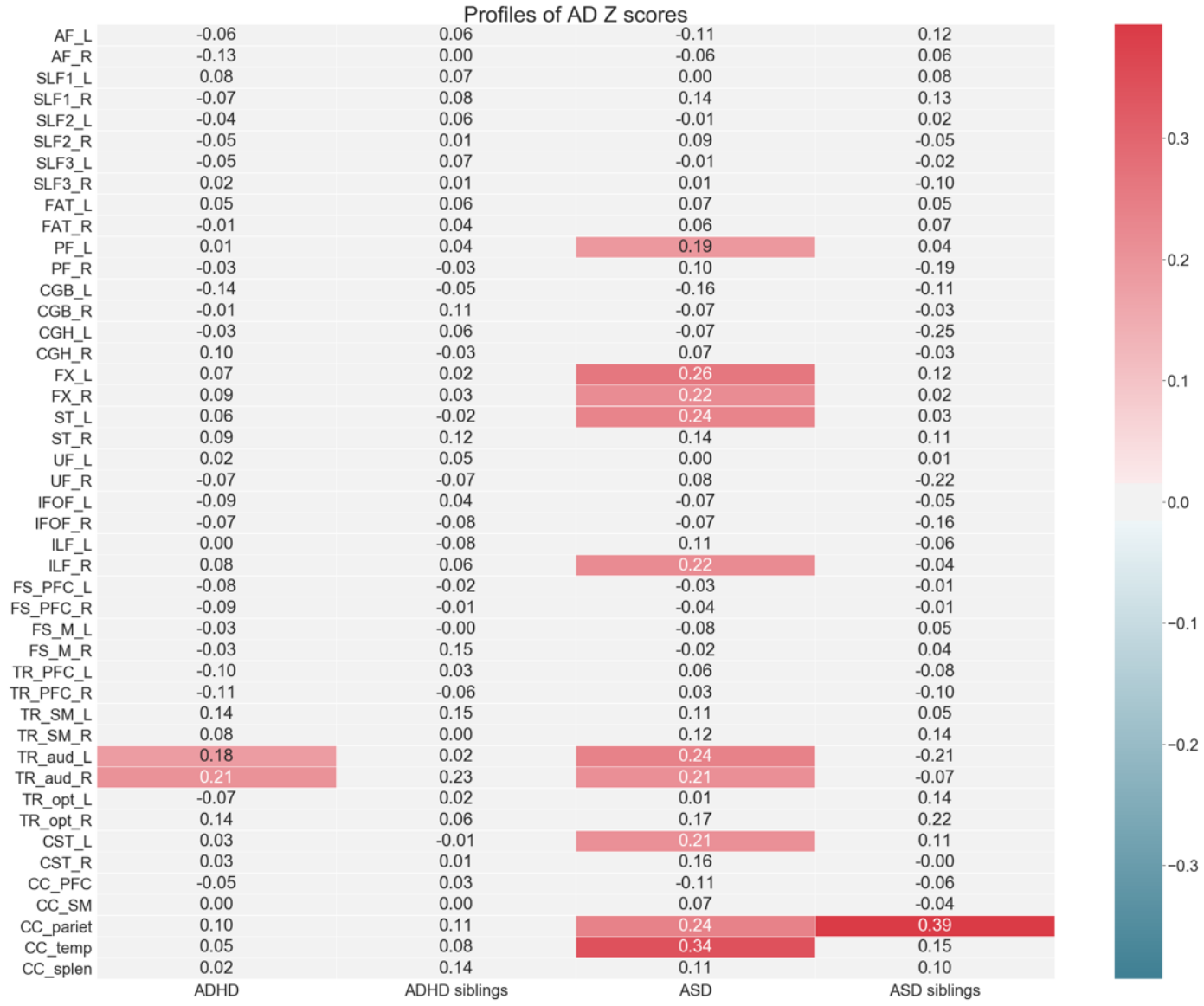
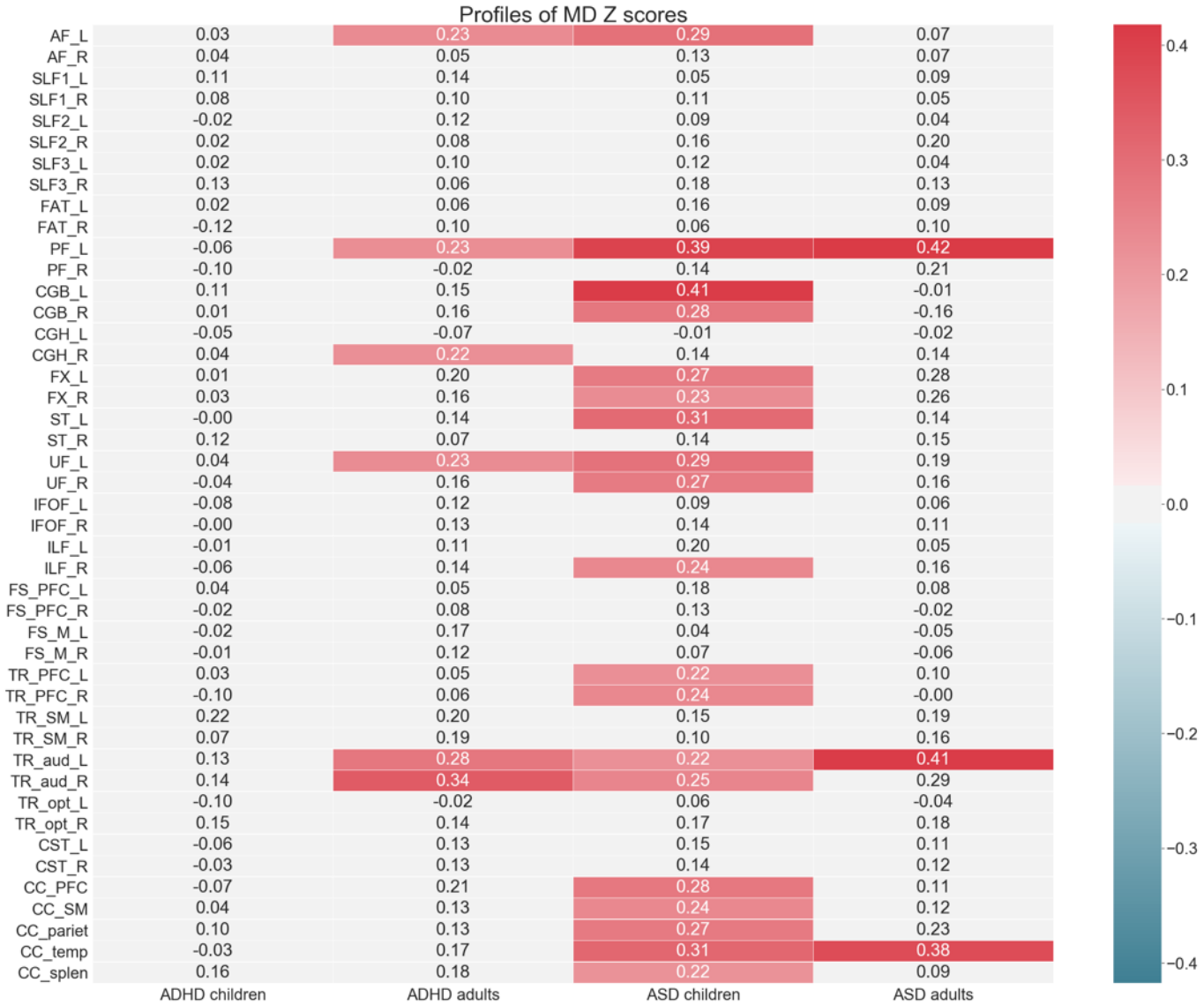


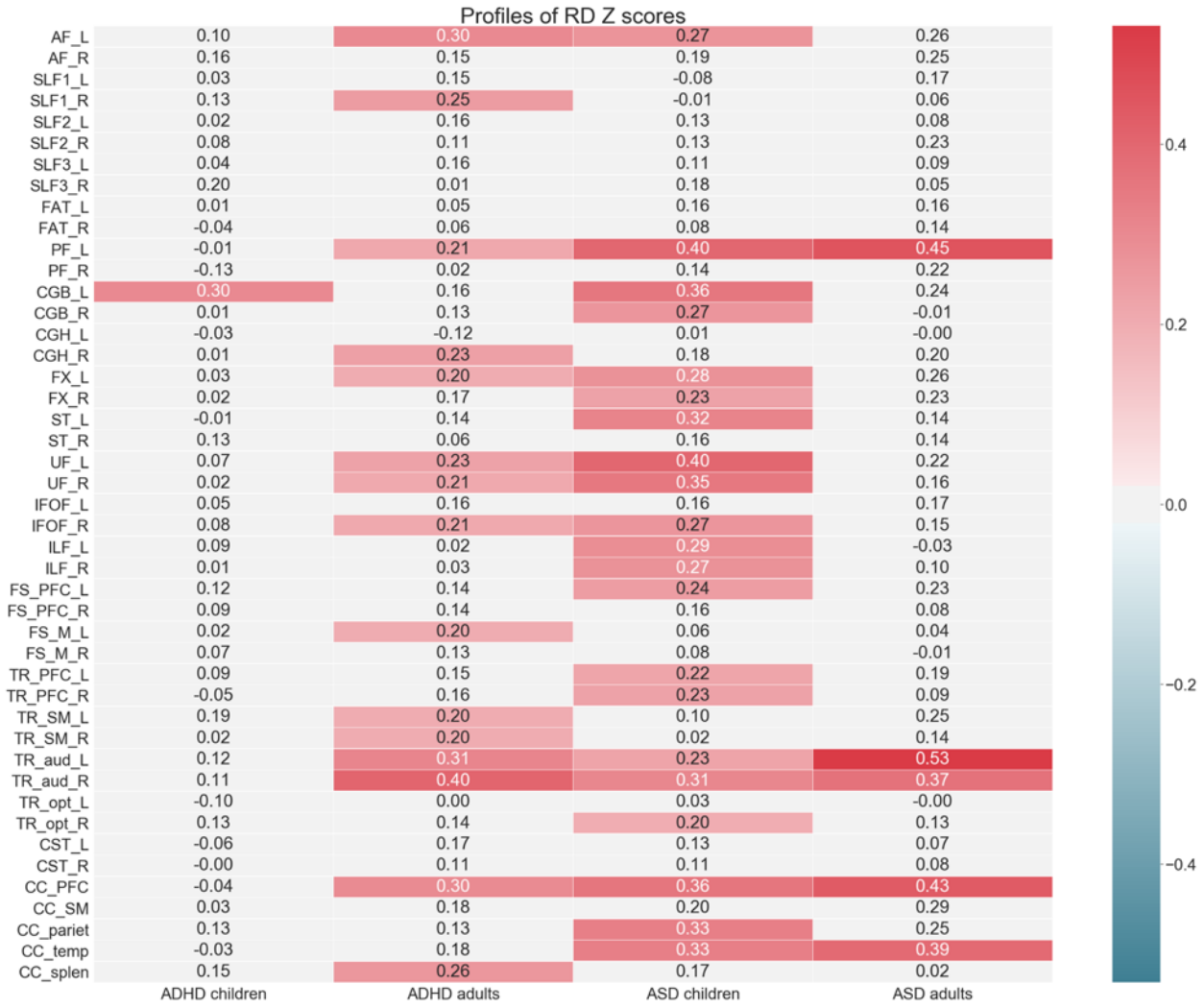
Figure S22. Diffusion Z-score profiles of children and adults with attention-deficit/hyperactivity disorder or autism spectrum disorder.

(A) mean diffusivity (MD). **(B)** radial diffusivity (RD). **(C)** axial diffusivity (AD). Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes the Z-score effect size; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1.

(A) MD Z-score profiles



(B) RD Z-score profiles



(C) AD Z-score profiles

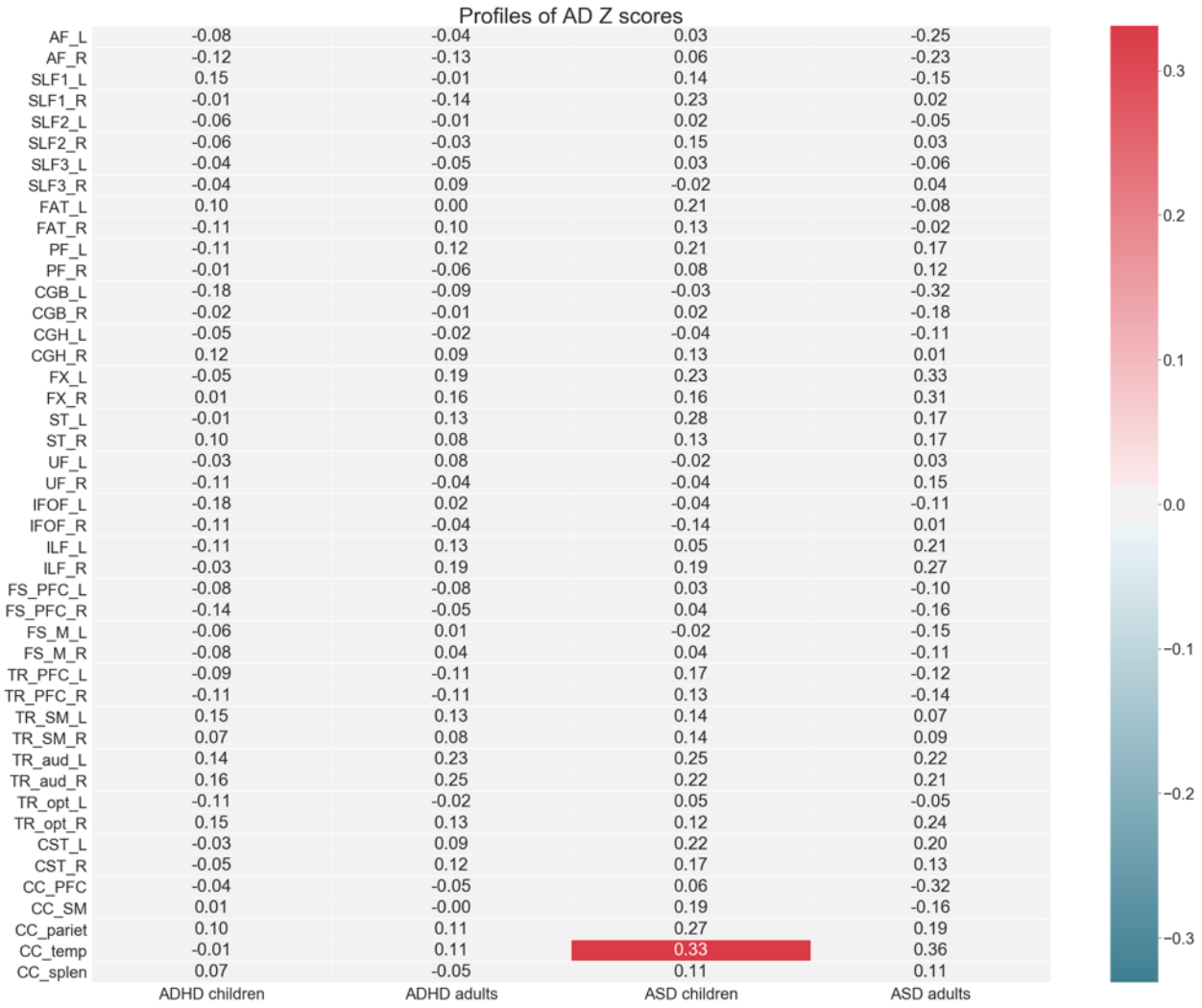
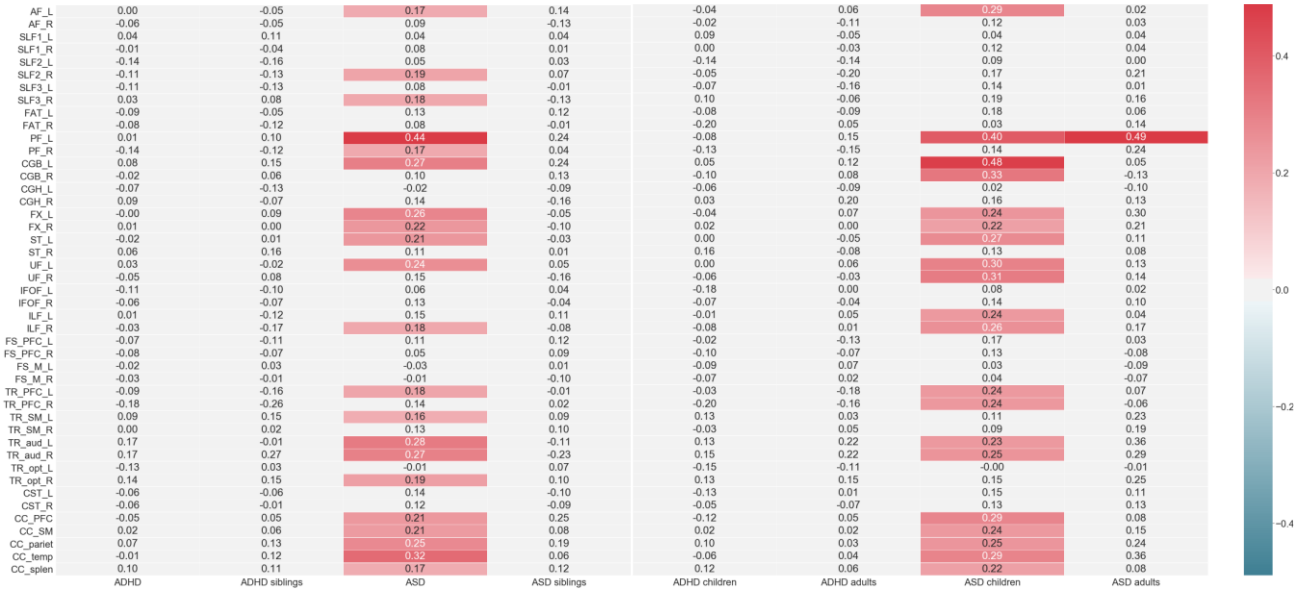


Figure S23. Sex-specific diffusion Z-score profiles.

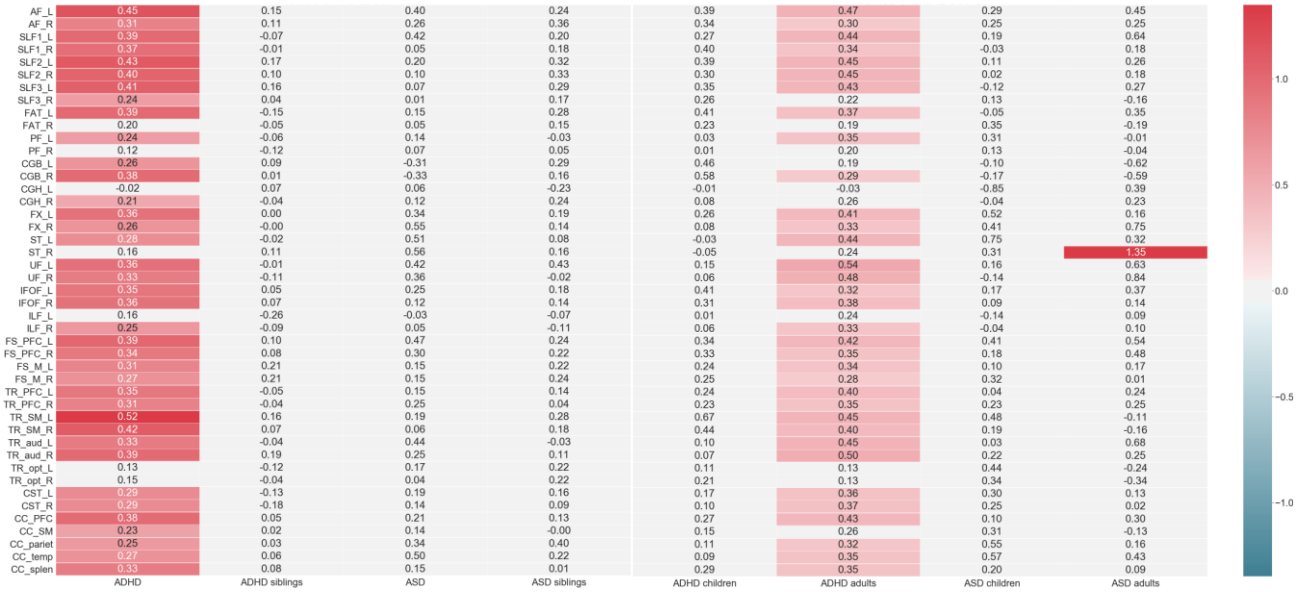
Scores that did not pass multiple testing using the Benjamini–Hochberg procedure (FDR = 0.05) were masked. The color gradient encodes the Z-score effect size; cyan indicates a negative effect size, and red indicates a positive effect size. For complete tract names, please refer to Table S1. (A) MD (B) RD (C) AD

(A) MD

A. Profiles of MD Z scores for male

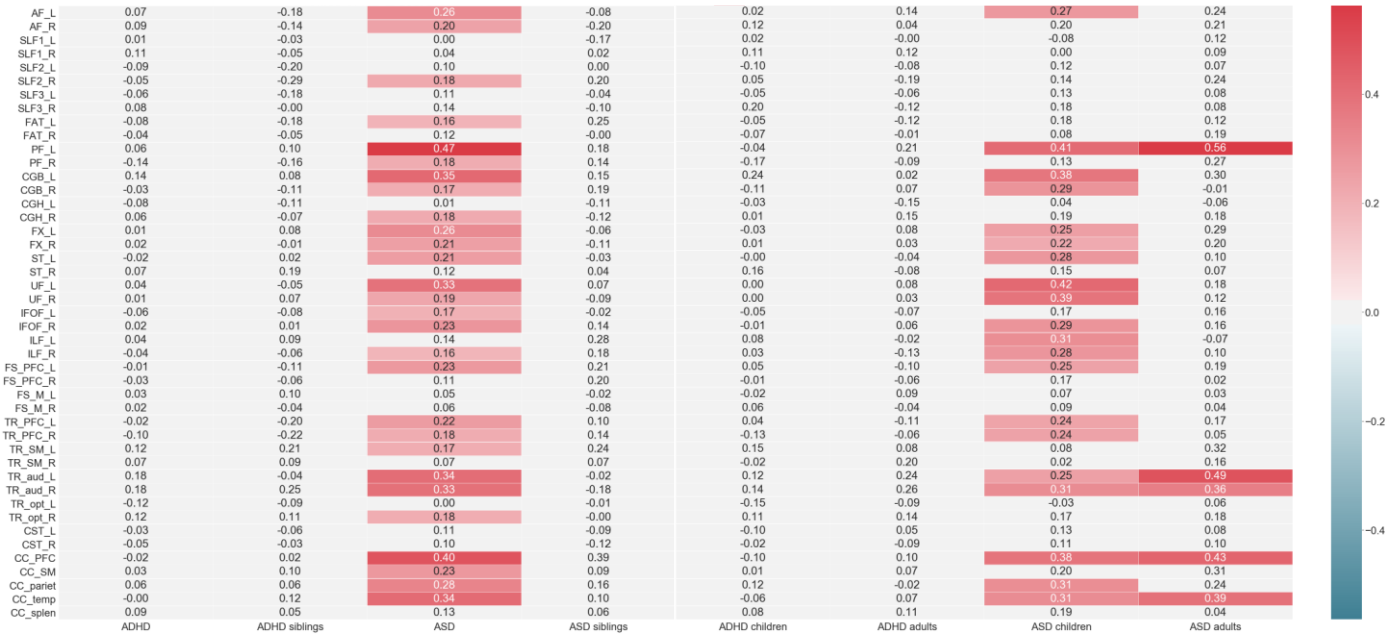


B. Profiles of MD Z scores for female



(B) RD

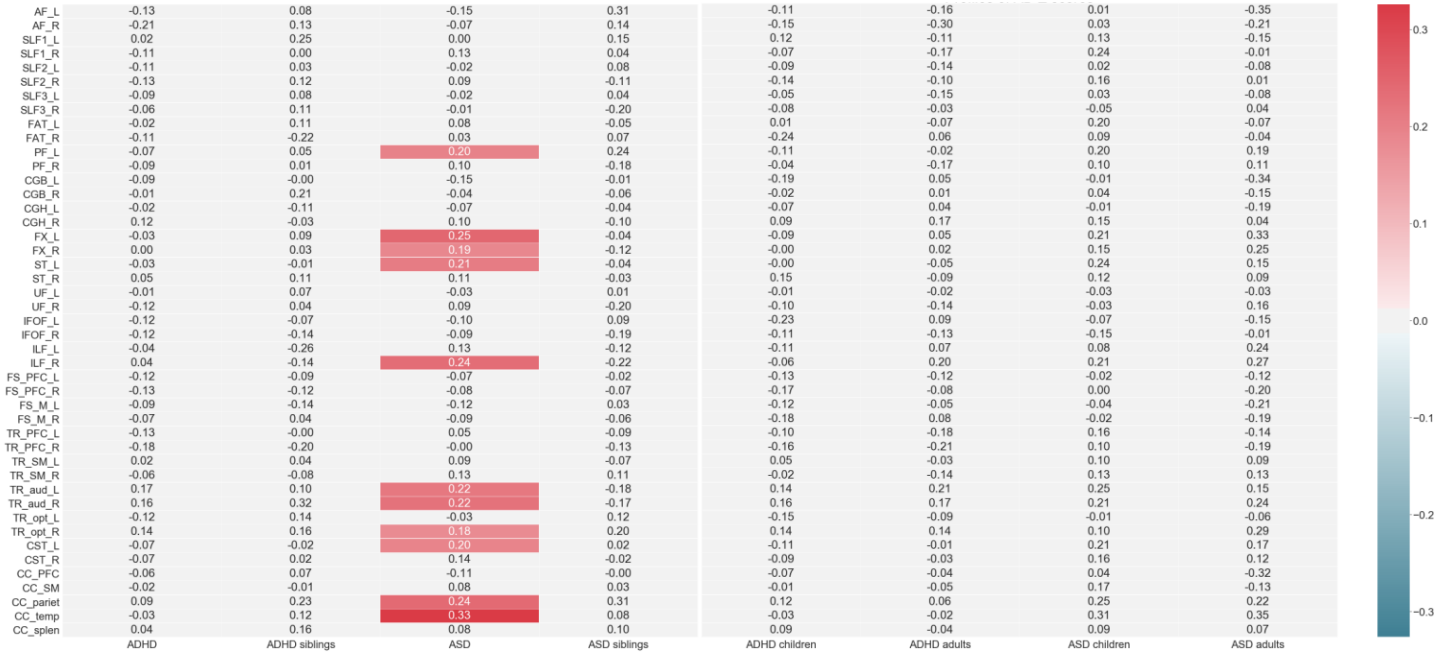
A. Profiles of RD Z scores for male



B. Profiles of RD Z scores for female

(C) AD

A. Profiles of AD Z scores for male



B. Profiles of AD Z scores for female

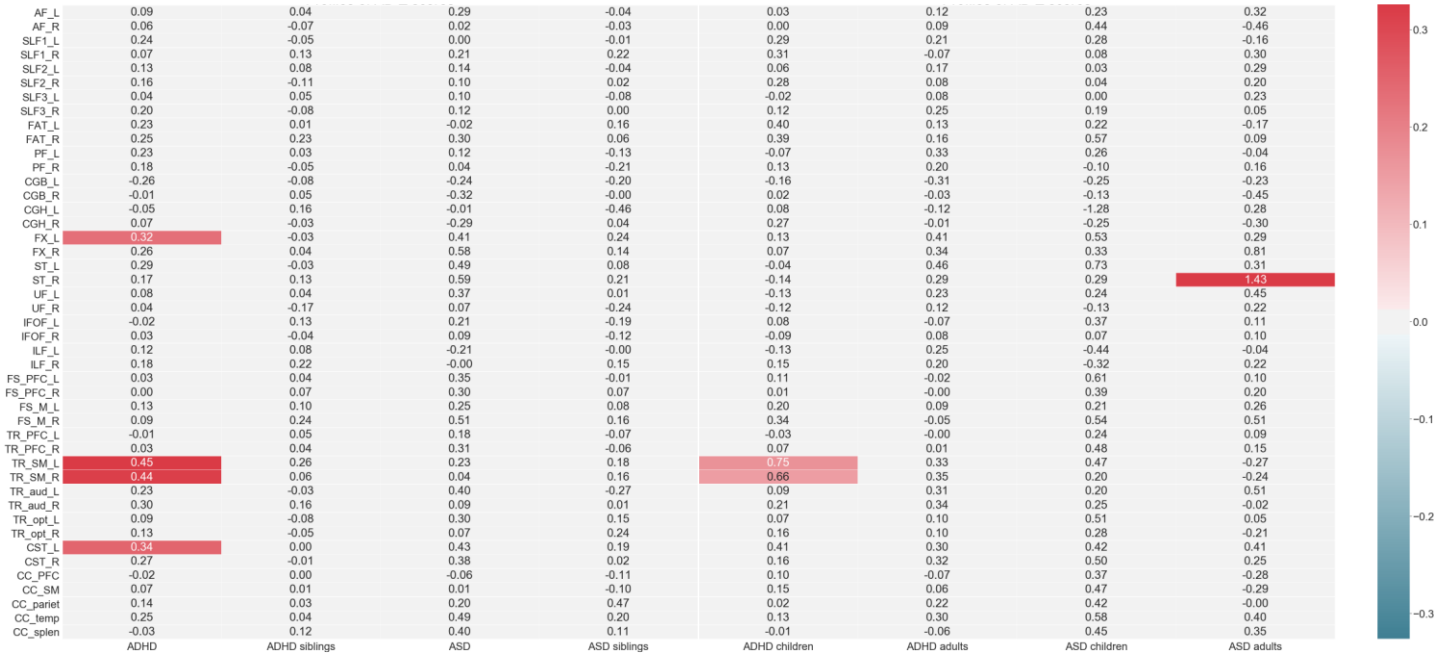
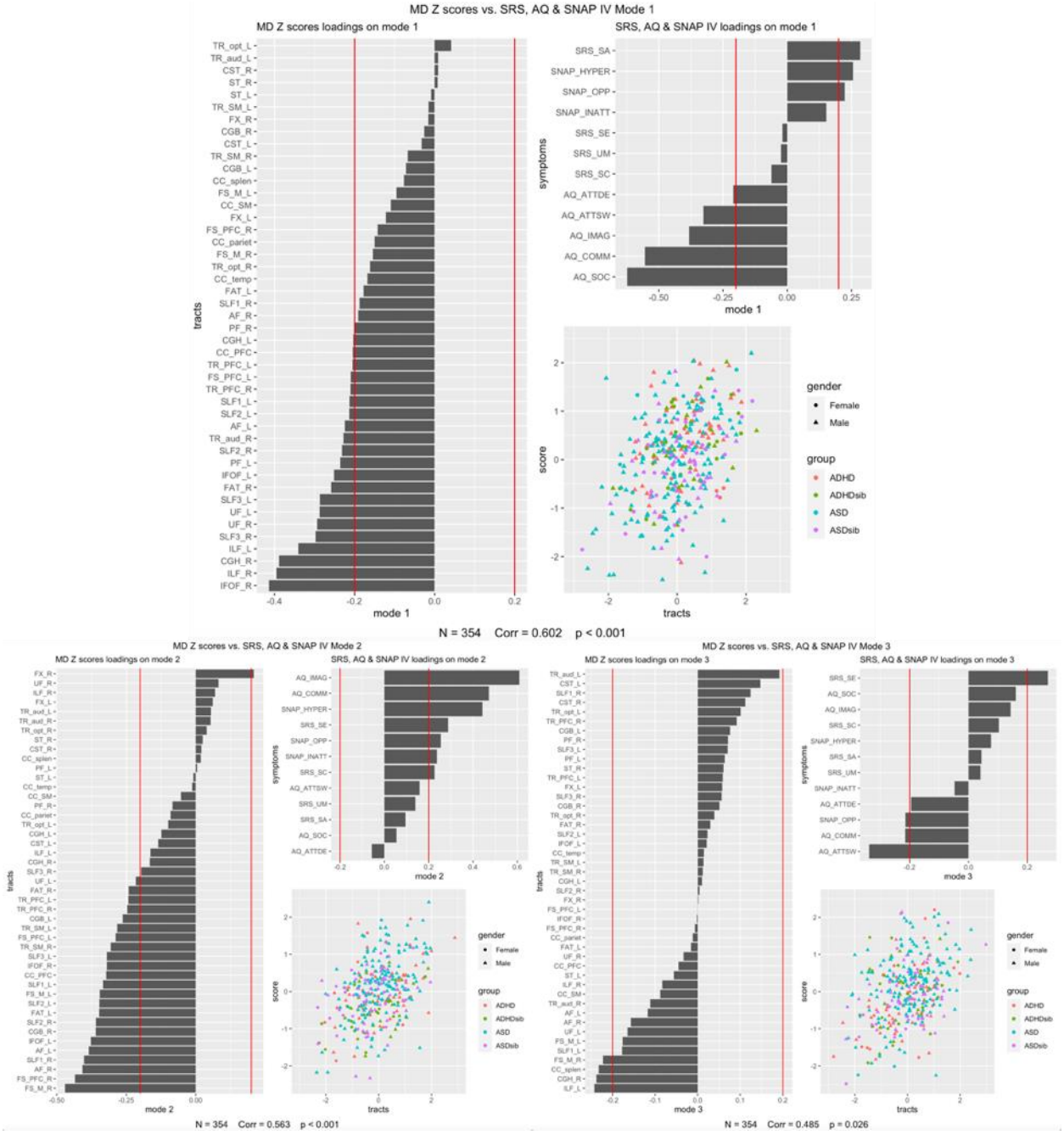


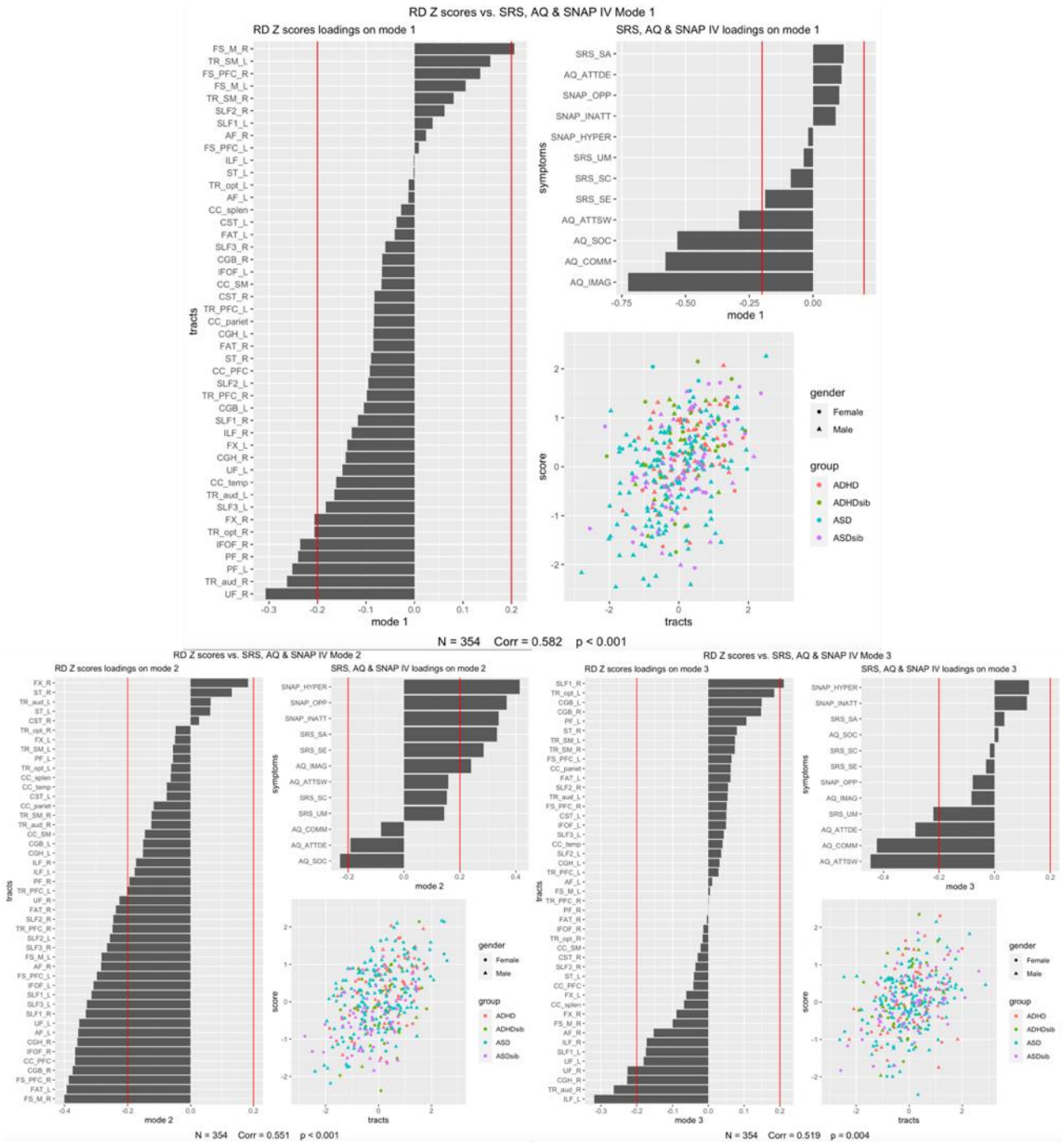
Figure S24. Canonical correlation analysis (CCA) between diffusion Z-scores and symptom assessment

Canonical correlation analysis (CCA) between diffusion indices Z-scores and symptom assessment, including Autism Spectrum Quotient (AQ), Social Response Scale (SRS), and the Swanson, Nolan, and Pelham Teacher and Parent Rating Scale-IV (SNAP-IV). For complete white matter tract names, please refer to Table S1. The following figurers show the CCA between symptom scores and (A) MD (mode 1, 2), and (B) RD (mode 1-3) (C) AD (mode 1-3) Z-scores.

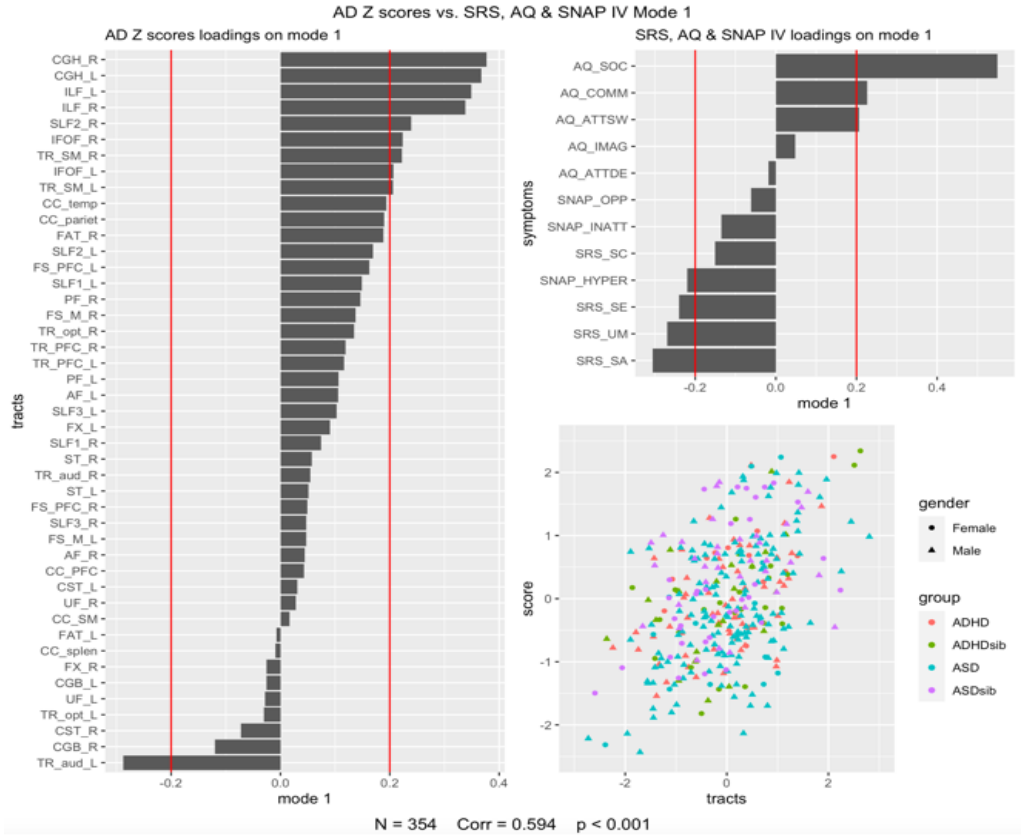
(A) MD



(B) RD


RD Z scores vs. SRS, AQ & SNAP IV Mode 1
RD Z scores loadings on mode 1
SRS, AQ & SNAP IV loadings on mode 1
tracts
symptoms
mode 1
score
gender
Female
Male
group
ADHD
ADHDsib
ASD
ASDsib
N = 354 Corr = 0.582 p < 0.001
RD Z scores vs. SRS, AQ & SNAP IV Mode 2
RD Z scores loadings on mode 2
SRS, AQ & SNAP IV loadings on mode 2
N = 354 Corr = 0.551 p < 0.001
RD Z scores vs. SRS, AQ & SNAP IV Mode 3
RD Z scores loadings on mode 3
SRS, AQ & SNAP IV loadings on mode 3
N = 354 Corr = 0.519 p = 0.004

(C) AD

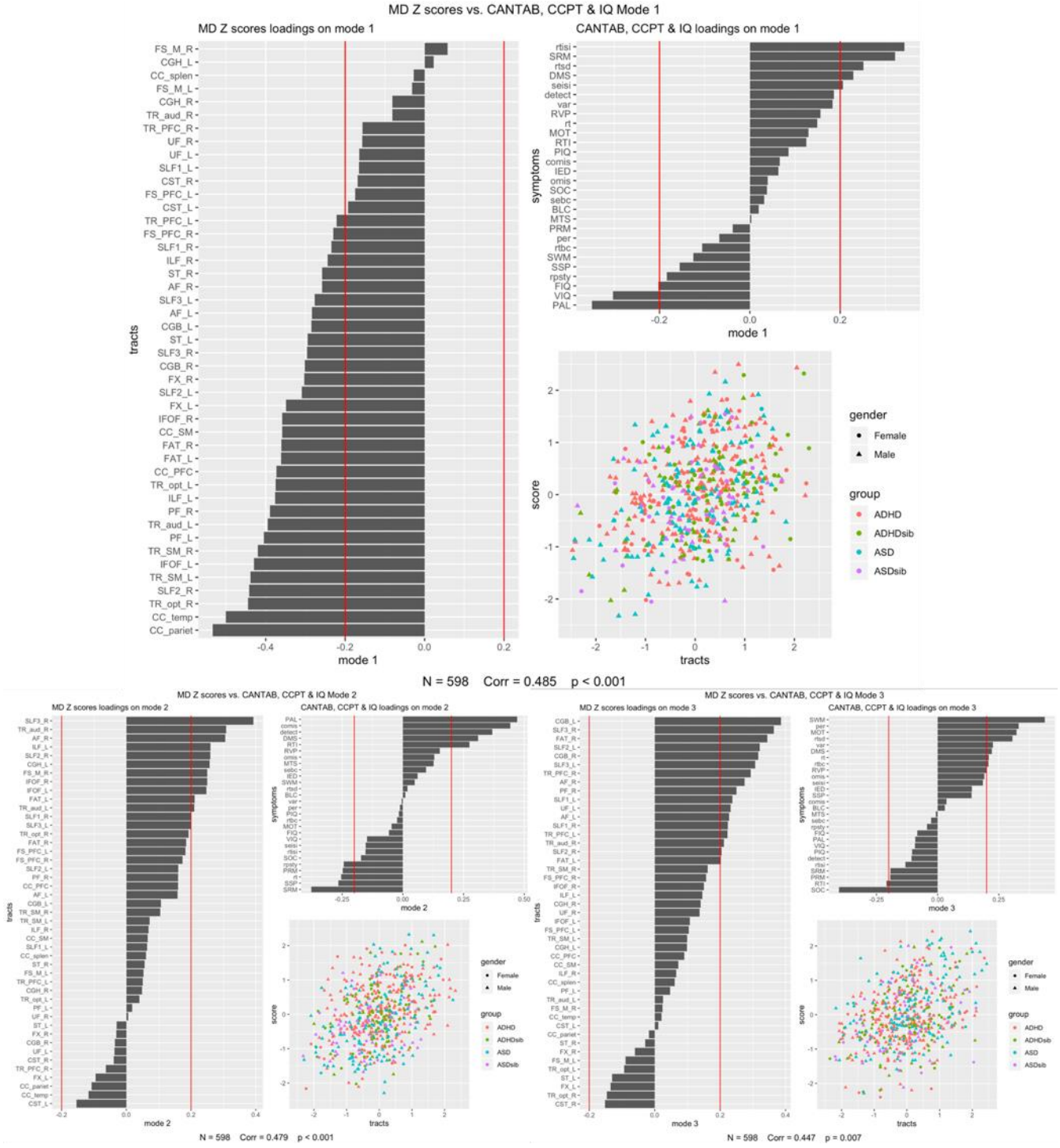


N = 354 Corr = 0.542 p = 0.001

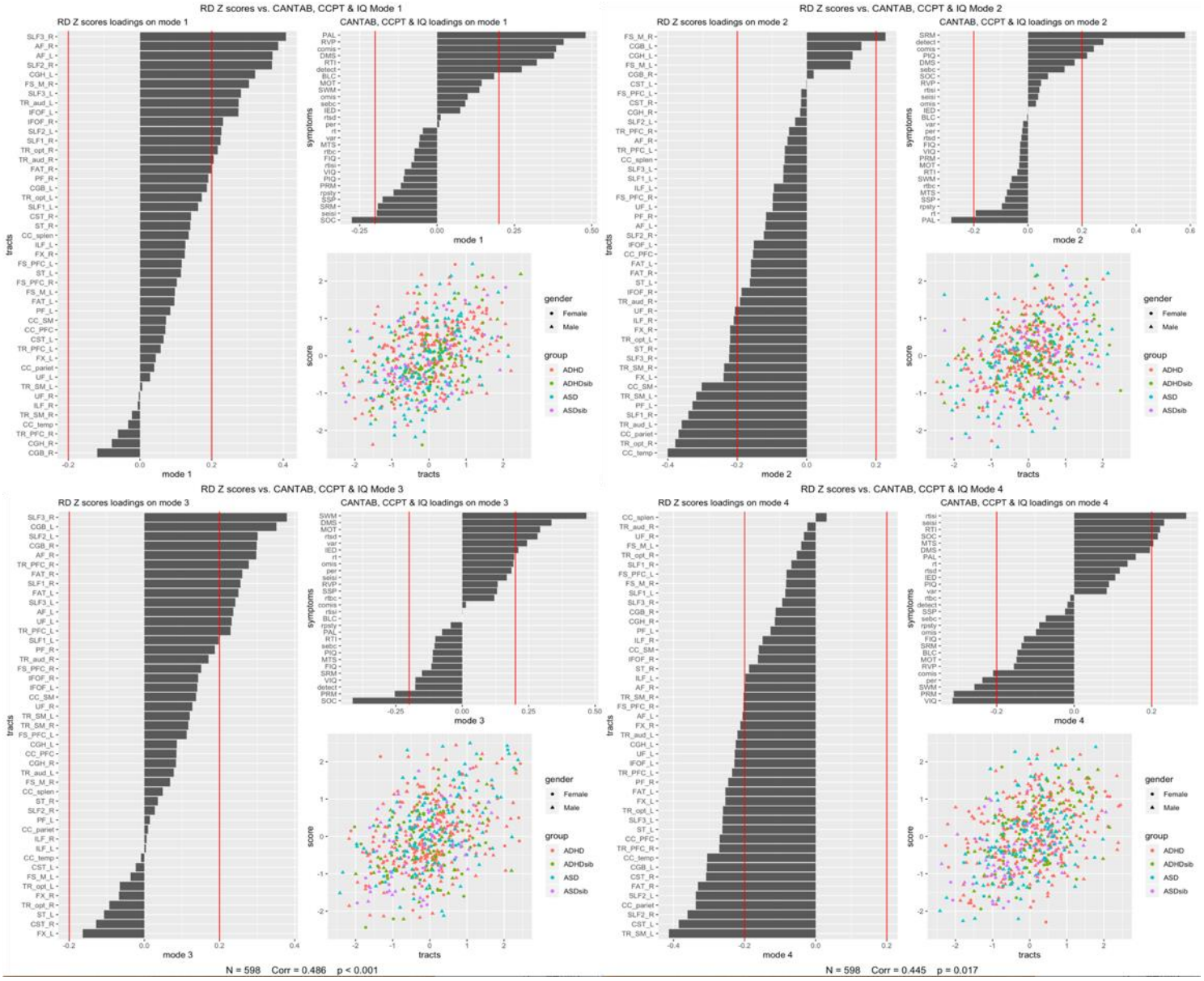
Figure S25. Canonical correlation analysis (CCA) between diffusion indices Z-scores and neuropsychological assessment.

Canonical correlation analysis (CCA) between diffusion indices Z-scores and neuropsychological assessment, including the Cambridge Neuropsychological Test Automated Battery (CANTAB) and Conner's continuous performance test (CCPT). Because of the orthogonality of CCA, each mode exhibited a distinct correlation with different CANTAB items and white matter tracts. For complete white matter tract names, please refer to Table S1. For a full list of CCPT and CANTAB items, please refer to Table S3 and Table S4, respectively. Here list the results of CCA between neuropsychological items and (A) MD (mode 1-3) and (B) RD (mode 1-4) (C) AD (mode 1-3) Z-scores.

(A) MD


MD Z scores vs. CANTAB, CCPT & IQ Mode 1
MD Z scores loadings on mode 1
CANTAB, CCPT & IQ loadings on mode 1
tracts
mode 1
symptoms
mode 1
score
tracts
gender
Female
Male
group
ADHD
ADHDsib
ASD
ASDsib
N = 598 Corr = 0.485 p < 0.001
MD Z scores vs. CANTAB, CCPT & IQ Mode 2
MD Z scores loadings on mode 2
CANTAB, CCPT & IQ loadings on mode 2
mode 2
N = 598 Corr = 0.479 p < 0.001
MD Z scores vs. CANTAB, CCPT & IQ Mode 3
MD Z scores loadings on mode 3
CANTAB, CCPT & IQ loadings on mode 3
mode 3
N = 598 Corr = 0.447 p = 0.007

(B) RD


RD Z scores vs. CANTAB, CCPT & IQ Mode 1
RD Z scores loadings on mode 1
CANTAB, CCPT & IQ loadings on mode 1
RD Z scores vs. CANTAB, CCPT & IQ Mode 2
RD Z scores loadings on mode 2
CANTAB, CCPT & IQ loadings on mode 2
RD Z scores vs. CANTAB, CCPT & IQ Mode 3
RD Z scores loadings on mode 3
CANTAB, CCPT & IQ loadings on mode 3
RD Z scores vs. CANTAB, CCPT & IQ Mode 4
RD Z scores loadings on mode 4
CANTAB, CCPT & IQ loadings on mode 4
tracts
symptoms
score
mode 1
mode 2
mode 3
mode 4
gender
Female
Male
group
ADHD
ADHDsib
ASD
ASDsib
N = 598 Corr = 0.486 p < 0.001
N = 598 Corr = 0.445 p = 0.017

(C) AD

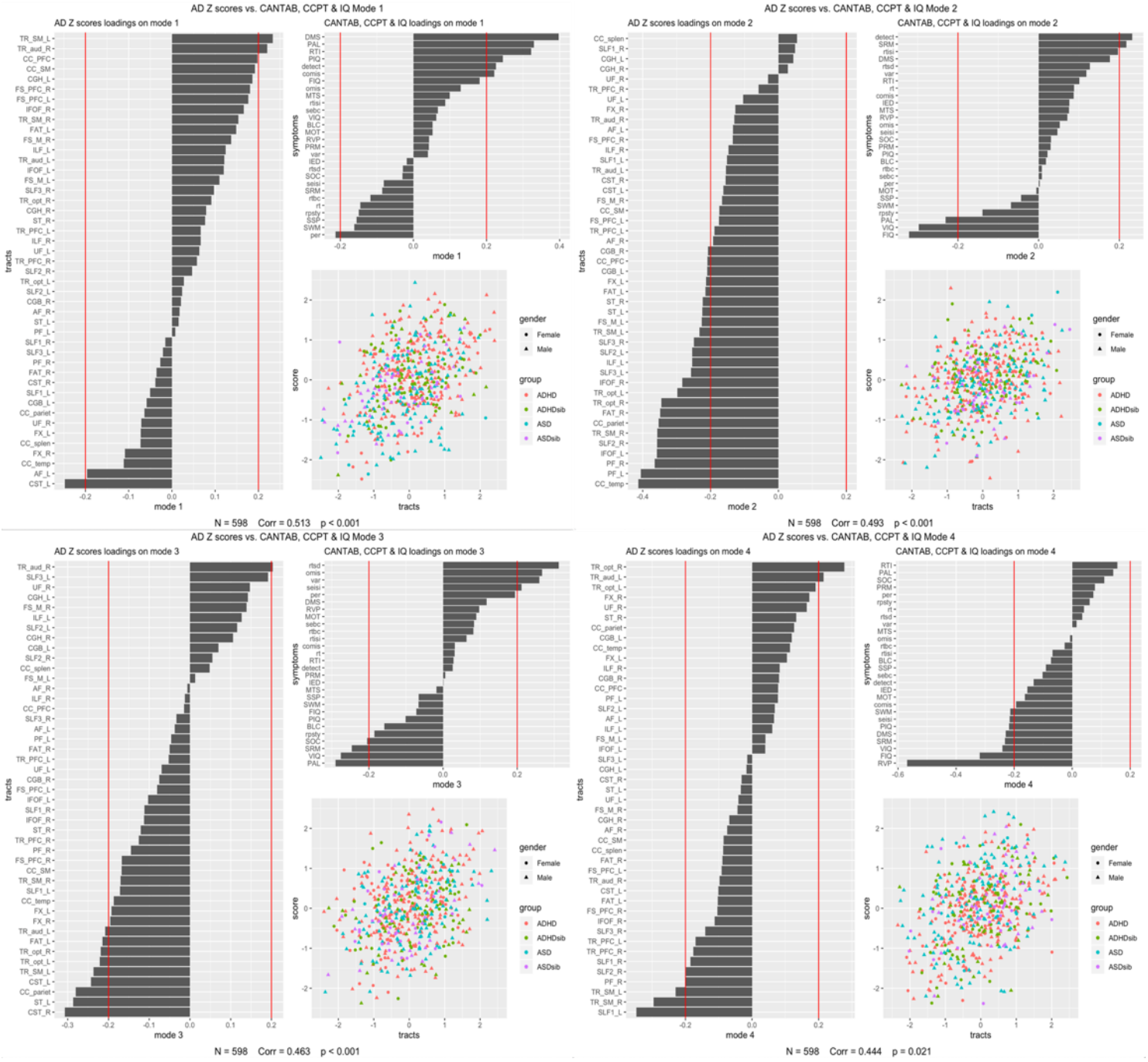
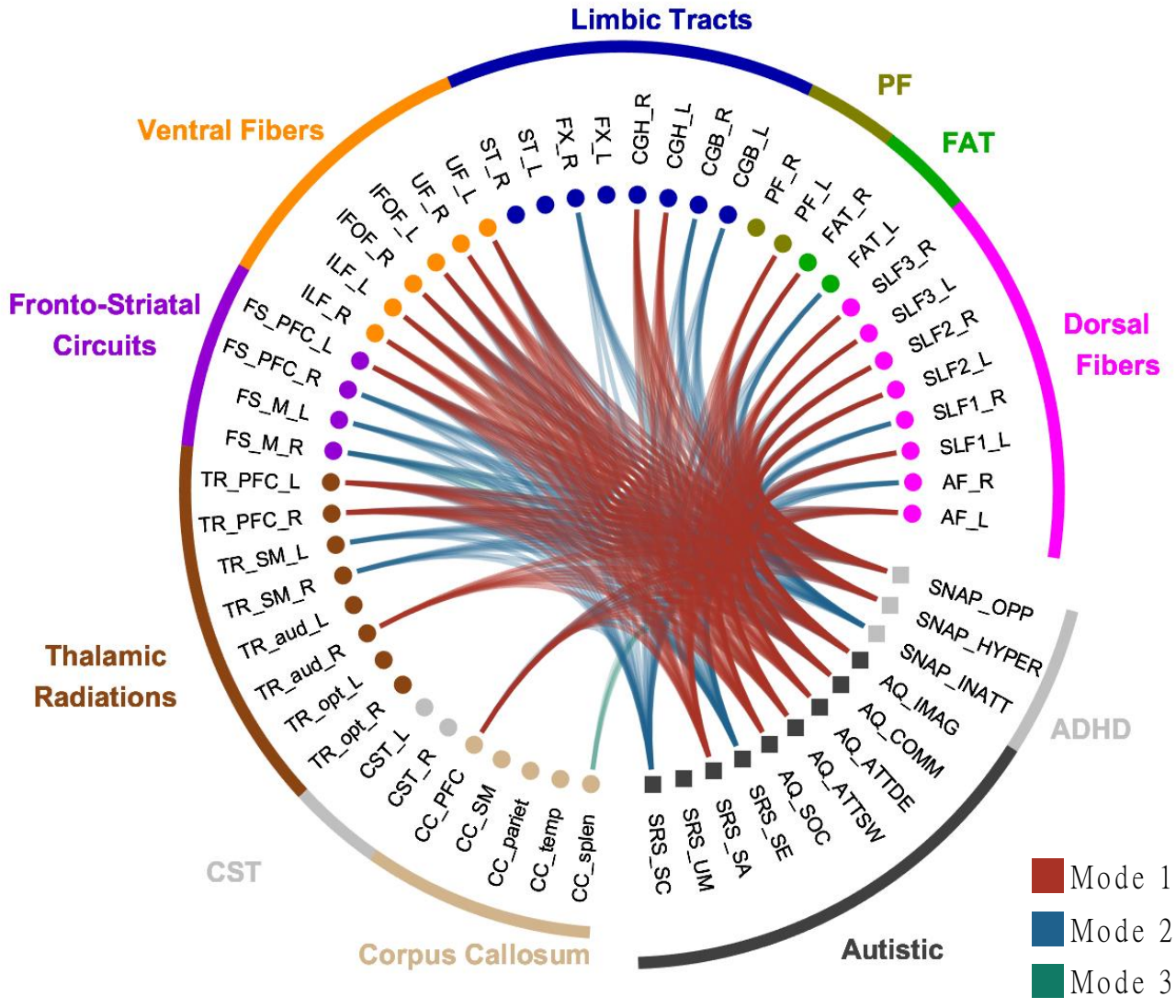

AD Z scores vs. CANTAB, CCPT & IQ Mode 1
AD Z scores loadings on mode 1
CANTAB, CCPT & IQ loadings on mode 1
tracts
symptoms
mode 1
score
gender
Female
Male
group
ADHD
ADHDsib
ASD
ASDsib
N = 598 Corr = 0.513 p < 0.001
AD Z scores vs. CANTAB, CCPT & IQ Mode 2
AD Z scores loadings on mode 2
CANTAB, CCPT & IQ loadings on mode 2
N = 598 Corr = 0.493 p < 0.001
AD Z scores vs. CANTAB, CCPT & IQ Mode 3
AD Z scores loadings on mode 3
CANTAB, CCPT & IQ loadings on mode 3
N = 598 Corr = 0.463 p < 0.001
AD Z scores vs. CANTAB, CCPT & IQ Mode 4
AD Z scores loadings on mode 4
CANTAB, CCPT & IQ loadings on mode 4
N = 598 Corr = 0.444 p = 0.021

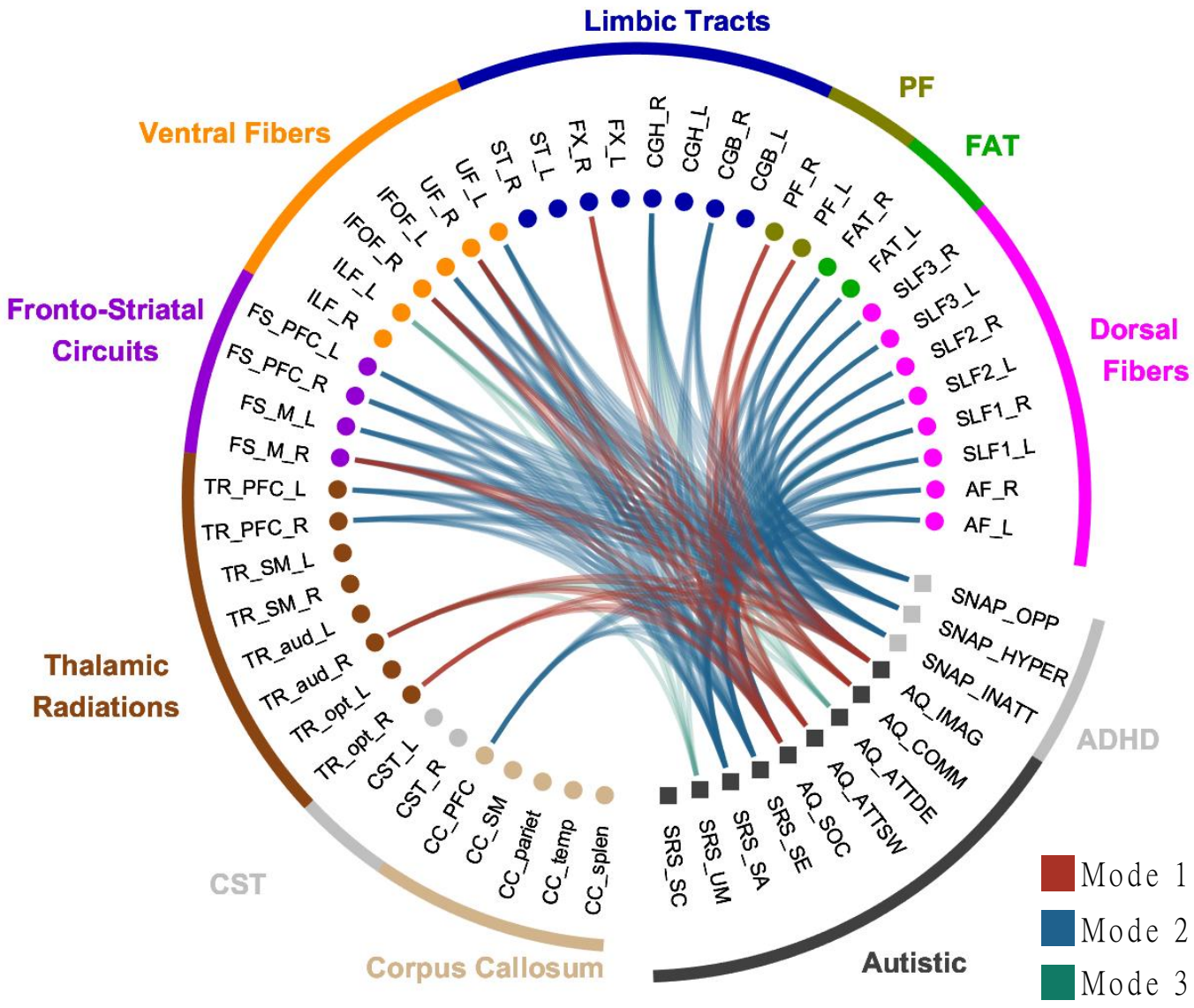
Figure S26: Circos plots of brain-behavior relationships revealed by canonical correlation analysis (CCA).

Potential associations between diffusion index Z-scores of white matter tracts and symptom scores. (A) CCA of MD Z-scores and symptom scores, (B) CCA of RD Z-scores and symptom scores, (C) CCA of AD Z-scores, and symptom scores. The associations were identified in significant modes of CCA results. Items with high loadings (>0.2) on the significant modes ($p<0.05$) were selected. The plots showed the underlying brain-behavior relationship beyond diagnostic boundaries.

(A) CCA of MD Z-scores and symptom scores



(B) CCA of RD Z-scores and symptom scores



(C) CCA of AD Z-scores and symptom scores

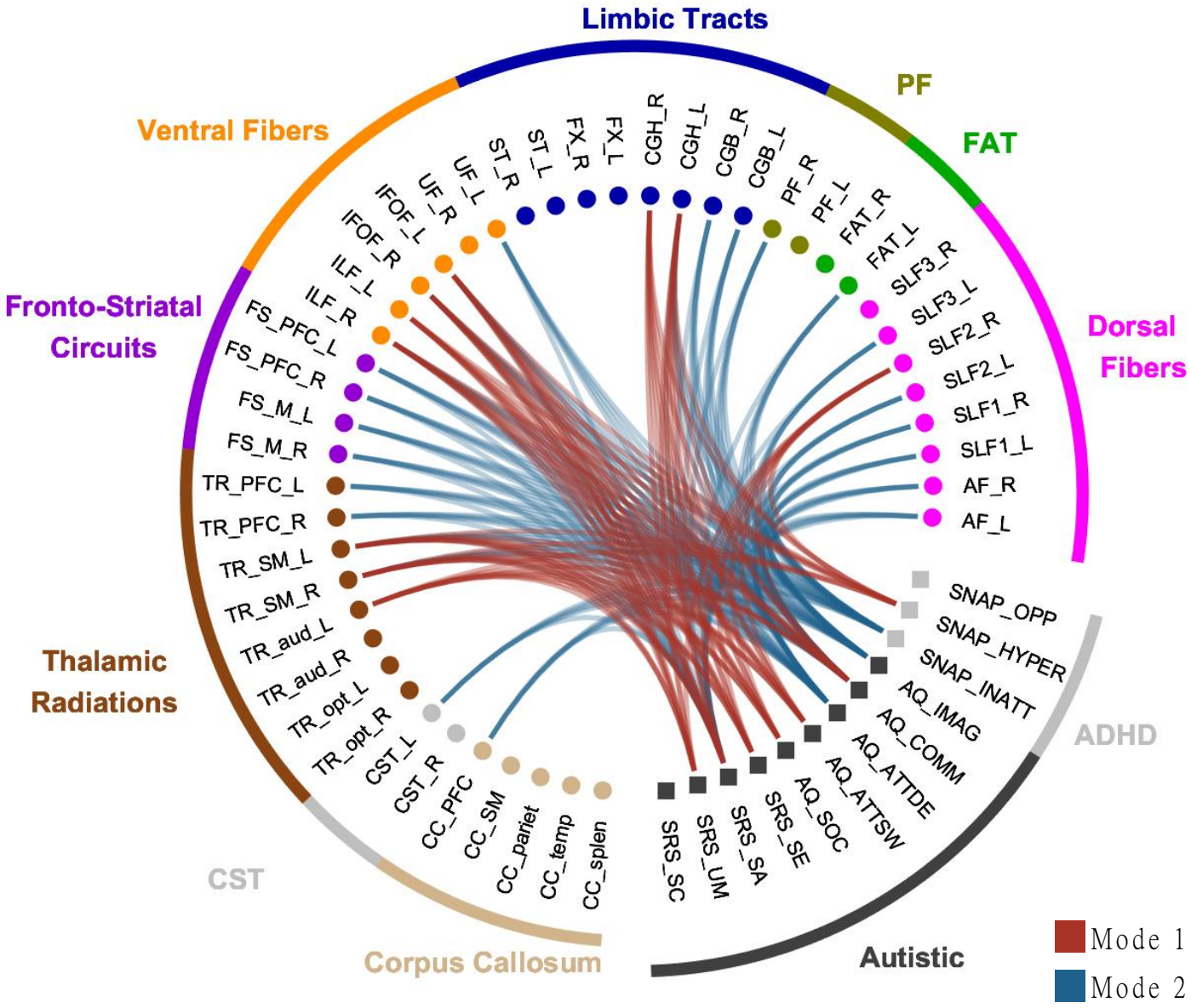
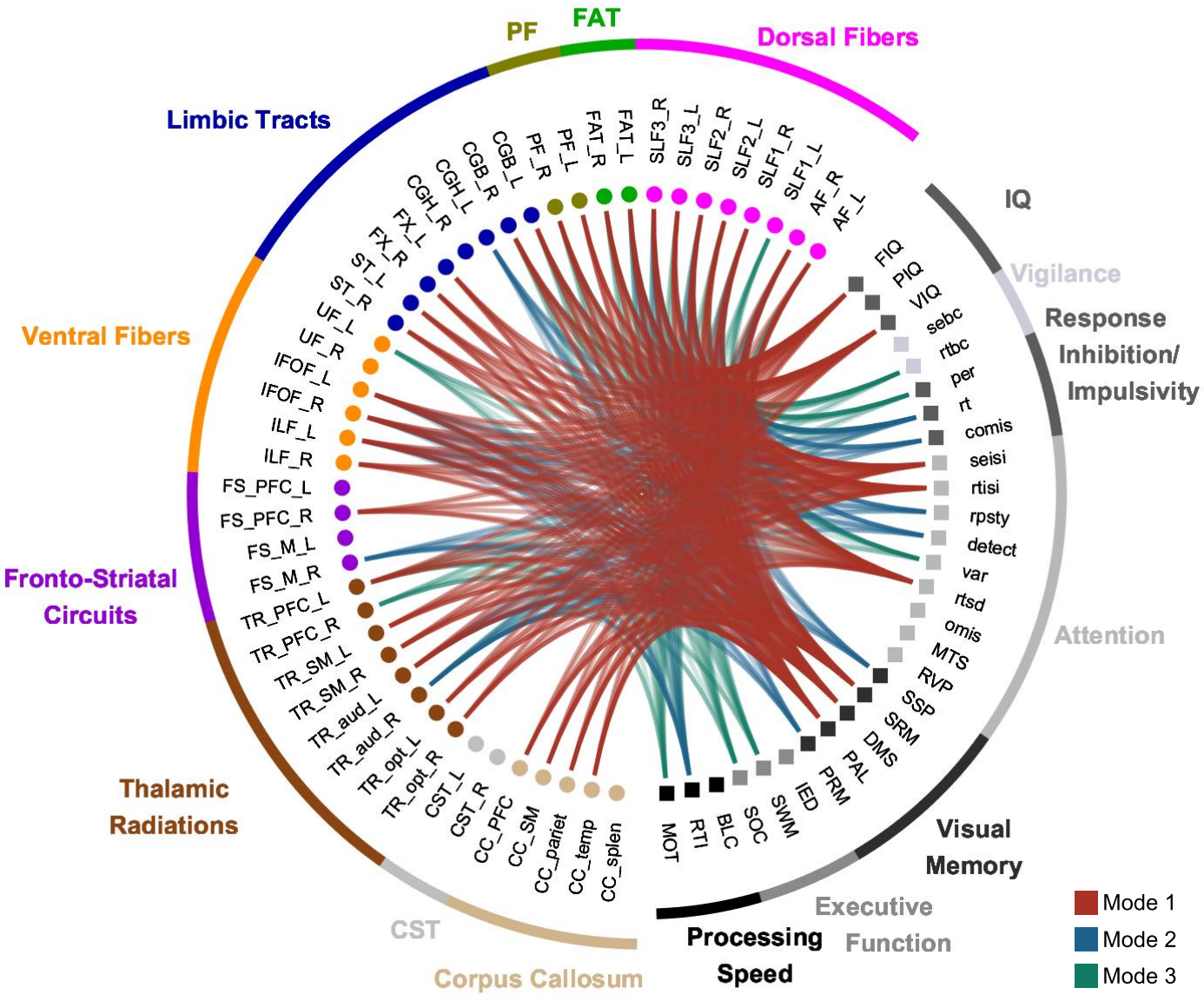


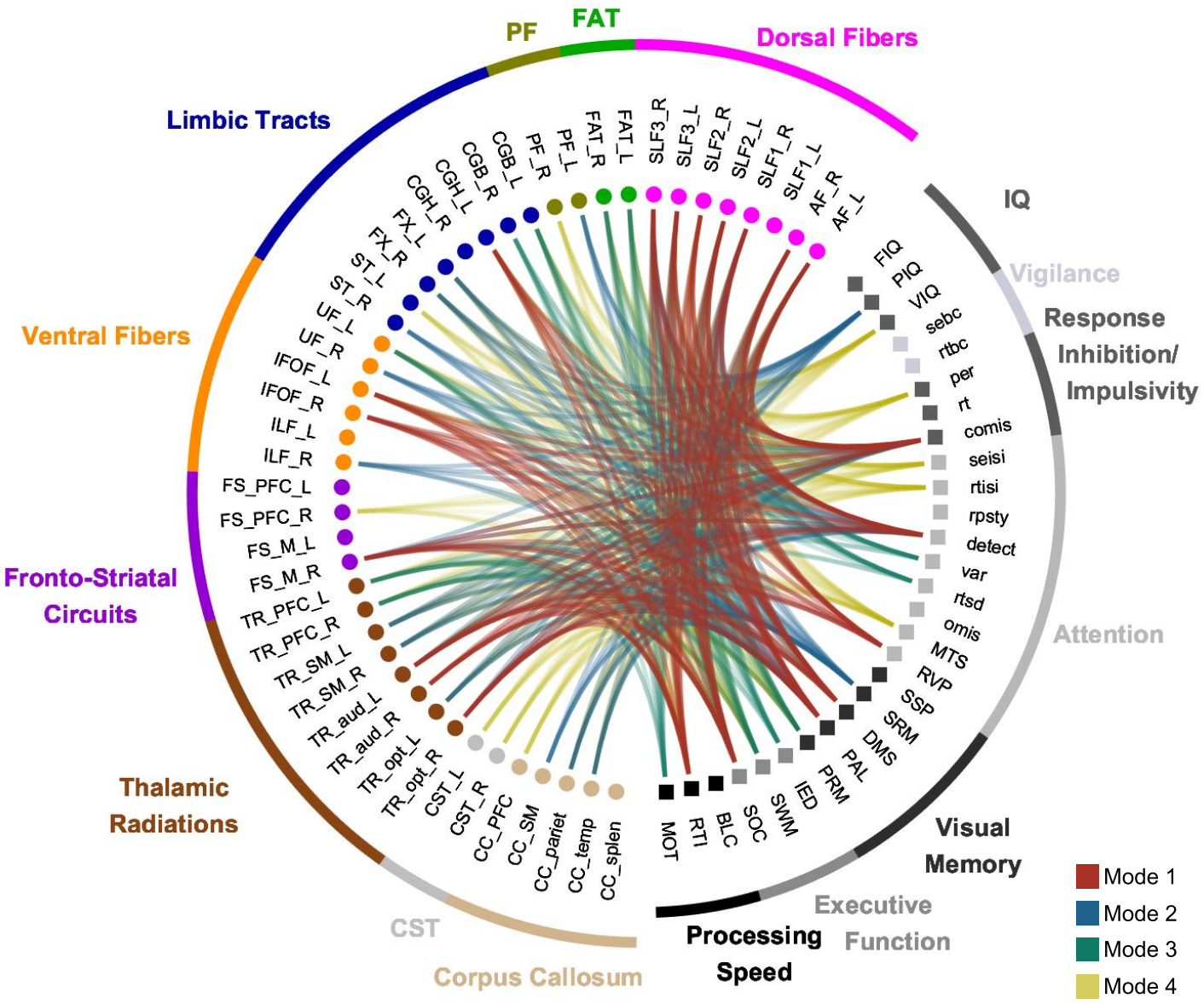
Figure S27: Circos plots of brain-function relationships revealed by canonical correlation analysis (CCA).

Potential associations between neuropsychological tests and diffusion index Z-scores of white matter tracts. (A) CCA of MD Z-scores and neuropsychological assessment, (B) CCA of RD Z-scores and neuropsychological assessment, (C) CCA of AD Z-scores and neuropsychological assessment.

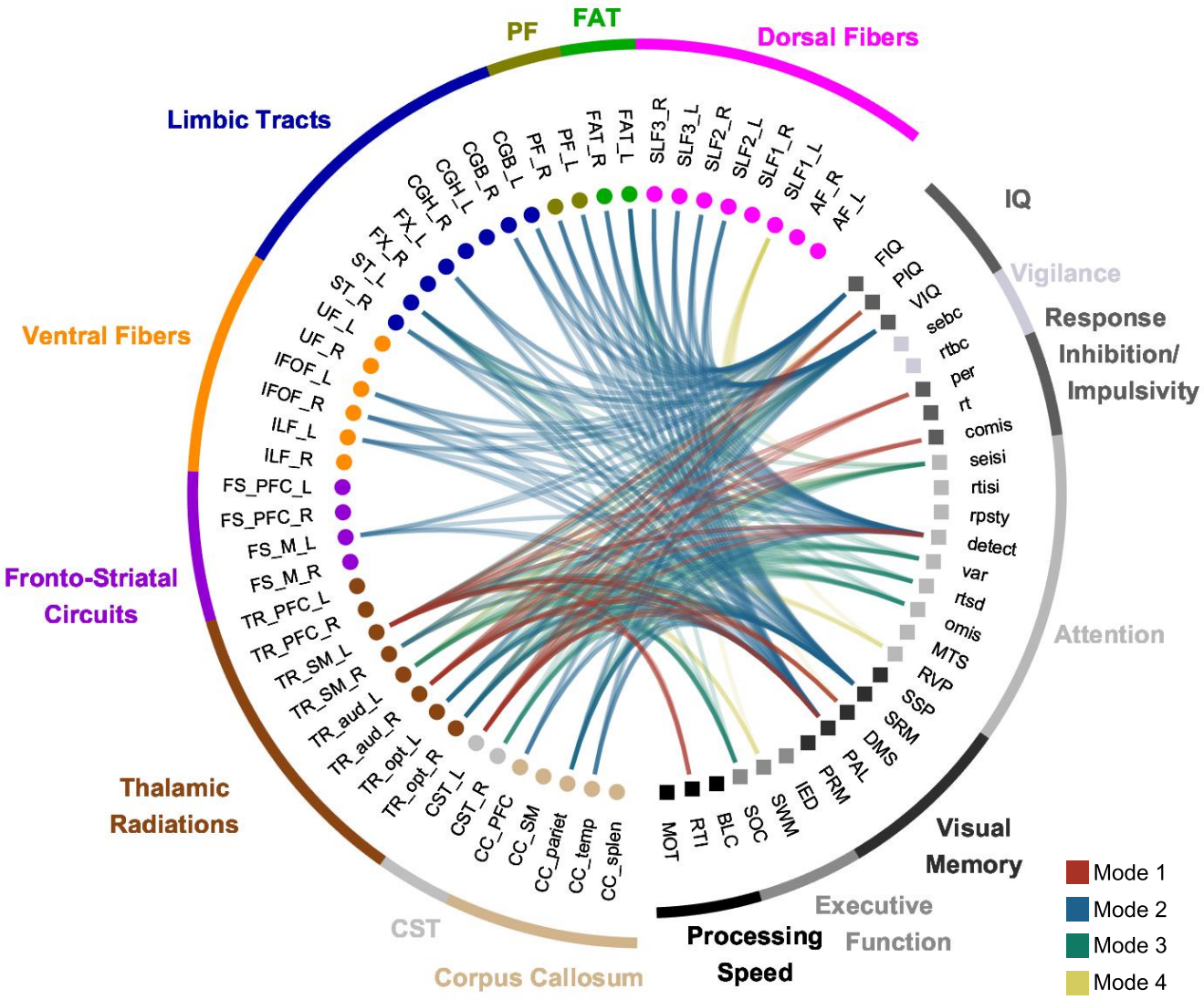
(A) CCA of MD Z-scores and neuropsychological assessment



(B) CCA of RD Z-scores and neuropsychological assessment



(C) CCA of AD Z-scores and neuropsychological assessment



Supplementary Results

Result S1-1: Mean deviation effect size of people with ADHD

The effect size (ES) of mean deviation of people with ADHD, lower and upper bound of the confidence interval (CI). The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.20	-0.32	-0.08	-3.40	0.000	0.009	2	Yes
AF_R	-0.19	-0.31	-0.07	-3.15	0.001	0.010	4	Yes
SLF1_L	-0.06	-0.18	0.06	-0.97	0.167	0.209	36	No
SLF1_R	-0.16	-0.28	-0.04	-2.68	0.004	0.016	11	Yes
SLF2_L	-0.10	-0.22	0.01	-1.72	0.043	0.072	27	No
SLF2_R	-0.13	-0.25	-0.02	-2.23	0.013	0.032	19	Yes
SLF3_L	-0.10	-0.21	0.02	-1.60	0.055	0.085	29	No
SLF3_R	-0.12	-0.23	0.00	-1.93	0.027	0.047	26	Yes
FAT_L	-0.01	-0.13	0.10	-0.21	0.416	0.426	44	No
FAT_R	-0.12	-0.24	0.00	-1.96	0.025	0.048	24	Yes
PF_L	-0.12	-0.24	0.00	-2.03	0.022	0.043	23	Yes
PF_R	0.04	-0.08	0.16	0.68	0.249	0.295	38	No
CGB_L	-0.25	-0.37	-0.13	-4.20	<0.001	0.001	1	Yes
CGB_R	-0.08	-0.20	0.03	-1.39	0.083	0.125	30	No
CGH_L	-0.01	-0.13	0.10	-0.22	0.415	0.434	43	No
CGH_R	-0.06	-0.18	0.05	-1.07	0.143	0.190	34	No
FX_L	-0.14	-0.26	-0.02	-2.34	0.010	0.026	17	Yes
FX_R	-0.03	-0.15	0.09	-0.47	0.319	0.368	39	No
ST_L	-0.01	-0.13	0.11	-0.15	0.440	0.440	45	No
ST_R	-0.02	-0.13	0.10	-0.27	0.394	0.422	42	No
UF_L	-0.12	-0.24	0.00	-2.04	0.021	0.044	22	Yes
UF_R	-0.13	-0.25	-0.01	-2.16	0.016	0.034	21	Yes
IFOF_L	-0.16	-0.27	-0.04	-2.62	0.005	0.018	12	Yes
IFOF_R	-0.18	-0.29	-0.06	-2.92	0.002	0.017	5	Yes
ILF_L	-0.02	-0.14	0.10	-0.32	0.375	0.411	41	No
ILF_R	0.07	-0.05	0.18	1.10	0.136	0.185	33	No
FS_PFC_L	-0.15	-0.27	-0.04	-2.56	0.006	0.019	13	Yes

FS_PFC_R	-0.16	-0.28	-0.05	-2.75	0.003	0.016	9	Yes
FS_M_L	-0.12	-0.23	0.00	-1.95	0.026	0.047	25	Yes
FS_M_R	-0.15	-0.26	-0.03	-2.45	0.007	0.022	15	Yes
TR_PFC_L	-0.15	-0.27	-0.03	-2.50	0.006	0.021	14	Yes
TR_PFC_R	-0.13	-0.25	-0.01	-2.19	0.015	0.033	20	Yes
TR_SM_L	-0.13	-0.25	-0.02	-2.25	0.013	0.032	18	Yes
TR_SM_R	-0.07	-0.19	0.05	-1.21	0.114	0.160	32	No
TR_aud_L	-0.16	-0.28	-0.05	-2.73	0.003	0.015	10	Yes
TR_aud_R	-0.19	-0.31	-0.07	-3.22	0.001	0.011	3	Yes
TR_opt_L	-0.05	-0.17	0.07	-0.87	0.192	0.233	37	No
TR_opt_R	-0.02	-0.14	0.10	-0.36	0.359	0.404	40	No
CST_L	-0.10	-0.22	0.02	-1.67	0.048	0.078	28	No
CST_R	-0.07	-0.19	0.04	-1.24	0.108	0.157	31	No
CC_PFC	-0.17	-0.29	-0.06	-2.91	0.002	0.015	6	Yes
CC_SM	-0.14	-0.26	-0.02	-2.38	0.009	0.025	16	Yes
CC_pariet	-0.06	-0.18	0.06	-1.04	0.151	0.194	35	No
CC_temp	-0.17	-0.29	-0.05	-2.88	0.002	0.014	7	Yes
CC_splen	-0.17	-0.29	-0.05	-2.84	0.002	0.014	8	Yes

Result S1-2: Mean deviation effect size of people with ASD

The effect size (ES) of the mean deviation of people with ASD, lower and upper bound of the confidence interval (CI). The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of the p-value, and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.33	-0.49	-0.18	-4.43	<0.001	<0.001	3	Yes
AF_R	-0.23	-0.38	-0.08	-3.02	0.001	0.005	12	Yes
SLF1_L	-0.03	-0.18	0.12	-0.38	0.352	0.396	40	No
SLF1_R	-0.01	-0.16	0.14	-0.10	0.460	0.460	45	No
SLF2_L	-0.22	-0.37	-0.07	-2.85	0.002	0.007	15	Yes
SLF2_R	-0.22	-0.37	-0.07	-2.94	0.002	0.006	13	Yes
SLF3_L	-0.19	-0.34	-0.04	-2.47	0.007	0.016	20	Yes
SLF3_R	-0.25	-0.40	-0.09	-3.25	0.001	0.004	9	Yes
FAT_L	-0.26	-0.41	-0.11	-3.44	<0.001	0.003	5	Yes
FAT_R	-0.16	-0.31	-0.01	-2.11	0.018	0.033	25	Yes
PF_L	-0.26	-0.41	-0.10	-3.38	<0.001	0.003	7	Yes
PF_R	-0.04	-0.19	0.10	-0.58	0.283	0.344	37	No
CGB_L	-0.35	-0.50	-0.20	-4.61	<0.001	<0.001	2	Yes
CGB_R	-0.17	-0.32	-0.02	-2.20	0.014	0.028	23	Yes
CGH_L	-0.09	-0.24	0.06	-1.20	0.116	0.180	29	No
CGH_R	-0.17	-0.32	-0.02	-2.22	0.014	0.029	22	Yes
FX_L	-0.15	-0.30	0.00	-2.04	0.022	0.037	26	Yes
FX_R	-0.15	-0.30	0.00	-1.99	0.024	0.040	27	Yes
ST_L	-0.08	-0.23	0.07	-1.04	0.150	0.224	30	No
ST_R	0.02	-0.13	0.16	0.21	0.418	0.427	44	No
UF_L	-0.31	-0.46	-0.16	-4.06	<0.001	<0.001	4	Yes
UF_R	-0.26	-0.41	-0.11	-3.43	<0.001	0.003	6	Yes
IFOF_L	-0.24	-0.39	-0.09	-3.14	0.001	0.004	10	Yes
IFOF_R	-0.22	-0.36	-0.07	-2.85	0.002	0.007	16	Yes
ILF_L	-0.03	-0.18	0.12	-0.38	0.352	0.406	39	No
ILF_R	-0.04	-0.19	0.11	-0.50	0.309	0.366	38	No
FS_PFC_L	-0.25	-0.40	-0.10	-3.26	0.001	0.004	8	Yes
FS_PFC_R	-0.21	-0.36	-0.06	-2.80	0.003	0.007	17	Yes

FS_M_L	-0.04	-0.19	0.10	-0.59	0.278	0.347	36	No
FS_M_R	-0.07	-0.22	0.08	-0.89	0.187	0.254	33	No
TR_PFC_L	-0.20	-0.35	-0.05	-2.68	0.004	0.010	18	Yes
TR_PFC_R	-0.19	-0.34	-0.04	-2.49	0.007	0.016	19	Yes
TR_SM_L	-0.07	-0.22	0.08	-0.95	0.172	0.242	32	No
TR_SM_R	-0.02	-0.17	0.13	-0.28	0.390	0.418	42	No
TR_aud_L	-0.23	-0.38	-0.08	-3.05	0.001	0.005	11	Yes
TR_aud_R	-0.18	-0.33	-0.03	-2.34	0.010	0.022	21	Yes
TR_opt_L	-0.02	-0.17	0.13	-0.24	0.406	0.425	43	No
TR_opt_R	-0.02	-0.17	0.13	-0.30	0.381	0.418	41	No
CST_L	0.06	-0.09	0.21	0.81	0.208	0.268	35	No
CST_R	0.11	-0.04	0.26	1.47	0.072	0.116	28	No
CC_PFC	-0.47	-0.63	-0.31	-6.20	<0.001	<0.001	1	Yes
CC_SM	-0.16	-0.31	-0.01	-2.13	0.017	0.033	24	Yes
CC_pariet	-0.07	-0.21	0.08	-0.88	0.191	0.253	34	No
CC_temp	-0.22	-0.37	-0.07	-2.91	0.002	0.007	14	Yes
CC_splen	-0.07	-0.22	0.08	-0.96	0.169	0.245	31	No

Result S1-3: Mean deviation effect size of siblings of people with ADHD

The effect size (ES) of the mean deviation of siblings of people with ADHD, lower and upper bound of confidence interval (CI). The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	0.01	-0.16	0.19	0.15	0.440	0.507	39	No
AF_R	-0.08	-0.26	0.10	-0.91	0.183	0.435	19	No
SLF1_L	0.06	-0.11	0.24	0.71	0.239	0.468	23	No
SLF1_R	0.06	-0.12	0.24	0.63	0.264	0.494	24	No
SLF2_L	-0.03	-0.21	0.15	-0.36	0.360	0.463	35	No
SLF2_R	-0.01	-0.18	0.17	-0.06	0.478	0.524	41	No
SLF3_L	-0.03	-0.21	0.14	-0.38	0.351	0.479	33	No
SLF3_R	-0.04	-0.22	0.14	-0.45	0.326	0.506	29	No
FAT_L	0.15	-0.03	0.33	1.61	0.054	0.817	3	No
FAT_R	-0.07	-0.25	0.11	-0.74	0.232	0.474	22	No
PF_L	-0.02	-0.20	0.16	-0.21	0.415	0.492	38	No
PF_R	0.19	0.01	0.37	2.04	0.022	0.973	1	No
CGB_L	-0.13	-0.31	0.05	-1.44	0.076	0.491	7	No
CGB_R	0.08	-0.10	0.26	0.91	0.181	0.453	18	No
CGH_L	0.00	-0.17	0.18	0.04	0.484	0.518	42	No
CGH_R	0.09	-0.09	0.27	0.98	0.166	0.497	15	No
FX_L	-0.12	-0.30	0.06	-1.31	0.097	0.435	10	No
FX_R	-0.01	-0.19	0.17	-0.11	0.455	0.512	40	No
ST_L	0.11	-0.06	0.29	1.26	0.104	0.426	11	No
ST_R	0.06	-0.12	0.24	0.63	0.264	0.475	25	No
UF_L	0.08	-0.10	0.25	0.83	0.204	0.460	20	No
UF_R	-0.03	-0.21	0.14	-0.38	0.353	0.467	34	No
IFOF_L	0.05	-0.12	0.23	0.59	0.278	0.447	28	No
IFOF_R	-0.13	-0.31	0.05	-1.47	0.072	0.542	6	No
ILF_L	0.11	-0.06	0.29	1.26	0.105	0.394	12	No
ILF_R	0.15	-0.03	0.33	1.64	0.052	1.000	2	No
FS_PFC_L	0.00	-0.18	0.18	0.03	0.489	0.512	43	No
FS_PFC_R	-0.04	-0.22	0.14	-0.42	0.336	0.504	30	No

FS_M_L	-0.11	-0.29	0.07	-1.21	0.113	0.393	13	No
FS_M_R	-0.02	-0.20	0.16	-0.25	0.403	0.490	37	No
TR_PFC_L	0.14	-0.04	0.32	1.52	0.065	0.588	5	No
TR_PFC_R	0.06	-0.12	0.24	0.62	0.267	0.462	26	No
TR_SM_L	-0.07	-0.25	0.11	-0.80	0.213	0.457	21	No
TR_SM_R	-0.05	-0.23	0.12	-0.60	0.275	0.458	27	No
TR_aud_L	0.08	-0.09	0.26	0.93	0.176	0.466	17	No
TR_aud_R	0.00	-0.18	0.18	0.01	0.495	0.506	44	No
TR_opt_L	0.13	-0.05	0.31	1.42	0.079	0.446	8	No
TR_opt_R	-0.03	-0.21	0.15	-0.33	0.370	0.463	36	No
CST_L	0.09	-0.09	0.26	0.94	0.175	0.493	16	No
CST_R	0.15	-0.03	0.32	1.60	0.056	0.633	4	No
CC_PFC	-0.10	-0.28	0.08	-1.10	0.137	0.439	14	No
CC_SM	-0.04	-0.21	0.14	-0.39	0.347	0.504	31	No
CC_pariet	0.13	-0.05	0.31	1.40	0.082	0.410	9	No
CC_temp	0.04	-0.14	0.21	0.39	0.349	0.491	32	No
CC_splen	0.00	-0.18	0.18	0.01	0.496	0.496	45	No

Result S1-4: Mean deviation effect size of siblings of people with ASD

The effect size (ES) of the mean deviation of siblings of people with ASD, lower and upper bound of the confidence interval (CI). The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.15	-0.38	0.09	-1.24	0.109	0.223	22	No
AF_R	-0.17	-0.40	0.06	-1.44	0.077	0.165	21	No
SLF1_L	-0.12	-0.35	0.11	-1.04	0.152	0.262	26	No
SLF1_R	-0.07	-0.30	0.16	-0.59	0.277	0.357	35	No
SLF2_L	-0.30	-0.53	-0.06	-2.51	0.007	0.032	10	Yes
SLF2_R	-0.42	-0.66	-0.18	-3.56	<0.001	0.008	2	Yes
SLF3_L	-0.26	-0.50	-0.03	-2.23	0.015	0.044	15	Yes
SLF3_R	-0.20	-0.43	0.04	-1.68	0.049	0.115	19	No
FAT_L	-0.34	-0.58	-0.10	-2.88	0.003	0.024	5	Yes
FAT_R	-0.30	-0.54	-0.07	-2.56	0.006	0.031	9	Yes
PF_L	-0.09	-0.33	0.14	-0.80	0.212	0.308	31	No
PF_R	-0.14	-0.37	0.09	-1.17	0.124	0.223	25	No
CGB_L	-0.32	-0.56	-0.09	-2.74	0.004	0.025	7	Yes
CGB_R	-0.20	-0.44	0.03	-1.72	0.045	0.119	17	No
CGH_L	-0.20	-0.43	0.03	-1.70	0.047	0.118	18	No
CGH_R	-0.14	-0.38	0.09	-1.22	0.114	0.223	23	No
FX_L	0.06	-0.17	0.29	0.48	0.317	0.386	37	No
FX_R	-0.10	-0.33	0.13	-0.85	0.199	0.308	29	No
ST_L	0.11	-0.13	0.34	0.89	0.187	0.301	28	No
ST_R	0.02	-0.21	0.25	0.14	0.443	0.453	44	No
UF_L	-0.24	-0.48	-0.01	-2.07	0.021	0.060	16	No
UF_R	-0.14	-0.38	0.09	-1.22	0.114	0.214	24	No
IFOF_L	-0.26	-0.50	-0.03	-2.24	0.014	0.045	14	Yes
IFOF_R	-0.33	-0.57	-0.10	-2.83	0.003	0.023	6	Yes
ILF_L	-0.10	-0.33	0.13	-0.85	0.199	0.299	30	No
ILF_R	0.04	-0.19	0.27	0.34	0.366	0.422	39	No
FS_PFC_L	-0.39	-0.63	-0.15	-3.28	0.001	0.009	4	Yes
FS_PFC_R	-0.39	-0.63	-0.15	-3.31	0.001	0.011	3	Yes

FS_M_L	-0.12	-0.35	0.11	-0.99	0.162	0.270	27	No
FS_M_R	-0.04	-0.27	0.19	-0.35	0.363	0.430	38	No
TR_PFC_L	-0.31	-0.55	-0.07	-2.62	0.005	0.030	8	Yes
TR_PFC_R	-0.29	-0.52	-0.05	-2.43	0.009	0.033	12	Yes
TR_SM_L	-0.29	-0.53	-0.06	-2.47	0.008	0.033	11	Yes
TR_SM_R	-0.04	-0.27	0.19	-0.34	0.368	0.414	40	No
TR_aud_L	-0.27	-0.51	-0.04	-2.30	0.012	0.042	13	Yes
TR_aud_R	0.03	-0.20	0.26	0.24	0.406	0.425	43	No
TR_opt_L	0.00	-0.24	0.23	-0.04	0.483	0.483	45	No
TR_opt_R	0.07	-0.16	0.30	0.59	0.279	0.348	36	No
CST_L	-0.04	-0.27	0.19	-0.31	0.378	0.415	41	No
CST_R	0.07	-0.16	0.30	0.62	0.269	0.355	34	No
CC_PFC	-0.46	-0.70	-0.21	-3.87	<0.001	0.005	1	Yes
CC_SM	-0.09	-0.32	0.14	-0.76	0.223	0.314	32	No
CC_pariet	0.08	-0.15	0.31	0.66	0.256	0.349	33	No
CC_temp	-0.17	-0.40	0.06	-1.44	0.077	0.172	20	No
CC_splen	-0.03	-0.26	0.20	-0.26	0.397	0.426	42	No

Result S2-1: Mean deviation effect size of children with ADHD

The effect size of the mean deviation of children with ADHD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.19	-0.35	-0.03	-2.29	0.012	0.052	10	Yes
AF_R	-0.29	-0.45	-0.12	-3.51	<0.001	0.007	2	Yes
SLF1_L	-0.06	-0.22	0.10	-0.75	0.228	0.278	37	No
SLF1_R	-0.10	-0.26	0.06	-1.19	0.119	0.178	30	No
SLF2_L	-0.15	-0.32	0.01	-1.87	0.032	0.062	23	No
SLF2_R	-0.19	-0.35	-0.02	-2.25	0.013	0.054	11	Yes
SLF3_L	-0.13	-0.29	0.03	-1.55	0.062	0.107	26	No
SLF3_R	-0.21	-0.38	-0.05	-2.57	0.006	0.042	6	Yes
FAT_L	-0.03	-0.19	0.14	-0.32	0.374	0.391	43	No
FAT_R	-0.18	-0.35	-0.02	-2.22	0.014	0.052	12	Yes
PF_L	-0.18	-0.34	-0.02	-2.19	0.015	0.049	14	Yes
PF_R	0.05	-0.11	0.21	0.65	0.260	0.308	38	No
CGB_L	-0.33	-0.50	-0.16	-4.01	<0.001	0.002	1	Yes
CGB_R	-0.03	-0.19	0.13	-0.33	0.370	0.396	42	No
CGH_L	-0.17	-0.33	-0.01	-2.09	0.019	0.051	17	Yes
CGH_R	-0.03	-0.19	0.13	-0.40	0.346	0.380	41	No
FX_L	-0.11	-0.28	0.05	-1.37	0.086	0.144	27	No
FX_R	0.00	-0.16	0.17	0.04	0.482	0.482	45	No
ST_L	-0.05	-0.21	0.12	-0.55	0.292	0.328	40	No
ST_R	-0.18	-0.34	-0.01	-2.16	0.016	0.049	15	Yes
UF_L	-0.17	-0.34	-0.01	-2.10	0.019	0.053	16	Yes
UF_R	-0.14	-0.30	0.03	-1.65	0.050	0.091	25	No
IFOF_L	-0.24	-0.40	-0.07	-2.87	0.002	0.026	4	Yes
IFOF_R	-0.20	-0.37	-0.04	-2.47	0.007	0.047	7	Yes
ILF_L	-0.14	-0.30	0.02	-1.73	0.043	0.081	24	No
ILF_R	-0.01	-0.17	0.15	-0.10	0.460	0.470	44	No
FS_PFC_L	-0.22	-0.38	-0.06	-2.67	0.004	0.038	5	Yes
FS_PFC_R	-0.18	-0.35	-0.02	-2.22	0.014	0.048	13	Yes
FS_M_L	-0.11	-0.27	0.05	-1.33	0.094	0.150	28	No

FS_M_R	-0.25	-0.41	-0.09	-3.04	0.001	0.021	3	Yes
TR_PFC_L	-0.17	-0.33	-0.01	-2.06	0.020	0.048	19	Yes
TR_PFC_R	-0.08	-0.24	0.08	-0.94	0.176	0.232	34	No
TR_SM_L	-0.17	-0.33	-0.01	-2.07	0.020	0.051	18	Yes
TR_SM_R	-0.08	-0.24	0.08	-0.95	0.171	0.233	33	No
TR_aud_L	-0.20	-0.36	-0.04	-2.44	0.008	0.040	9	Yes
TR_aud_R	-0.20	-0.36	-0.04	-2.44	0.008	0.045	8	Yes
TR_opt_L	-0.16	-0.32	0.01	-1.91	0.029	0.060	22	No
TR_opt_R	-0.05	-0.21	0.11	-0.63	0.266	0.307	39	No
CST_L	-0.06	-0.23	0.10	-0.78	0.218	0.272	36	No
CST_R	-0.11	-0.27	0.05	-1.31	0.096	0.150	29	No
CC_PFC	-0.08	-0.24	0.09	-0.91	0.182	0.234	35	No
CC_SM	-0.10	-0.26	0.06	-1.19	0.119	0.172	31	No
CC_pariet	-0.08	-0.24	0.08	-0.96	0.169	0.238	32	No
CC_temp	-0.16	-0.32	0.00	-1.95	0.026	0.060	20	No
CC_splen	-0.16	-0.32	0.00	-1.95	0.027	0.057	21	No

Result S2-2: Mean deviation effect size of adults with ADHD

The effect size of the mean deviation of adults with ADHD, lower and upper bound of confidence interval. The t-statistics, p-value, and adjusted p value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.22	-0.39	-0.05	-2.51	0.007	0.099	3	No
AF_R	-0.08	-0.25	0.09	-0.95	0.172	0.298	26	No
SLF1_L	-0.05	-0.22	0.12	-0.61	0.270	0.328	37	No
SLF1_R	-0.23	-0.40	-0.05	-2.59	0.005	0.120	2	No
SLF2_L	-0.05	-0.22	0.12	-0.61	0.270	0.320	38	No
SLF2_R	-0.08	-0.25	0.09	-0.92	0.181	0.301	27	No
SLF3_L	-0.06	-0.24	0.11	-0.74	0.231	0.324	32	No
SLF3_R	-0.01	-0.18	0.16	-0.14	0.443	0.464	43	No
FAT_L	0.00	-0.17	0.17	0.01	0.495	0.495	45	No
FAT_R	-0.06	-0.23	0.11	-0.69	0.245	0.334	33	No
PF_L	-0.06	-0.23	0.11	-0.66	0.255	0.328	35	No
PF_R	0.03	-0.14	0.20	0.30	0.382	0.409	42	No
CGB_L	-0.18	-0.35	0.00	-2.01	0.023	0.115	9	No
CGB_R	-0.14	-0.31	0.03	-1.64	0.051	0.154	15	No
CGH_L	0.15	-0.02	0.32	1.69	0.047	0.151	14	No
CGH_R	-0.09	-0.26	0.08	-1.06	0.146	0.273	24	No
FX_L	-0.17	-0.34	0.00	-1.96	0.026	0.118	10	No
FX_R	-0.07	-0.24	0.10	-0.76	0.224	0.335	30	No
ST_L	0.03	-0.14	0.20	0.31	0.377	0.414	41	No
ST_R	0.15	-0.02	0.32	1.75	0.041	0.169	11	No
UF_L	-0.07	-0.24	0.10	-0.82	0.207	0.321	29	No
UF_R	-0.12	-0.29	0.05	-1.39	0.084	0.180	21	No
IFOF_L	-0.08	-0.25	0.09	-0.90	0.185	0.297	28	No
IFOF_R	-0.14	-0.31	0.03	-1.63	0.052	0.147	16	No
ILF_L	0.11	-0.06	0.28	1.22	0.112	0.230	22	No
ILF_R	0.15	-0.02	0.32	1.70	0.046	0.158	13	No
FS_PFC_L	-0.09	-0.26	0.08	-1.01	0.156	0.281	25	No
FS_PFC_R	-0.15	-0.32	0.02	-1.71	0.045	0.169	12	No
FS_M_L	-0.12	-0.30	0.05	-1.42	0.079	0.186	19	No

FS_M_R	-0.06	-0.23	0.11	-0.69	0.246	0.325	34	No
TR_PFC_L	-0.13	-0.30	0.04	-1.47	0.071	0.179	18	No
TR_PFC_R	-0.19	-0.36	-0.01	-2.13	0.017	0.156	5	No
TR_SM_L	-0.10	-0.27	0.08	-1.09	0.138	0.271	23	No
TR_SM_R	-0.07	-0.24	0.10	-0.76	0.225	0.327	31	No
TR_aud_L	-0.12	-0.29	0.05	-1.42	0.079	0.178	20	No
TR_aud_R	-0.18	-0.36	-0.01	-2.11	0.018	0.119	7	No
TR_opt_L	0.06	-0.12	0.23	0.63	0.264	0.330	36	No
TR_opt_R	0.01	-0.16	0.18	0.10	0.461	0.472	44	No
CST_L	-0.13	-0.31	0.04	-1.54	0.063	0.167	17	No
CST_R	-0.05	-0.22	0.13	-0.52	0.302	0.339	40	No
CC_PFC	-0.28	-0.45	-0.11	-3.23	0.001	0.035	1	Yes
CC_SM	-0.19	-0.36	-0.01	-2.14	0.017	0.191	4	No
CC_pariet	-0.05	-0.22	0.13	-0.52	0.301	0.348	39	No
CC_temp	-0.18	-0.36	-0.01	-2.12	0.018	0.135	6	No
CC_splen	-0.18	-0.35	-0.01	-2.06	0.021	0.117	8	No

Result S2-3: Mean deviation effect size of children with ASD

The effect size of the mean deviation of children with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.30	-0.49	-0.10	-3.04	0.001	0.011	6	Yes
AF_R	-0.23	-0.42	-0.03	-2.30	0.012	0.035	15	Yes
SLF1_L	0.08	-0.12	0.27	0.79	0.217	0.263	37	No
SLF1_R	0.07	-0.12	0.27	0.74	0.229	0.271	38	No
SLF2_L	-0.25	-0.44	-0.05	-2.51	0.007	0.028	11	Yes
SLF2_R	-0.20	-0.40	-0.01	-2.08	0.020	0.048	19	Yes
SLF3_L	-0.16	-0.36	0.03	-1.67	0.049	0.079	28	No
SLF3_R	-0.24	-0.43	-0.04	-2.41	0.009	0.033	12	Yes
FAT_L	-0.22	-0.41	-0.02	-2.22	0.014	0.040	16	Yes
FAT_R	-0.16	-0.36	0.03	-1.66	0.050	0.077	29	No
PF_L	-0.26	-0.46	-0.07	-2.68	0.004	0.027	7	Yes
PF_R	-0.11	-0.30	0.08	-1.10	0.137	0.186	33	No
CGB_L	-0.31	-0.51	-0.11	-3.16	0.001	0.009	5	Yes
CGB_R	-0.19	-0.38	0.01	-1.92	0.029	0.054	24	No
CGH_L	-0.11	-0.31	0.08	-1.16	0.125	0.181	31	No
CGH_R	-0.17	-0.36	0.02	-1.74	0.043	0.071	27	No
FX_L	-0.21	-0.40	-0.02	-2.15	0.017	0.043	18	Yes
FX_R	-0.20	-0.39	0.00	-2.00	0.024	0.051	21	No
ST_L	-0.23	-0.43	-0.04	-2.37	0.010	0.032	14	Yes
ST_R	-0.10	-0.30	0.09	-1.06	0.145	0.192	34	No
UF_L	-0.41	-0.61	-0.21	-4.20	<0.001	<0.001	3	Yes
UF_R	-0.42	-0.62	-0.22	-4.30	<0.001	<0.001	2	Yes
IFOF_L	-0.25	-0.45	-0.06	-2.59	0.005	0.031	8	Yes
IFOF_R	-0.33	-0.53	-0.13	-3.37	0.001	0.006	4	Yes
ILF_L	-0.19	-0.39	0.00	-1.95	0.027	0.053	23	No
ILF_R	-0.18	-0.37	0.02	-1.79	0.038	0.066	26	No
FS_PFC_L	-0.25	-0.45	-0.06	-2.57	0.006	0.029	9	Yes
FS_PFC_R	-0.22	-0.41	-0.02	-2.20	0.015	0.040	17	Yes
FS_M_L	-0.07	-0.26	0.12	-0.74	0.231	0.266	39	No

FS_M_R	-0.14	-0.34	0.05	-1.47	0.072	0.108	30	No
TR_PFC_L	-0.19	-0.39	0.00	-1.96	0.026	0.054	22	No
TR_PFC_R	-0.23	-0.43	-0.04	-2.39	0.009	0.032	13	Yes
TR_SM_L	-0.02	-0.22	0.17	-0.25	0.401	0.410	44	No
TR_SM_R	-0.02	-0.22	0.17	-0.23	0.408	0.408	45	No
TR_aud_L	-0.10	-0.29	0.10	-0.98	0.163	0.210	35	No
TR_aud_R	-0.19	-0.38	0.01	-1.90	0.030	0.055	25	No
TR_opt_L	-0.05	-0.25	0.14	-0.56	0.289	0.325	40	No
TR_opt_R	-0.20	-0.39	0.00	-2.02	0.023	0.052	20	No
CST_L	0.05	-0.15	0.24	0.46	0.323	0.355	41	No
CST_R	0.09	-0.10	0.28	0.93	0.177	0.222	36	No
CC_PFC	-0.43	-0.63	-0.23	-4.37	<0.001	<0.001	1	Yes
CC_SM	-0.04	-0.23	0.15	-0.40	0.347	0.371	42	No
CC_pariet	-0.03	-0.22	0.16	-0.28	0.390	0.408	43	No
CC_temp	-0.25	-0.45	-0.06	-2.57	0.006	0.026	10	Yes
CC_splen	-0.11	-0.30	0.08	-1.14	0.128	0.181	32	No

Result S2-4: Mean deviation effect size of adults with ASD

The effect size of the mean deviation of adults with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.39	-0.63	-0.15	-3.29	0.001	0.009	4	Yes
AF_R	-0.23	-0.47	0.00	-1.96	0.027	0.111	11	No
SLF1_L	-0.16	-0.40	0.07	-1.36	0.088	0.166	24	No
SLF1_R	-0.12	-0.35	0.12	-0.98	0.166	0.226	33	No
SLF2_L	-0.17	-0.41	0.06	-1.46	0.074	0.166	20	No
SLF2_R	-0.25	-0.48	-0.01	-2.07	0.021	0.119	8	No
SLF3_L	-0.22	-0.45	0.02	-1.83	0.036	0.115	14	No
SLF3_R	-0.26	-0.49	-0.02	-2.16	0.017	0.110	7	No
FAT_L	-0.32	-0.56	-0.08	-2.67	0.005	0.042	5	Yes
FAT_R	-0.15	-0.39	0.08	-1.30	0.099	0.171	26	No
PF_L	-0.24	-0.48	-0.01	-2.04	0.023	0.113	9	No
PF_R	0.05	-0.18	0.28	0.42	0.337	0.389	39	No
CGB_L	-0.40	-0.64	-0.16	-3.36	0.001	0.010	3	Yes
CGB_R	-0.13	-0.37	0.10	-1.13	0.132	0.198	30	No
CGH_L	-0.06	-0.29	0.18	-0.48	0.316	0.375	38	No
CGH_R	-0.16	-0.40	0.07	-1.39	0.085	0.166	23	No
FX_L	-0.06	-0.29	0.17	-0.52	0.304	0.380	36	No
FX_R	-0.07	-0.30	0.16	-0.60	0.274	0.353	35	No
ST_L	0.14	-0.09	0.38	1.21	0.115	0.192	27	No
ST_R	0.22	-0.02	0.45	1.85	0.035	0.119	13	No
UF_L	-0.18	-0.41	0.06	-1.50	0.069	0.163	19	No
UF_R	-0.06	-0.29	0.18	-0.48	0.316	0.384	37	No
IFOF_L	-0.21	-0.44	0.03	-1.77	0.041	0.108	17	No
IFOF_R	-0.04	-0.28	0.19	-0.36	0.360	0.405	40	No
ILF_L	0.21	-0.02	0.45	1.78	0.040	0.111	16	No
ILF_R	0.16	-0.07	0.39	1.35	0.091	0.164	25	No
FS_PFC_L	-0.24	-0.47	0.00	-1.99	0.026	0.115	10	No
FS_PFC_R	-0.21	-0.44	0.03	-1.73	0.044	0.110	18	No
FS_M_L	-0.01	-0.24	0.22	-0.08	0.469	0.469	45	No

FS_M_R	0.01	-0.22	0.24	0.09	0.463	0.474	44	No
TR_PFC_L	-0.22	-0.45	0.02	-1.81	0.037	0.111	15	No
TR_PFC_R	-0.12	-0.35	0.11	-1.02	0.155	0.225	31	No
TR_SM_L	-0.14	-0.37	0.10	-1.15	0.128	0.198	29	No
TR_SM_R	-0.02	-0.25	0.21	-0.15	0.439	0.470	42	No
TR_aud_L	-0.43	-0.68	-0.19	-3.64	<0.001	0.006	2	Yes
TR_aud_R	-0.17	-0.40	0.07	-1.40	0.083	0.169	22	No
TR_opt_L	0.04	-0.19	0.27	0.34	0.368	0.404	41	No
TR_opt_R	0.22	-0.01	0.46	1.87	0.033	0.123	12	No
CST_L	0.08	-0.15	0.32	0.71	0.239	0.316	34	No
CST_R	0.14	-0.09	0.37	1.18	0.122	0.196	28	No
CC_PFC	-0.53	-0.78	-0.28	-4.44	<0.001	0.001	1	Yes
CC_SM	-0.32	-0.55	-0.08	-2.66	0.005	0.036	6	Yes
CC_pariet	-0.12	-0.35	0.12	-0.99	0.162	0.228	32	No
CC_temp	-0.17	-0.41	0.06	-1.46	0.075	0.160	21	No
CC_splen	-0.01	-0.24	0.22	-0.10	0.461	0.482	43	No

Result S3-1: Mean deviation effect size of men and boys with ADHD

Effect size of mean deviation of men and boys with ADHD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple correction.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.14	-0.28	0.00	-2.02	0.022	0.168	6	No
AF_R	-0.17	-0.31	-0.03	-2.42	0.008	0.124	3	No
SLF1_L	-0.04	-0.17	0.10	-0.53	0.297	0.382	35	No
SLF1_R	-0.13	-0.27	0.00	-1.92	0.028	0.159	8	No
SLF2_L	0.00	-0.13	0.14	0.05	0.479	0.479	45	No
SLF2_R	-0.07	-0.21	0.07	-0.99	0.161	0.329	22	No
SLF3_L	0.02	-0.12	0.16	0.27	0.394	0.432	41	No
SLF3_R	-0.12	-0.26	0.02	-1.69	0.047	0.191	11	No
FAT_L	0.07	-0.07	0.21	1.00	0.159	0.340	21	No
FAT_R	-0.11	-0.25	0.02	-1.62	0.053	0.200	12	No
PF_L	-0.12	-0.26	0.01	-1.78	0.038	0.171	10	No
PF_R	0.04	-0.09	0.18	0.61	0.272	0.360	34	No
CGB_L	-0.18	-0.32	-0.04	-2.55	0.006	0.261	1	No
CGB_R	0.00	-0.14	0.13	-0.07	0.473	0.483	44	No
CGH_L	0.03	-0.11	0.17	0.41	0.343	0.395	39	No
CGH_R	0.01	-0.12	0.15	0.19	0.425	0.445	43	No
FX_L	-0.08	-0.22	0.06	-1.15	0.125	0.313	18	No
FX_R	-0.03	-0.17	0.11	-0.44	0.329	0.390	38	No
ST_L	-0.03	-0.17	0.10	-0.48	0.315	0.383	37	No
ST_R	-0.04	-0.18	0.09	-0.62	0.267	0.375	32	No
UF_L	-0.05	-0.19	0.09	-0.74	0.231	0.371	28	No
UF_R	-0.08	-0.22	0.05	-1.19	0.117	0.330	16	No
IFOF_L	-0.08	-0.21	0.06	-1.10	0.137	0.324	19	No
IFOF_R	-0.09	-0.23	0.05	-1.27	0.103	0.357	13	No
ILF_L	-0.03	-0.17	0.11	-0.40	0.343	0.386	40	No
ILF_R	0.08	-0.05	0.22	1.19	0.117	0.352	15	No
FS_PFC_L	-0.05	-0.19	0.09	-0.72	0.235	0.365	29	No
FS_PFC_R	-0.07	-0.21	0.07	-1.01	0.158	0.355	20	No
FS_M_L	-0.06	-0.20	0.08	-0.83	0.203	0.352	26	No

FS_M_R	-0.09	-0.22	0.05	-1.26	0.105	0.338	14	No
TR_PFC_L	-0.06	-0.20	0.08	-0.88	0.189	0.369	23	No
TR_PFC_R	-0.05	-0.19	0.08	-0.76	0.225	0.375	27	No
TR_SM_L	-0.16	-0.29	-0.02	-2.23	0.013	0.152	4	No
TR_SM_R	-0.14	-0.27	0.00	-1.93	0.027	0.175	7	No
TR_aud_L	-0.15	-0.29	-0.01	-2.12	0.018	0.160	5	No
TR_aud_R	-0.17	-0.31	-0.03	-2.44	0.008	0.176	2	No
TR_opt_L	-0.04	-0.17	0.10	-0.53	0.300	0.374	36	No
TR_opt_R	-0.01	-0.15	0.12	-0.21	0.418	0.448	42	No
CST_L	-0.06	-0.20	0.08	-0.84	0.201	0.363	25	No
CST_R	-0.04	-0.18	0.09	-0.62	0.268	0.366	33	No
CC_PFC	-0.06	-0.20	0.08	-0.88	0.191	0.358	24	No
CC_SM	-0.08	-0.22	0.05	-1.19	0.118	0.312	17	No
CC_pariet	0.05	-0.09	0.18	0.67	0.252	0.377	30	No
CC_temp	-0.13	-0.27	0.01	-1.84	0.034	0.169	9	No
CC_splen	-0.04	-0.18	0.09	-0.64	0.263	0.382	31	No

Result S3-2: Mean deviation effect size of women and girls with ADHD

The effect size of mean deviation of women and girls with ADHD, lower and upper bound of the confidence interval. The t-statistics, p value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.34	-0.58	-0.11	-2.94	0.002	0.010	10	Yes
AF_R	-0.24	-0.47	-0.01	-2.06	0.022	0.041	24	Yes
SLF1_L	-0.11	-0.34	0.12	-0.95	0.173	0.222	35	No
SLF1_R	-0.22	-0.45	0.01	-1.90	0.031	0.053	26	No
SLF2_L	-0.38	-0.61	-0.14	-3.23	0.001	0.006	7	Yes
SLF2_R	-0.28	-0.51	-0.05	-2.40	0.010	0.025	17	Yes
SLF3_L	-0.41	-0.65	-0.17	-3.54	<0.001	0.003	5	Yes
SLF3_R	-0.11	-0.34	0.12	-0.95	0.172	0.227	34	No
FAT_L	-0.21	-0.44	0.02	-1.81	0.037	0.062	27	No
FAT_R	-0.13	-0.36	0.10	-1.10	0.138	0.200	31	No
PF_L	-0.12	-0.35	0.11	-1.01	0.159	0.217	33	No
PF_R	0.04	-0.19	0.26	0.30	0.381	0.408	42	No
CGB_L	-0.45	-0.69	-0.22	-3.91	<0.001	0.002	2	Yes
CGB_R	-0.26	-0.49	-0.03	-2.24	0.014	0.030	21	Yes
CGH_L	-0.12	-0.35	0.11	-1.03	0.153	0.215	32	No
CGH_R	-0.25	-0.48	-0.02	-2.14	0.018	0.037	22	Yes
FX_L	-0.30	-0.53	-0.06	-2.54	0.007	0.021	14	Yes
FX_R	-0.02	-0.25	0.21	-0.18	0.429	0.439	44	No
ST_L	0.04	-0.18	0.27	0.37	0.355	0.400	40	No
ST_R	0.05	-0.18	0.28	0.41	0.340	0.392	39	No
UF_L	-0.28	-0.51	-0.05	-2.43	0.009	0.027	15	Yes
UF_R	-0.24	-0.47	-0.01	-2.05	0.022	0.039	25	Yes
IFOF_L	-0.33	-0.56	-0.09	-2.81	0.003	0.013	11	Yes
IFOF_R	-0.37	-0.61	-0.13	-3.18	0.001	0.006	8	Yes
ILF_L	0.00	-0.22	0.23	0.03	0.487	0.487	45	No
ILF_R	0.02	-0.21	0.25	0.18	0.429	0.449	43	No
FS_PFC_L	-0.41	-0.65	-0.18	-3.55	<0.001	0.004	4	Yes
FS_PFC_R	-0.40	-0.64	-0.16	-3.44	<0.001	0.004	6	Yes
FS_M_L	-0.26	-0.49	-0.03	-2.26	0.013	0.030	20	Yes

FS_M_R	-0.28	-0.51	-0.05	-2.39	0.010	0.024	18	Yes
TR_PFC_L	-0.37	-0.60	-0.13	-3.15	0.001	0.006	9	Yes
TR_PFC_R	-0.31	-0.54	-0.07	-2.63	0.005	0.018	13	Yes
TR_SM_L	-0.10	-0.33	0.13	-0.85	0.200	0.250	36	No
TR_SM_R	0.05	-0.18	0.28	0.43	0.335	0.397	38	No
TR_aud_L	-0.21	-0.44	0.02	-1.77	0.040	0.065	28	No
TR_aud_R	-0.25	-0.48	-0.01	-2.11	0.019	0.037	23	Yes
TR_opt_L	-0.08	-0.31	0.14	-0.73	0.235	0.285	37	No
TR_opt_R	-0.04	-0.27	0.19	-0.33	0.372	0.408	41	No
CST_L	-0.19	-0.42	0.04	-1.65	0.052	0.081	29	No
CST_R	-0.14	-0.37	0.08	-1.24	0.109	0.163	30	No
CC_PFC	-0.44	-0.68	-0.20	-3.80	<0.001	0.002	3	Yes
CC_SM	-0.26	-0.49	-0.03	-2.26	0.013	0.031	19	Yes
CC_pariet	-0.31	-0.54	-0.07	-2.64	0.005	0.019	12	Yes
CC_temp	-0.28	-0.51	-0.05	-2.42	0.009	0.025	16	Yes
CC_splen	-0.46	-0.70	-0.22	-3.96	<0.001	0.004	1	Yes

Result S3-3: Mean deviation effect size of male siblings of people with ADHD

Effect size of mean deviation of male siblings of people with ADHD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	0.24	-0.03	0.51	1.80	0.039	0.434	4	No
AF_R	0.15	-0.11	0.42	1.14	0.130	0.586	10	No
SLF1_L	0.13	-0.13	0.40	1.00	0.161	0.556	13	No
SLF1_R	0.02	-0.24	0.28	0.17	0.434	0.488	40	No
SLF2_L	0.14	-0.12	0.40	1.04	0.152	0.571	12	No
SLF2_R	0.22	-0.04	0.49	1.66	0.052	0.332	7	No
SLF3_L	0.13	-0.13	0.39	0.98	0.165	0.531	14	No
SLF3_R	-0.02	-0.28	0.24	-0.16	0.439	0.481	41	No
FAT_L	0.09	-0.17	0.35	0.66	0.254	0.603	19	No
FAT_R	-0.25	-0.51	0.02	-1.85	0.035	0.526	3	No
PF_L	-0.06	-0.32	0.20	-0.44	0.332	0.554	27	No
PF_R	0.35	0.08	0.62	2.60	0.006	0.268	1	No
CGB_L	-0.13	-0.39	0.14	-0.95	0.174	0.522	15	No
CGB_R	0.16	-0.11	0.42	1.16	0.125	0.705	8	No
CGH_L	-0.02	-0.28	0.24	-0.17	0.434	0.513	38	No
CGH_R	0.06	-0.20	0.33	0.47	0.320	0.554	26	No
FX_L	0.01	-0.26	0.27	0.04	0.483	0.483	45	No
FX_R	-0.07	-0.34	0.19	-0.56	0.289	0.566	23	No
ST_L	0.04	-0.22	0.30	0.30	0.382	0.506	34	No
ST_R	0.09	-0.17	0.35	0.65	0.258	0.580	20	No
UF_L	0.10	-0.17	0.36	0.72	0.239	0.632	17	No
UF_R	0.01	-0.26	0.27	0.04	0.482	0.493	44	No
IFOF_L	0.02	-0.24	0.28	0.15	0.442	0.473	42	No
IFOF_R	-0.03	-0.29	0.24	-0.20	0.421	0.512	37	No
ILF_L	-0.09	-0.35	0.17	-0.68	0.249	0.622	18	No
ILF_R	-0.03	-0.30	0.23	-0.25	0.402	0.502	36	No
FS_PFC_L	0.07	-0.20	0.33	0.49	0.314	0.588	24	No
FS_PFC_R	-0.06	-0.32	0.21	-0.43	0.335	0.539	28	No
FS_M_L	-0.04	-0.30	0.23	-0.28	0.392	0.504	35	No

FS_M_R	0.05	-0.22	0.31	0.34	0.368	0.534	31	No
TR_PFC_L	0.15	-0.11	0.42	1.14	0.130	0.650	9	No
TR_PFC_R	0.05	-0.22	0.31	0.35	0.365	0.547	30	No
TR_SM_L	-0.23	-0.49	0.04	-1.71	0.047	0.420	5	No
TR_SM_R	-0.15	-0.41	0.11	-1.12	0.135	0.550	11	No
TR_aud_L	0.08	-0.19	0.34	0.58	0.283	0.579	22	No
TR_aud_R	0.04	-0.22	0.31	0.32	0.374	0.510	33	No
TR_opt_L	0.33	0.07	0.60	2.50	0.008	0.172	2	No
TR_opt_R	0.05	-0.21	0.31	0.36	0.358	0.556	29	No
CST_L	0.06	-0.20	0.33	0.48	0.317	0.570	25	No
CST_R	0.08	-0.18	0.34	0.58	0.283	0.606	21	No
CC_PFC	-0.04	-0.31	0.22	-0.33	0.371	0.521	32	No
CC_SM	-0.12	-0.38	0.15	-0.87	0.194	0.546	16	No
CC_pariet	0.23	-0.04	0.49	1.70	0.047	0.354	6	No
CC_temp	0.02	-0.24	0.28	0.17	0.434	0.500	39	No
CC_splen	0.02	-0.24	0.28	0.13	0.447	0.468	43	No

Result S3-4: Mean deviation effect size of female siblings of people with ADHD

The effect size of the mean deviation of female siblings of people with ADHD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.15	-0.40	0.09	-1.22	0.113	0.362	14	No
AF_R	-0.31	-0.56	-0.06	-2.48	0.008	0.177	2	No
SLF1_L	0.00	-0.24	0.24	0.01	0.495	0.495	45	No
SLF1_R	0.09	-0.15	0.34	0.76	0.225	0.506	20	No
SLF2_L	-0.15	-0.40	0.09	-1.23	0.112	0.388	13	No
SLF2_R	-0.21	-0.45	0.04	-1.66	0.051	0.326	7	No
SLF3_L	-0.16	-0.40	0.09	-1.26	0.106	0.433	11	No
SLF3_R	-0.06	-0.30	0.19	-0.47	0.321	0.498	29	No
FAT_L	0.19	-0.05	0.44	1.55	0.063	0.352	8	No
FAT_R	0.09	-0.15	0.33	0.72	0.237	0.484	22	No
PF_L	0.01	-0.23	0.25	0.08	0.467	0.478	44	No
PF_R	0.07	-0.18	0.31	0.54	0.296	0.513	26	No
CGB_L	-0.14	-0.38	0.11	-1.10	0.137	0.412	15	No
CGB_R	0.03	-0.21	0.27	0.25	0.400	0.473	38	No
CGH_L	0.03	-0.22	0.27	0.22	0.412	0.463	40	No
CGH_R	0.11	-0.13	0.36	0.90	0.186	0.493	17	No
FX_L	-0.22	-0.47	0.03	-1.78	0.040	0.358	5	No
FX_R	0.04	-0.21	0.28	0.30	0.383	0.478	36	No
ST_L	0.18	-0.07	0.42	1.43	0.079	0.357	10	No
ST_R	0.04	-0.20	0.28	0.31	0.377	0.485	35	No
UF_L	0.06	-0.19	0.30	0.45	0.325	0.472	31	No
UF_R	-0.07	-0.32	0.17	-0.59	0.279	0.523	24	No
IFOF_L	0.08	-0.16	0.32	0.66	0.257	0.503	23	No
IFOF_R	-0.22	-0.47	0.02	-1.81	0.038	0.426	4	No
ILF_L	0.28	0.03	0.52	2.23	0.015	0.221	3	No
ILF_R	0.32	0.07	0.57	2.62	0.006	0.250	1	No
FS_PFC_L	-0.06	-0.30	0.19	-0.45	0.328	0.461	32	No
FS_PFC_R	-0.02	-0.26	0.22	-0.18	0.431	0.473	41	No

FS_M_L	-0.18	-0.42	0.07	-1.43	0.079	0.394	9	No
FS_M_R	-0.07	-0.31	0.17	-0.58	0.283	0.509	25	No
TR_PFC_L	0.13	-0.12	0.37	1.01	0.158	0.445	16	No
TR_PFC_R	0.07	-0.18	0.31	0.53	0.300	0.500	27	No
TR_SM_L	0.06	-0.19	0.30	0.47	0.321	0.515	28	No
TR_SM_R	0.03	-0.21	0.27	0.24	0.407	0.470	39	No
TR_aud_L	0.09	-0.15	0.33	0.73	0.233	0.498	21	No
TR_aud_R	-0.04	-0.28	0.21	-0.30	0.384	0.467	37	No
TR_opt_L	0.01	-0.23	0.25	0.09	0.466	0.488	43	No
TR_opt_R	-0.10	-0.34	0.14	-0.80	0.213	0.505	19	No
CST_L	0.10	-0.14	0.35	0.84	0.201	0.503	18	No
CST_R	0.21	-0.04	0.46	1.69	0.047	0.356	6	No
CC_PFC	-0.15	-0.40	0.09	-1.23	0.112	0.420	12	No
CC_SM	0.04	-0.20	0.28	0.33	0.369	0.489	34	No
CC_pariet	0.06	-0.19	0.30	0.46	0.324	0.486	30	No
CC_temp	0.05	-0.20	0.29	0.37	0.358	0.488	33	No
CC_splen	-0.01	-0.26	0.23	-0.10	0.462	0.495	42	No

Result S3-5: Mean deviation effect size of men and boys with ASD

The effect size of the mean deviation of men and boys with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	pvalue	p_corrected	rank	Significance
AF_L	-0.34	-0.50	-0.18	-4.30	<0.001	<0.001	3	Yes
AF_R	-0.22	-0.38	-0.06	-2.75	0.003	0.008	18	Yes
SLF1_L	-0.01	-0.17	0.15	-0.12	0.454	0.475	43	No
SLF1_R	0.00	-0.16	0.15	-0.04	0.483	0.494	44	No
SLF2_L	-0.23	-0.39	-0.07	-2.92	0.002	0.006	14	Yes
SLF2_R	-0.23	-0.38	-0.07	-2.83	0.003	0.008	15	Yes
SLF3_L	-0.21	-0.36	-0.05	-2.59	0.005	0.013	19	Yes
SLF3_R	-0.26	-0.42	-0.10	-3.29	0.001	0.004	7	Yes
FAT_L	-0.26	-0.42	-0.10	-3.26	0.001	0.004	8	Yes
FAT_R	-0.19	-0.35	-0.04	-2.43	0.008	0.017	21	Yes
PF_L	-0.31	-0.47	-0.15	-3.86	0.000	0.001	5	Yes
PF_R	-0.07	-0.23	0.08	-0.93	0.177	0.242	33	No
CGB_L	-0.40	-0.56	-0.24	-5.03	<0.001	<0.001	2	Yes
CGB_R	-0.18	-0.34	-0.02	-2.28	0.012	0.022	24	Yes
CGH_L	-0.10	-0.25	0.06	-1.20	0.115	0.173	30	No
CGH_R	-0.16	-0.32	-0.01	-2.07	0.020	0.033	27	Yes
FX_L	-0.18	-0.34	-0.02	-2.28	0.012	0.022	25	Yes
FX_R	-0.17	-0.33	-0.01	-2.15	0.016	0.028	26	Yes
ST_L	-0.07	-0.22	0.09	-0.86	0.197	0.261	34	No
ST_R	0.00	-0.15	0.16	0.02	0.490	0.490	45	No
UF_L	-0.34	-0.50	-0.18	-4.29	<0.001	<0.001	4	Yes
UF_R	-0.26	-0.42	-0.10	-3.26	0.001	0.003	9	Yes
IFOF_L	-0.27	-0.43	-0.11	-3.38	<0.001	0.003	6	Yes
IFOF_R	-0.24	-0.40	-0.08	-3.02	0.001	0.005	13	Yes
ILF_L	-0.02	-0.18	0.14	-0.25	0.401	0.429	42	No
ILF_R	-0.03	-0.18	0.13	-0.36	0.359	0.404	40	No
FS_PFC_L	-0.26	-0.42	-0.10	-3.25	0.001	0.003	10	Yes
FS_PFC_R	-0.22	-0.38	-0.07	-2.81	0.003	0.008	16	Yes
FS_M_L	-0.05	-0.20	0.11	-0.58	0.282	0.352	36	No

FS_M_R	-0.13	-0.28	0.03	-1.61	0.055	0.088	28	No
TR_PFC_L	-0.22	-0.38	-0.06	-2.78	0.003	0.008	17	Yes
TR_PFC_R	-0.21	-0.36	-0.05	-2.59	0.005	0.012	20	Yes
TR_SM_L	-0.09	-0.24	0.07	-1.11	0.135	0.195	31	No
TR_SM_R	-0.03	-0.19	0.12	-0.39	0.347	0.400	39	No
TR_aud_L	-0.24	-0.40	-0.08	-3.05	0.001	0.005	12	Yes
TR_aud_R	-0.19	-0.35	-0.03	-2.41	0.009	0.018	22	Yes
TR_opt_L	-0.04	-0.19	0.12	-0.47	0.320	0.379	38	No
TR_opt_R	-0.04	-0.20	0.11	-0.53	0.297	0.361	37	No
CST_L	0.05	-0.11	0.20	0.58	0.280	0.360	35	No
CST_R	0.08	-0.07	0.24	1.07	0.144	0.203	32	No
CC_PFC	-0.50	-0.66	-0.33	-6.23	<0.001	<0.001	1	Yes
CC_SM	-0.18	-0.34	-0.03	-2.31	0.011	0.022	23	Yes
CC_pariet	-0.03	-0.18	0.13	-0.32	0.374	0.411	41	No
CC_temp	-0.25	-0.41	-0.09	-3.16	0.001	0.004	11	Yes
CC_splen	-0.10	-0.25	0.06	-1.23	0.111	0.172	29	No

Result S3-6: Mean deviation effect size of women and girls with ASD

The effect size of the mean deviation of women and girls with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.26	-0.74	0.23	-1.05	0.154	1.000	6	No
AF_R	-0.30	-0.79	0.18	-1.24	0.116	1.000	4	No
SLF1_L	-0.23	-0.71	0.26	-0.93	0.182	0.912	9	No
SLF1_R	-0.04	-0.52	0.43	-0.17	0.433	0.573	34	No
SLF2_L	-0.08	-0.56	0.39	-0.34	0.368	0.637	26	No
SLF2_R	-0.19	-0.67	0.29	-0.78	0.225	0.778	13	No
SLF3_L	0.00	-0.47	0.48	0.02	0.493	0.493	45	No
SLF3_R	-0.07	-0.55	0.41	-0.28	0.390	0.585	30	No
FAT_L	-0.26	-0.74	0.23	-1.06	0.152	1.000	5	No
FAT_R	0.19	-0.29	0.67	0.79	0.220	0.991	10	No
PF_L	0.08	-0.40	0.55	0.31	0.379	0.610	28	No
PF_R	0.15	-0.32	0.63	0.64	0.267	0.751	16	No
CGB_L	0.14	-0.34	0.62	0.59	0.282	0.748	17	No
CGB_R	-0.04	-0.51	0.44	-0.16	0.438	0.563	35	No
CGH_L	-0.03	-0.51	0.44	-0.14	0.445	0.541	37	No
CGH_R	-0.19	-0.67	0.29	-0.78	0.224	0.839	12	No
FX_L	0.04	-0.44	0.51	0.15	0.440	0.550	36	No
FX_R	-0.01	-0.49	0.46	-0.05	0.482	0.504	43	No
ST_L	-0.16	-0.63	0.32	-0.64	0.266	0.797	15	No
ST_R	0.16	-0.32	0.64	0.65	0.261	0.840	14	No
UF_L	-0.06	-0.54	0.41	-0.27	0.397	0.576	31	No
UF_R	-0.26	-0.74	0.23	-1.05	0.154	0.990	7	No
IFOF_L	-0.02	-0.50	0.45	-0.10	0.461	0.531	39	No
IFOF_R	-0.05	-0.53	0.42	-0.21	0.418	0.570	33	No
ILF_L	-0.10	-0.57	0.38	-0.40	0.346	0.650	24	No
ILF_R	-0.12	-0.60	0.35	-0.52	0.307	0.690	20	No
FS_PFC_L	-0.13	-0.61	0.35	-0.54	0.300	0.710	19	No
FS_PFC_R	-0.08	-0.56	0.40	-0.33	0.374	0.623	27	No
FS_M_L	-0.03	-0.51	0.44	-0.13	0.448	0.531	38	No

FS_M_R	0.45	-0.05	0.95	1.84	0.042	1.000	1	No
TR_PFC_L	-0.02	-0.50	0.45	-0.10	0.462	0.520	40	No
TR_PFC_R	-0.01	-0.49	0.46	-0.06	0.478	0.512	42	No
TR_SM_L	0.07	-0.40	0.55	0.30	0.386	0.598	29	No
TR_SM_R	0.06	-0.42	0.53	0.23	0.409	0.575	32	No
TR_aud_L	-0.14	-0.61	0.34	-0.56	0.292	0.730	18	No
TR_aud_R	-0.09	-0.56	0.39	-0.36	0.363	0.654	25	No
TR_opt_L	0.11	-0.37	0.58	0.44	0.334	0.654	23	No
TR_opt_R	0.12	-0.35	0.60	0.51	0.308	0.659	21	No
CST_L	0.19	-0.29	0.67	0.78	0.223	0.913	11	No
CST_R	0.32	-0.16	0.81	1.34	0.100	1.000	3	No
CC_PFC	-0.23	-0.71	0.25	-0.94	0.182	1.000	8	No
CC_SM	0.02	-0.46	0.49	0.07	0.471	0.517	41	No
CC_pariet	-0.41	-0.90	0.09	-1.68	0.056	1.000	2	No
CC_temp	-0.01	-0.48	0.47	-0.03	0.490	0.501	44	No
CC_splen	0.11	-0.37	0.59	0.46	0.327	0.668	22	No

Result S3-7: Mean deviation effect size of male siblings of people with ASD

The effect size of the mean deviation of male siblings of people with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	0.15	-0.17	0.47	0.94	0.177	0.379	21	No
AF_R	0.18	-0.14	0.50	1.13	0.133	0.353	17	No
SLF1_L	0.04	-0.28	0.36	0.25	0.403	0.503	36	No
SLF1_R	-0.15	-0.46	0.17	-0.90	0.188	0.368	23	No
SLF2_L	-0.08	-0.39	0.24	-0.46	0.323	0.469	31	No
SLF2_R	-0.31	-0.64	0.02	-1.91	0.032	0.179	8	No
SLF3_L	-0.02	-0.33	0.30	-0.09	0.463	0.521	40	No
SLF3_R	-0.10	-0.42	0.22	-0.62	0.271	0.452	27	No
FAT_L	-0.42	-0.75	-0.08	-2.56	0.007	0.110	3	No
FAT_R	-0.31	-0.63	0.02	-1.88	0.034	0.169	9	No
PF_L	0.00	-0.32	0.32	0.01	0.497	0.497	45	No
PF_R	-0.13	-0.45	0.19	-0.80	0.214	0.402	24	No
CGB_L	-0.20	-0.52	0.12	-1.23	0.113	0.317	16	No
CGB_R	-0.18	-0.50	0.14	-1.09	0.141	0.352	18	No
CGH_L	0.01	-0.31	0.33	0.08	0.470	0.491	43	No
CGH_R	0.07	-0.25	0.38	0.41	0.342	0.481	32	No
FX_L	-0.05	-0.37	0.27	-0.31	0.380	0.489	35	No
FX_R	-0.03	-0.35	0.28	-0.21	0.419	0.496	38	No
ST_L	0.01	-0.30	0.33	0.08	0.467	0.500	42	No
ST_R	-0.04	-0.36	0.28	-0.24	0.407	0.495	37	No
UF_L	-0.09	-0.41	0.23	-0.56	0.289	0.434	30	No
UF_R	-0.10	-0.41	0.22	-0.59	0.281	0.436	29	No
IFOF_L	-0.05	-0.37	0.26	-0.34	0.369	0.488	34	No
IFOF_R	-0.27	-0.59	0.05	-1.66	0.053	0.238	10	No
ILF_L	-0.26	-0.59	0.06	-1.62	0.057	0.232	11	No
ILF_R	-0.15	-0.47	0.17	-0.91	0.184	0.377	22	No
FS_PFC_L	-0.37	-0.70	-0.04	-2.29	0.014	0.157	4	No
FS_PFC_R	-0.45	-0.78	-0.11	-2.75	0.005	0.103	2	No

FS_M_L	0.10	-0.22	0.41	0.59	0.278	0.447	28	No
FS_M_R	0.06	-0.26	0.38	0.39	0.351	0.479	33	No
TR_PFC_L	-0.32	-0.64	0.01	-1.96	0.029	0.184	7	No
TR_PFC_R	-0.36	-0.69	-0.04	-2.24	0.016	0.140	5	No
TR_SM_L	-0.26	-0.58	0.07	-1.58	0.061	0.230	12	No
TR_SM_R	0.02	-0.30	0.34	0.13	0.449	0.518	39	No
TR_aud_L	-0.13	-0.45	0.19	-0.78	0.220	0.395	25	No
TR_aud_R	0.21	-0.11	0.53	1.29	0.103	0.330	14	No
TR_opt_L	0.20	-0.12	0.52	1.24	0.112	0.335	15	No
TR_opt_R	0.16	-0.16	0.48	0.96	0.172	0.388	20	No
CST_L	0.11	-0.21	0.43	0.68	0.251	0.434	26	No
CST_R	0.34	0.01	0.67	2.10	0.022	0.161	6	No
CC_PFC	-0.55	-0.89	-0.21	-3.41	0.001	0.036	1	Yes
CC_SM	-0.01	-0.33	0.30	-0.09	0.466	0.512	41	No
CC_pariet	0.23	-0.09	0.56	1.45	0.078	0.271	13	No
CC_temp	-0.17	-0.49	0.15	-1.04	0.153	0.362	19	No
CC_splen	0.00	-0.32	0.32	-0.01	0.496	0.507	44	No

Result S3-8: Mean deviation effect size of female siblings of people with ASD

The effect size of mean deviation of female siblings of people with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Sig
AF_L	-0.41	-0.76	-0.06	-2.41	0.011	0.055	9	No
AF_R	-0.57	-0.93	-0.20	-3.30	0.001	0.026	2	Yes
SLF1_L	-0.31	-0.66	0.03	-1.83	0.038	0.095	18	No
SLF1_R	0.01	-0.32	0.35	0.07	0.474	0.474	45	No
SLF2_L	-0.57	-0.93	-0.20	-3.30	0.001	0.052	1	Yes
SLF2_R	-0.53	-0.89	-0.18	-3.12	0.002	0.021	4	Yes
SLF3_L	-0.54	-0.90	-0.18	-3.17	0.002	0.025	3	Yes
SLF3_R	-0.30	-0.65	0.04	-1.77	0.043	0.096	20	No
FAT_L	-0.26	-0.61	0.08	-1.54	0.066	0.135	22	No
FAT_R	-0.30	-0.64	0.05	-1.73	0.046	0.099	21	No
PF_L	-0.20	-0.54	0.14	-1.18	0.124	0.199	28	No
PF_R	-0.14	-0.48	0.19	-0.84	0.204	0.255	36	No
CGB_L	-0.45	-0.81	-0.10	-2.65	0.006	0.040	7	Yes
CGB_R	-0.23	-0.57	0.11	-1.32	0.098	0.176	25	No
CGH_L	-0.52	-0.88	-0.16	-3.04	0.002	0.021	5	Yes
CGH_R	-0.35	-0.69	0.00	-2.02	0.026	0.072	16	No
FX_L	0.18	-0.16	0.52	1.04	0.153	0.230	30	No
FX_R	-0.16	-0.50	0.18	-0.94	0.176	0.248	32	No
ST_L	0.18	-0.15	0.52	1.08	0.145	0.224	29	No
ST_R	0.07	-0.26	0.41	0.43	0.336	0.369	41	No
UF_L	-0.39	-0.74	-0.04	-2.29	0.014	0.054	12	No
UF_R	-0.21	-0.55	0.13	-1.24	0.112	0.187	27	No
IFOF_L	-0.47	-0.82	-0.11	-2.73	0.005	0.038	6	Yes
IFOF_R	-0.39	-0.74	-0.05	-2.30	0.014	0.057	11	No
ILF_L	0.09	-0.24	0.43	0.55	0.294	0.330	40	No
ILF_R	0.25	-0.09	0.59	1.46	0.077	0.150	23	No
FS_PFC_L	-0.40	-0.75	-0.05	-2.35	0.012	0.055	10	No
FS_PFC_R	-0.36	-0.71	-0.01	-2.09	0.022	0.066	15	No
FS_M_L	-0.39	-0.74	-0.04	-2.28	0.015	0.050	13	No

FS_M_R	-0.16	-0.50	0.18	-0.92	0.181	0.240	34	No
TR_PFC_L	-0.31	-0.65	0.04	-1.79	0.041	0.097	19	No
TR_PFC_R	-0.23	-0.57	0.11	-1.34	0.095	0.179	24	No
TR_SM_L	-0.33	-0.67	0.02	-1.91	0.033	0.086	17	No
TR_SM_R	-0.11	-0.45	0.23	-0.64	0.263	0.304	39	No
TR_aud_L	-0.42	-0.77	-0.07	-2.43	0.010	0.059	8	No
TR_aud_R	-0.14	-0.48	0.20	-0.81	0.211	0.256	37	No
TR_opt_L	-0.21	-0.55	0.13	-1.24	0.112	0.194	26	No
TR_opt_R	-0.02	-0.36	0.31	-0.14	0.444	0.454	44	No
CST_L	-0.16	-0.50	0.18	-0.94	0.177	0.242	33	No
CST_R	-0.14	-0.47	0.20	-0.80	0.216	0.256	38	No
CC_PFC	-0.38	-0.72	-0.03	-2.19	0.018	0.058	14	No
CC_SM	-0.16	-0.50	0.18	-0.92	0.183	0.236	35	No
CC_pariet	-0.05	-0.39	0.29	-0.30	0.384	0.402	43	No
CC_temp	-0.17	-0.51	0.17	-0.99	0.165	0.239	31	No
CC_splen	-0.06	-0.40	0.28	-0.35	0.366	0.392	42	No

Result S3-9: Mean deviation effect size of boys with ADHD

The effect size of the mean deviation of boys with ADHD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.16	-0.34	0.02	-1.79	0.038	0.141	12	No
AF_R	-0.26	-0.45	-0.08	-2.90	0.002	0.033	3	Yes
SLF1_L	-0.06	-0.24	0.12	-0.62	0.267	0.364	33	No
SLF1_R	-0.12	-0.30	0.06	-1.34	0.092	0.197	21	No
SLF2_L	-0.08	-0.26	0.09	-0.93	0.178	0.276	29	No
SLF2_R	-0.17	-0.35	0.01	-1.89	0.031	0.125	11	No
SLF3_L	-0.06	-0.24	0.12	-0.66	0.255	0.359	32	No
SLF3_R	-0.21	-0.39	-0.03	-2.29	0.012	0.108	5	No
FAT_L	-0.01	-0.19	0.17	-0.14	0.443	0.453	44	No
FAT_R	-0.19	-0.37	-0.01	-2.12	0.018	0.116	7	No
PF_L	-0.15	-0.33	0.03	-1.68	0.048	0.154	14	No
PF_R	0.04	-0.14	0.22	0.46	0.322	0.381	38	No
CGB_L	-0.28	-0.46	-0.10	-3.07	0.001	0.059	1	Yes
CGB_R	0.06	-0.12	0.24	0.66	0.254	0.369	31	No
CGH_L	-0.16	-0.34	0.02	-1.79	0.038	0.132	13	No
CGH_R	-0.02	-0.20	0.16	-0.20	0.421	0.441	43	No
FX_L	-0.02	-0.20	0.16	-0.24	0.407	0.436	42	No
FX_R	0.03	-0.15	0.20	0.29	0.386	0.435	40	No
ST_L	-0.09	-0.27	0.09	-1.00	0.160	0.267	27	No
ST_R	-0.14	-0.32	0.04	-1.56	0.061	0.160	17	No
UF_L	-0.12	-0.30	0.06	-1.30	0.098	0.201	22	No
UF_R	-0.13	-0.31	0.05	-1.44	0.076	0.179	19	No
IFOF_L	-0.18	-0.36	0.00	-1.97	0.026	0.115	10	No
IFOF_R	-0.11	-0.29	0.07	-1.20	0.116	0.217	24	No
ILF_L	-0.15	-0.33	0.03	-1.67	0.048	0.145	15	No
ILF_R	-0.04	-0.22	0.14	-0.47	0.320	0.389	37	No
FS_PFC_L	-0.18	-0.36	0.00	-2.01	0.023	0.130	8	No
FS_PFC_R	-0.13	-0.31	0.05	-1.46	0.073	0.182	18	No
FS_M_L	-0.09	-0.26	0.09	-0.94	0.173	0.279	28	No

FS_M_R	-0.28	-0.46	-0.10	-3.07	0.001	0.030	2	Yes
TR_PFC_L	-0.12	-0.30	0.05	-1.37	0.087	0.196	20	No
TR_PFC_R	-0.03	-0.21	0.15	-0.32	0.376	0.433	39	No
TR_SM_L	-0.18	-0.36	0.00	-1.97	0.026	0.128	9	No
TR_SM_R	-0.10	-0.28	0.08	-1.12	0.133	0.239	25	No
TR_aud_L	-0.21	-0.39	-0.03	-2.30	0.012	0.130	4	No
TR_aud_R	-0.20	-0.38	-0.02	-2.21	0.015	0.110	6	No
TR_opt_L	-0.11	-0.29	0.07	-1.21	0.114	0.223	23	No
TR_opt_R	-0.02	-0.20	0.16	-0.24	0.407	0.446	41	No
CST_L	-0.05	-0.23	0.13	-0.53	0.300	0.385	35	No
CST_R	-0.10	-0.28	0.08	-1.11	0.135	0.233	26	No
CC_PFC	-0.05	-0.22	0.13	-0.50	0.310	0.387	36	No
CC_SM	-0.05	-0.23	0.13	-0.58	0.280	0.371	34	No
CC_pariet	0.00	-0.18	0.18	0.00	0.499	0.499	45	No
CC_temp	-0.15	-0.33	0.03	-1.62	0.054	0.153	16	No
CC_splen	-0.07	-0.25	0.11	-0.78	0.219	0.328	30	No

Result S3-10: Mean deviation effect size of girls with ADHD

The effect size of mean deviation of girls with ADHD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.29	-0.68	0.10	-1.49	0.075	0.198	17	No
AF_R	-0.42	-0.82	-0.02	-2.13	0.021	0.107	9	No
SLF1_L	-0.08	-0.46	0.31	-0.40	0.346	0.370	42	No
SLF1_R	-0.01	-0.39	0.37	-0.05	0.480	0.480	45	No
SLF2_L	-0.55	-0.96	-0.14	-2.81	0.005	0.072	3	No
SLF2_R	-0.24	-0.63	0.15	-1.22	0.118	0.252	21	No
SLF3_L	-0.52	-0.93	-0.11	-2.67	0.007	0.059	5	No
SLF3_R	-0.23	-0.61	0.16	-1.15	0.131	0.268	22	No
FAT_L	-0.07	-0.46	0.31	-0.38	0.355	0.372	43	No
FAT_R	-0.15	-0.53	0.24	-0.74	0.232	0.317	33	No
PF_L	-0.28	-0.67	0.11	-1.44	0.081	0.203	18	No
PF_R	0.10	-0.29	0.48	0.51	0.309	0.347	40	No
CGB_L	-0.55	-0.97	-0.14	-2.82	0.005	0.104	2	No
CGB_R	-0.42	-0.82	-0.02	-2.14	0.021	0.119	8	No
CGH_L	-0.21	-0.60	0.18	-1.06	0.150	0.281	24	No
CGH_R	-0.10	-0.49	0.29	-0.51	0.307	0.354	39	No
FX_L	-0.54	-0.95	-0.13	-2.75	0.005	0.062	4	No
FX_R	-0.11	-0.49	0.28	-0.55	0.292	0.346	38	No
ST_L	0.11	-0.27	0.50	0.57	0.287	0.349	37	No
ST_R	-0.31	-0.71	0.08	-1.59	0.062	0.174	16	No
UF_L	-0.37	-0.77	0.03	-1.88	0.036	0.135	12	No
UF_R	-0.16	-0.54	0.23	-0.80	0.217	0.315	31	No
IFOF_L	-0.46	-0.86	-0.05	-2.33	0.014	0.090	7	No
IFOF_R	-0.56	-0.98	-0.15	-2.88	0.004	0.182	1	No
ILF_L	-0.09	-0.48	0.29	-0.48	0.318	0.349	41	No
ILF_R	0.12	-0.26	0.51	0.62	0.270	0.347	35	No
FS_PFC_L	-0.36	-0.75	0.04	-1.81	0.041	0.142	13	No
FS_PFC_R	-0.37	-0.77	0.02	-1.91	0.034	0.138	11	No
FS_M_L	-0.21	-0.60	0.18	-1.05	0.151	0.272	25	No

FS_M_R	-0.18	-0.57	0.21	-0.91	0.186	0.289	29	No
TR_PFC_L	-0.34	-0.73	0.06	-1.72	0.049	0.158	14	No
TR_PFC_R	-0.26	-0.65	0.13	-1.33	0.098	0.231	19	No
TR_SM_L	-0.16	-0.54	0.23	-0.81	0.214	0.321	30	No
TR_SM_R	-0.02	-0.40	0.37	-0.08	0.469	0.480	44	No
TR_aud_L	-0.16	-0.54	0.23	-0.79	0.218	0.306	32	No
TR_aud_R	-0.20	-0.59	0.19	-1.04	0.155	0.268	26	No
TR_opt_L	-0.34	-0.73	0.06	-1.71	0.050	0.149	15	No
TR_opt_R	-0.19	-0.57	0.20	-0.94	0.177	0.295	27	No
CST_L	-0.12	-0.51	0.27	-0.61	0.273	0.341	36	No
CST_R	-0.13	-0.52	0.25	-0.68	0.251	0.332	34	No
CC_PFC	-0.18	-0.57	0.20	-0.93	0.180	0.289	28	No
CC_SM	-0.26	-0.65	0.13	-1.33	0.098	0.221	20	No
CC_pariet	-0.39	-0.79	0.01	-1.98	0.029	0.132	10	No
CC_temp	-0.22	-0.61	0.17	-1.12	0.137	0.268	23	No
CC_splen	-0.51	-0.92	-0.10	-2.61	0.008	0.057	6	No

Result S3-11: Mean deviation effect size of men with ADHD

Effect size of mean deviation of men with ADHD, lower and upper bound of confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple correction.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.10	-0.32	0.11	-0.94	0.174	0.435	18	No
AF_R	-0.03	-0.24	0.18	-0.28	0.389	0.501	35	No
SLF1_L	-0.01	-0.22	0.21	-0.07	0.473	0.519	41	No
SLF1_R	-0.15	-0.37	0.06	-1.38	0.086	0.644	6	No
SLF2_L	0.13	-0.08	0.35	1.20	0.116	0.653	8	No
SLF2_R	0.09	-0.13	0.30	0.80	0.212	0.478	20	No
SLF3_L	0.13	-0.08	0.35	1.20	0.116	0.582	9	No
SLF3_R	0.02	-0.20	0.23	0.17	0.433	0.487	40	No
FAT_L	0.17	-0.04	0.39	1.60	0.057	0.637	4	No
FAT_R	-0.03	-0.24	0.19	-0.23	0.408	0.497	37	No
PF_L	-0.08	-0.30	0.13	-0.75	0.227	0.426	24	No
PF_R	0.04	-0.17	0.26	0.39	0.348	0.490	32	No
CGB_L	-0.06	-0.27	0.16	-0.51	0.305	0.458	30	No
CGB_R	-0.11	-0.32	0.11	-1.00	0.161	0.454	16	No
CGH_L	0.26	0.04	0.48	2.39	0.010	0.435	1	No
CGH_R	0.05	-0.16	0.27	0.48	0.317	0.460	31	No
FX_L	-0.17	-0.38	0.05	-1.54	0.064	0.577	5	No
FX_R	-0.13	-0.34	0.08	-1.19	0.118	0.531	10	No
ST_L	0.04	-0.17	0.26	0.39	0.350	0.477	33	No
ST_R	0.08	-0.13	0.30	0.76	0.223	0.437	23	No
UF_L	0.03	-0.18	0.25	0.29	0.387	0.513	34	No
UF_R	-0.01	-0.22	0.21	-0.06	0.476	0.510	42	No
IFOF_L	0.07	-0.15	0.28	0.61	0.273	0.456	27	No
IFOF_R	-0.06	-0.27	0.16	-0.53	0.300	0.466	29	No
ILF_L	0.14	-0.07	0.36	1.32	0.096	0.615	7	No
ILF_R	0.26	0.04	0.48	2.37	0.010	0.228	2	No
FS_PFC_L	0.10	-0.11	0.32	0.95	0.172	0.454	17	No
FS_PFC_R	0.00	-0.21	0.22	0.02	0.493	0.493	45	No
FS_M_L	-0.03	-0.24	0.19	-0.24	0.406	0.507	36	No

FS_M_R	0.11	-0.10	0.32	1.01	0.158	0.506	14	No
TR_PFC_L	0.02	-0.20	0.23	0.17	0.432	0.499	39	No
TR_PFC_R	-0.09	-0.30	0.13	-0.79	0.215	0.461	21	No
TR_SM_L	-0.12	-0.34	0.09	-1.12	0.133	0.459	13	No
TR_SM_R	-0.18	-0.39	0.04	-1.64	0.053	0.788	3	No
TR_aud_L	-0.06	-0.27	0.16	-0.53	0.297	0.478	28	No
TR_aud_R	-0.13	-0.34	0.09	-1.19	0.119	0.488	11	No
TR_opt_L	0.07	-0.14	0.29	0.67	0.251	0.452	25	No
TR_opt_R	0.00	-0.22	0.21	-0.04	0.485	0.508	43	No
CST_L	-0.07	-0.29	0.14	-0.66	0.257	0.444	26	No
CST_R	0.02	-0.19	0.24	0.20	0.423	0.500	38	No
CC_PFC	-0.08	-0.30	0.13	-0.77	0.223	0.455	22	No
CC_SM	-0.13	-0.34	0.09	-1.17	0.124	0.464	12	No
CC_pariet	0.11	-0.11	0.32	1.00	0.160	0.481	15	No
CC_temp	-0.10	-0.32	0.11	-0.94	0.175	0.415	19	No
CC_splen	0.00	-0.22	0.21	-0.03	0.487	0.498	44	No

Result S3-12: Mean deviation effect size of women with ADHD

The effect size of the mean deviation of women with ADHD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.36	-0.66	-0.07	-2.52	0.008	0.043	8	Yes
AF_R	-0.16	-0.45	0.12	-1.12	0.135	0.203	30	No
SLF1_L	-0.14	-0.43	0.14	-0.98	0.166	0.234	32	No
SLF1_R	-0.34	-0.63	-0.05	-2.33	0.012	0.060	9	No
SLF2_L	-0.32	-0.61	-0.03	-2.19	0.017	0.063	12	No
SLF2_R	-0.30	-0.59	-0.01	-2.05	0.023	0.069	15	No
SLF3_L	-0.37	-0.66	-0.08	-2.58	0.007	0.042	7	Yes
SLF3_R	-0.05	-0.34	0.23	-0.38	0.353	0.430	37	No
FAT_L	-0.29	-0.58	0.00	-2.03	0.024	0.068	16	No
FAT_R	-0.12	-0.40	0.17	-0.82	0.209	0.285	33	No
PF_L	-0.03	-0.31	0.26	-0.18	0.429	0.471	41	No
PF_R	0.00	-0.28	0.28	0.00	0.498	0.498	45	No
CGB_L	-0.40	-0.69	-0.10	-2.76	0.004	0.037	5	Yes
CGB_R	-0.19	-0.48	0.10	-1.31	0.098	0.157	28	No
CGH_L	-0.06	-0.35	0.22	-0.44	0.332	0.427	35	No
CGH_R	-0.31	-0.60	-0.02	-2.16	0.018	0.062	13	No
FX_L	-0.17	-0.46	0.11	-1.20	0.117	0.182	29	No
FX_R	0.02	-0.26	0.30	0.15	0.440	0.460	43	No
ST_L	0.01	-0.28	0.29	0.05	0.481	0.492	44	No
ST_R	0.27	-0.02	0.56	1.86	0.035	0.082	19	No
UF_L	-0.23	-0.52	0.06	-1.60	0.058	0.105	25	No
UF_R	-0.28	-0.57	0.01	-1.92	0.031	0.076	18	No
IFOF_L	-0.26	-0.55	0.03	-1.82	0.038	0.074	23	No
IFOF_R	-0.26	-0.55	0.03	-1.81	0.038	0.071	24	No
ILF_L	0.05	-0.23	0.33	0.34	0.369	0.438	38	No
ILF_R	-0.04	-0.33	0.24	-0.31	0.381	0.439	39	No
FS_PFC_L	-0.45	-0.75	-0.15	-3.11	0.002	0.036	2	Yes
FS_PFC_R	-0.41	-0.70	-0.11	-2.84	0.003	0.038	4	Yes
FS_M_L	-0.29	-0.58	0.00	-2.00	0.026	0.069	17	No

FS_M_R	-0.33	-0.62	-0.04	-2.30	0.013	0.058	10	No
TR_PFC_L	-0.38	-0.67	-0.09	-2.65	0.006	0.041	6	Yes
TR_PFC_R	-0.33	-0.62	-0.04	-2.26	0.014	0.059	11	No
TR_SM_L	-0.06	-0.34	0.22	-0.41	0.343	0.429	36	No
TR_SM_R	0.09	-0.19	0.37	0.62	0.268	0.355	34	No
TR_aud_L	-0.23	-0.52	0.06	-1.58	0.060	0.100	27	No
TR_aud_R	-0.27	-0.56	0.02	-1.85	0.035	0.079	20	No
TR_opt_L	0.04	-0.25	0.32	0.24	0.404	0.455	40	No
TR_opt_R	0.03	-0.26	0.31	0.18	0.430	0.461	42	No
CST_L	-0.23	-0.52	0.06	-1.60	0.058	0.101	26	No
CST_R	-0.15	-0.43	0.14	-1.03	0.154	0.224	31	No
CC_PFC	-0.61	-0.91	-0.30	-4.20	<0.001	0.003	1	Yes
CC_SM	-0.26	-0.55	0.02	-1.82	0.037	0.076	22	No
CC_pariet	-0.27	-0.55	0.02	-1.84	0.036	0.077	21	No
CC_temp	-0.31	-0.60	-0.02	-2.15	0.018	0.059	14	No
CC_splen	-0.43	-0.72	-0.13	-2.96	0.002	0.036	3	Yes

Result S3-13: Mean deviation effect size of boys with ASD

The effect size of the mean deviation of boys with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.30	-0.50	-0.10	-2.95	0.002	0.015	6	Yes
AF_R	-0.23	-0.43	-0.03	-2.27	0.013	0.034	17	Yes
SLF1_L	0.08	-0.12	0.28	0.80	0.214	0.260	37	No
SLF1_R	0.09	-0.11	0.29	0.89	0.187	0.234	36	No
SLF2_L	-0.25	-0.45	-0.04	-2.41	0.009	0.028	14	Yes
SLF2_R	-0.20	-0.40	0.00	-1.94	0.028	0.052	24	No
SLF3_L	-0.18	-0.38	0.02	-1.75	0.041	0.067	28	No
SLF3_R	-0.25	-0.45	-0.05	-2.47	0.008	0.029	12	Yes
FAT_L	-0.24	-0.44	-0.04	-2.37	0.010	0.030	15	Yes
FAT_R	-0.18	-0.38	0.02	-1.77	0.040	0.070	26	No
PF_L	-0.29	-0.49	-0.08	-2.82	0.003	0.016	8	Yes
PF_R	-0.12	-0.32	0.08	-1.16	0.124	0.165	34	No
CGB_L	-0.34	-0.55	-0.14	-3.40	<0.001	0.004	5	Yes
CGB_R	-0.21	-0.41	-0.01	-2.08	0.020	0.046	20	Yes
CGH_L	-0.13	-0.33	0.07	-1.31	0.096	0.131	33	No
CGH_R	-0.19	-0.39	0.01	-1.84	0.035	0.062	25	No
FX_L	-0.20	-0.40	0.00	-1.96	0.026	0.051	23	No
FX_R	-0.18	-0.38	0.02	-1.76	0.041	0.069	27	No
ST_L	-0.24	-0.44	-0.03	-2.32	0.011	0.031	16	Yes
ST_R	-0.11	-0.31	0.09	-1.10	0.137	0.176	35	No
UF_L	-0.46	-0.67	-0.25	-4.51	<0.001	<0.001	3	Yes
UF_R	-0.46	-0.67	-0.25	-4.57	<0.001	<0.001	2	Yes
IFOF_L	-0.28	-0.49	-0.08	-2.80	0.003	0.015	9	Yes
IFOF_R	-0.35	-0.56	-0.15	-3.48	<0.001	0.004	4	Yes
ILF_L	-0.21	-0.41	0.00	-2.02	0.023	0.049	21	Yes
ILF_R	-0.17	-0.37	0.03	-1.72	0.045	0.069	29	No
FS_PFC_L	-0.29	-0.50	-0.09	-2.88	0.002	0.016	7	Yes
FS_PFC_R	-0.25	-0.45	-0.04	-2.42	0.009	0.030	13	Yes
FS_M_L	-0.07	-0.27	0.13	-0.69	0.245	0.290	38	No

FS_M_R	-0.17	-0.37	0.03	-1.66	0.050	0.075	30	No
TR_PFC_L	-0.22	-0.42	-0.02	-2.20	0.015	0.038	18	Yes
TR_PFC_R	-0.26	-0.46	-0.06	-2.55	0.006	0.025	11	Yes
TR_SM_L	-0.02	-0.22	0.18	-0.22	0.413	0.422	44	No
TR_SM_R	-0.03	-0.23	0.17	-0.27	0.394	0.412	43	No
TR_aud_L	-0.14	-0.34	0.06	-1.34	0.092	0.129	32	No
TR_aud_R	-0.22	-0.42	-0.02	-2.15	0.017	0.040	19	Yes
TR_opt_L	-0.04	-0.24	0.16	-0.36	0.359	0.385	42	No
TR_opt_R	-0.20	-0.40	0.00	-1.97	0.026	0.052	22	No
CST_L	0.04	-0.16	0.24	0.37	0.356	0.390	41	No
CST_R	0.06	-0.14	0.26	0.63	0.264	0.305	39	No
CC_PFC	-0.47	-0.68	-0.26	-4.65	<0.001	<0.001	1	Yes
CC_SM	-0.05	-0.25	0.15	-0.48	0.317	0.357	40	No
CC_pariet	0.01	-0.19	0.20	0.06	0.477	0.477	45	No
CC_temp	-0.28	-0.49	-0.08	-2.79	0.003	0.015	10	Yes
CC_splen	-0.14	-0.34	0.06	-1.41	0.080	0.117	31	No

Result S3-14: Mean deviation effect size of girls with ASD

The effect size of mean deviation of girls with ASD, lower and upper bound of confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.28	-1.03	0.48	-0.73	0.247	1.000	8	No
AF_R	-0.15	-0.90	0.59	-0.41	0.348	0.746	21	No
SLF1_L	0.01	-0.73	0.75	0.02	0.492	0.503	44	No
SLF1_R	-0.14	-0.89	0.60	-0.37	0.361	0.706	23	No
SLF2_L	-0.24	-0.99	0.51	-0.64	0.274	1.000	10	No
SLF2_R	-0.28	-1.03	0.48	-0.74	0.244	1.000	6	No
SLF3_L	0.08	-0.66	0.83	0.22	0.416	0.604	31	No
SLF3_R	-0.01	-0.75	0.73	-0.03	0.490	0.513	43	No
FAT_L	0.13	-0.61	0.87	0.34	0.371	0.668	25	No
FAT_R	0.08	-0.66	0.83	0.22	0.417	0.586	32	No
PF_L	-0.04	-0.78	0.70	-0.11	0.457	0.542	38	No
PF_R	-0.03	-0.77	0.71	-0.08	0.470	0.542	39	No
CGB_L	0.20	-0.55	0.95	0.52	0.309	0.928	15	No
CGB_R	0.09	-0.65	0.83	0.24	0.410	0.636	29	No
CGH_L	0.17	-0.57	0.92	0.46	0.330	0.783	19	No
CGH_R	0.06	-0.68	0.80	0.15	0.443	0.553	36	No
FX_L	-0.33	-1.09	0.43	-0.86	0.210	1.000	4	No
FX_R	-0.39	-1.15	0.38	-1.02	0.174	1.000	2	No
ST_L	-0.18	-0.92	0.57	-0.47	0.327	0.921	16	No
ST_R	0.02	-0.72	0.76	0.05	0.482	0.516	42	No
UF_L	0.20	-0.54	0.95	0.54	0.304	0.979	14	No
UF_R	0.13	-0.61	0.87	0.34	0.371	0.696	24	No
IFOF_L	0.05	-0.69	0.79	0.13	0.450	0.547	37	No
IFOF_R	-0.12	-0.87	0.62	-0.33	0.377	0.653	26	No
ILF_L	0.00	-0.74	0.74	0.00	0.499	0.499	45	No
ILF_R	-0.17	-0.92	0.57	-0.46	0.330	0.825	18	No
FS_PFC_L	0.31	-0.45	1.06	0.81	0.225	1.000	5	No
FS_PFC_R	0.21	-0.54	0.95	0.54	0.303	1.000	13	No
FS_M_L	-0.11	-0.85	0.63	-0.29	0.391	0.628	28	No

FS_M_R	0.27	-0.49	1.02	0.71	0.253	1.000	9	No
TR_PFC_L	0.28	-0.48	1.03	0.73	0.246	1.000	7	No
TR_PFC_R	0.15	-0.60	0.89	0.39	0.356	0.729	22	No
TR_SM_L	-0.06	-0.80	0.68	-0.15	0.441	0.567	35	No
TR_SM_R	0.03	-0.71	0.77	0.07	0.472	0.531	40	No
TR_aud_L	0.24	-0.51	0.99	0.63	0.275	1.000	11	No
TR_aud_R	0.03	-0.71	0.77	0.07	0.473	0.519	41	No
TR_opt_L	-0.21	-0.96	0.54	-0.55	0.300	1.000	12	No
TR_opt_R	-0.16	-0.90	0.59	-0.42	0.344	0.774	20	No
CST_L	0.12	-0.62	0.86	0.31	0.382	0.637	27	No
CST_R	0.35	-0.41	1.11	0.93	0.194	1.000	3	No
CC_PFC	0.09	-0.65	0.83	0.23	0.412	0.618	30	No
CC_SM	0.07	-0.67	0.82	0.19	0.426	0.581	33	No
CC_pariet	-0.40	-1.17	0.37	-1.06	0.166	1.000	1	No
CC_temp	0.07	-0.67	0.81	0.19	0.428	0.566	34	No
CC_splen	0.18	-0.57	0.92	0.47	0.328	0.868	17	No

Result S3-15: Mean deviation effect size of men with ASD

The effect size of the mean deviation of men with ASD, lower and upper bound of confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.42	-0.68	-0.16	-3.26	0.001	0.014	3	Yes
AF_R	-0.20	-0.45	0.06	-1.55	0.064	0.137	21	No
SLF1_L	-0.13	-0.38	0.12	-1.04	0.152	0.214	32	No
SLF1_R	-0.14	-0.39	0.11	-1.11	0.136	0.211	29	No
SLF2_L	-0.21	-0.46	0.04	-1.64	0.053	0.148	16	No
SLF2_R	-0.26	-0.52	-0.01	-2.06	0.022	0.099	10	No
SLF3_L	-0.25	-0.50	0.01	-1.92	0.030	0.122	11	No
SLF3_R	-0.28	-0.53	-0.02	-2.15	0.018	0.088	9	No
FAT_L	-0.29	-0.54	-0.03	-2.24	0.014	0.080	8	No
FAT_R	-0.21	-0.47	0.04	-1.66	0.051	0.164	14	No
PF_L	-0.35	-0.60	-0.09	-2.71	0.004	0.033	6	Yes
PF_R	-0.01	-0.26	0.25	-0.04	0.484	0.484	45	No
CGB_L	-0.48	-0.74	-0.21	-3.75	<0.001	0.005	2	Yes
CGB_R	-0.13	-0.39	0.12	-1.05	0.150	0.217	31	No
CGH_L	-0.04	-0.29	0.21	-0.29	0.385	0.433	40	No
CGH_R	-0.14	-0.39	0.12	-1.06	0.147	0.220	30	No
FX_L	-0.15	-0.40	0.10	-1.15	0.127	0.204	28	No
FX_R	-0.16	-0.41	0.09	-1.24	0.109	0.182	27	No
ST_L	0.21	-0.05	0.46	1.62	0.055	0.145	17	No
ST_R	0.21	-0.04	0.47	1.66	0.051	0.154	15	No
UF_L	-0.18	-0.43	0.07	-1.39	0.085	0.152	25	No
UF_R	0.01	-0.24	0.26	0.09	0.464	0.486	43	No
IFOF_L	-0.24	-0.49	0.01	-1.87	0.033	0.124	12	No
IFOF_R	-0.05	-0.31	0.20	-0.43	0.335	0.396	38	No
ILF_L	0.30	0.04	0.55	2.32	0.012	0.076	7	No
ILF_R	0.19	-0.06	0.44	1.50	0.070	0.143	22	No
FS_PFC_L	-0.20	-0.46	0.05	-1.58	0.059	0.148	18	No
FS_PFC_R	-0.19	-0.44	0.07	-1.45	0.076	0.142	24	No
FS_M_L	-0.01	-0.26	0.24	-0.08	0.468	0.479	44	No

FS_M_R	-0.08	-0.33	0.17	-0.64	0.261	0.336	35	No
TR_PFC_L	-0.22	-0.47	0.03	-1.71	0.046	0.159	13	No
TR_PFC_R	-0.12	-0.37	0.13	-0.95	0.173	0.236	33	No
TR_SM_L	-0.19	-0.44	0.06	-1.49	0.071	0.138	23	No
TR_SM_R	-0.04	-0.29	0.21	-0.29	0.385	0.423	41	No
TR_aud_L	-0.40	-0.66	-0.14	-3.15	0.001	0.014	4	Yes
TR_aud_R	-0.16	-0.41	0.09	-1.25	0.107	0.186	26	No
TR_opt_L	-0.04	-0.29	0.21	-0.30	0.384	0.443	39	No
TR_opt_R	0.20	-0.05	0.46	1.58	0.060	0.142	19	No
CST_L	0.06	-0.19	0.31	0.46	0.323	0.392	37	No
CST_R	0.12	-0.14	0.37	0.91	0.184	0.244	34	No
CC_PFC	-0.53	-0.80	-0.26	-4.13	<0.001	0.003	1	Yes
CC_SM	-0.38	-0.63	-0.12	-2.93	0.002	0.022	5	Yes
CC_pariet	-0.07	-0.32	0.18	-0.55	0.292	0.364	36	No
CC_temp	-0.20	-0.45	0.05	-1.56	0.062	0.140	20	No
CC_splen	-0.02	-0.27	0.23	-0.17	0.432	0.463	42	No

Result S3-16: Mean deviation effect size of women with ASD

The effect size of mean deviation of women with ASD, lower and upper bound of confidence interval. The t-statistics, p-value, and adjusted p value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.24	-0.87	0.39	-0.75	0.236	0.507	21	No
AF_R	-0.39	-1.03	0.26	-1.22	0.126	0.567	10	No
SLF1_L	-0.34	-0.98	0.30	-1.08	0.154	0.630	11	No
SLF1_R	0.02	-0.59	0.64	0.08	0.469	0.515	41	No
SLF2_L	-0.02	-0.64	0.60	-0.06	0.479	0.513	42	No
SLF2_R	-0.12	-0.74	0.50	-0.39	0.354	0.514	31	No
SLF3_L	-0.04	-0.66	0.58	-0.11	0.456	0.513	40	No
SLF3_R	-0.11	-0.73	0.51	-0.34	0.370	0.505	33	No
FAT_L	-0.46	-1.11	0.19	-1.45	0.090	0.809	5	No
FAT_R	0.26	-0.37	0.89	0.81	0.218	0.546	18	No
PF_L	0.17	-0.45	0.80	0.55	0.298	0.516	26	No
PF_R	0.33	-0.31	0.96	1.03	0.164	0.568	13	No
CGB_L	0.10	-0.52	0.72	0.33	0.376	0.497	34	No
CGB_R	-0.13	-0.75	0.50	-0.40	0.351	0.526	30	No
CGH_L	-0.21	-0.84	0.41	-0.68	0.258	0.527	22	No
CGH_R	-0.33	-0.97	0.30	-1.05	0.160	0.600	12	No
FX_L	0.30	-0.34	0.93	0.94	0.187	0.560	15	No
FX_R	0.27	-0.36	0.90	0.86	0.207	0.548	17	No
ST_L	-0.13	-0.75	0.49	-0.41	0.344	0.534	29	No
ST_R	0.25	-0.38	0.88	0.79	0.224	0.531	19	No
UF_L	-0.18	-0.80	0.45	-0.56	0.294	0.529	25	No
UF_R	-0.53	-1.19	0.14	-1.66	0.066	0.983	3	No
IFOF_L	-0.08	-0.70	0.54	-0.25	0.405	0.521	35	No
IFOF_R	0.01	-0.61	0.63	0.04	0.486	0.497	44	No
ILF_L	-0.15	-0.77	0.47	-0.48	0.322	0.536	27	No
ILF_R	-0.07	-0.69	0.55	-0.23	0.413	0.502	37	No
FS_PFC_L	-0.43	-1.07	0.22	-1.35	0.105	0.790	6	No
FS_PFC_R	-0.40	-1.04	0.25	-1.26	0.120	0.675	8	No
FS_M_L	0.00	-0.62	0.61	-0.02	0.494	0.494	45	No

FS_M_R	0.54	-0.12	1.20	1.71	0.061	1.368	2	No
TR_PFC_L	-0.18	-0.80	0.45	-0.57	0.292	0.547	24	No
TR_PFC_R	-0.11	-0.74	0.51	-0.36	0.364	0.512	32	No
TR_SM_L	0.13	-0.49	0.76	0.42	0.341	0.548	28	No
TR_SM_R	0.08	-0.55	0.70	0.24	0.408	0.511	36	No
TR_aud_L	-0.66	-1.35	0.02	-2.09	0.033	1.488	1	No
TR_aud_R	-0.19	-0.81	0.44	-0.60	0.282	0.552	23	No
TR_opt_L	0.42	-0.22	1.07	1.34	0.107	0.688	7	No
TR_opt_R	0.32	-0.32	0.95	1.00	0.172	0.554	14	No
CST_L	0.25	-0.38	0.88	0.78	0.226	0.509	20	No
CST_R	0.29	-0.34	0.92	0.92	0.192	0.540	16	No
CC_PFC	-0.49	-1.15	0.16	-1.55	0.077	0.870	4	No
CC_SM	-0.02	-0.64	0.60	-0.05	0.480	0.502	43	No
CC_pariet	-0.39	-1.03	0.25	-1.23	0.124	0.621	9	No
CC_temp	-0.06	-0.68	0.56	-0.19	0.428	0.507	38	No
CC_splen	0.04	-0.58	0.66	0.14	0.447	0.516	39	No

Result S4-1: Idiosyncrasy of people with ADHD

F-ratio of people with ADHD, lower and upper bound of the confidence interval. The p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	F-ratio	CI_low	CI_up	p	p_adj	rank	Significance
AF_L	1.31	1.07	1.60	0.004	0.041	4	Yes
AF_R	1.21	0.99	1.48	0.029	0.088	15	No
SLF1_L	1.23	1.01	1.51	0.018	0.101	8	No
SLF1_R	1.02	0.84	1.25	0.422	0.513	37	No
SLF2_L	1.25	1.03	1.53	0.012	0.080	7	No
SLF2_R	1.07	0.88	1.32	0.238	0.346	31	No
SLF3_L	1.32	1.09	1.62	0.003	0.117	1	Yes
SLF3_R	1.12	0.92	1.38	0.122	0.229	24	No
FAT_L	1.05	0.86	1.28	0.319	0.422	34	No
FAT_R	1.00	0.82	1.23	0.497	0.545	41	No
PF_L	0.94	0.77	1.15	0.727	0.760	43	No
PF_R	1.11	0.91	1.36	0.157	0.272	26	No
CGB_L	1.00	0.83	1.23	0.477	0.550	39	No
CGB_R	1.23	1.01	1.50	0.021	0.080	12	No
CGH_L	1.06	0.87	1.29	0.293	0.400	33	No
CGH_R	1.07	0.88	1.32	0.235	0.352	30	No
FX_L	1.01	0.83	1.24	0.442	0.524	38	No
FX_R	1.04	0.85	1.27	0.360	0.450	36	No
ST_L	0.78	0.64	0.95	0.992	0.992	45	No
ST_R	0.91	0.75	1.12	0.817	0.836	44	No
UF_L	1.18	0.97	1.45	0.049	0.130	17	No
UF_R	1.22	1.00	1.50	0.024	0.082	13	No
IFOF_L	1.09	0.90	1.34	0.194	0.311	28	No
IFOF_R	1.19	0.97	1.45	0.045	0.126	16	No
ILF_L	1.10	0.91	1.35	0.165	0.274	27	No
ILF_R	1.23	1.01	1.51	0.018	0.092	9	No
FS_PFC_L	1.14	0.93	1.39	0.101	0.206	22	No
FS_PFC_R	1.13	0.93	1.38	0.114	0.224	23	No
FS_M_L	1.23	1.01	1.51	0.018	0.083	10	No

FS_M_R	1.05	0.86	1.28	0.327	0.420	35	No
TR_PFC_L	1.18	0.97	1.44	0.052	0.131	18	No
TR_PFC_R	1.31	1.08	1.61	0.003	0.050	3	Yes
TR_SM_L	1.07	0.88	1.31	0.250	0.351	32	No
TR_SM_R	1.16	0.95	1.42	0.072	0.171	19	No
TR_aud_L	1.30	1.07	1.60	0.004	0.035	5	Yes
TR_aud_R	1.11	0.91	1.37	0.142	0.255	25	No
TR_opt_L	1.00	0.82	1.23	0.485	0.545	40	No
TR_opt_R	1.09	0.90	1.34	0.194	0.301	29	No
CST_L	1.14	0.94	1.40	0.097	0.208	21	No
CST_R	1.23	1.01	1.50	0.021	0.085	11	No
CC_PFC	1.26	1.03	1.54	0.011	0.082	6	No
CC_SM	1.22	1.00	1.50	0.024	0.076	14	No
CC_pariet	1.32	1.09	1.62	0.003	0.060	2	Yes
CC_temp	1.15	0.94	1.40	0.088	0.197	20	No
CC_splen	0.99	0.81	1.21	0.542	0.581	42	No

Result S4-2: Idiosyncrasy of people with ASD

F-ratio of people with ASD, lower and upper bound of the confidence interval. The p value, and adjusted p value by Benjamini correction (FDR q=0.05), the rank of p value and whether the tract is significant after multiple corrections.

	F-ratio	CI_low	CI_up	p	p_adj	rank	Significance
AF_L	1.18	0.94	1.51	0.081	0.140	26	No
AF_R	1.26	1.00	1.62	0.023	0.061	17	No
SLF1_L	1.60	1.27	2.05	<0.001	<0.001	4	Yes
SLF1_R	0.97	0.77	1.25	0.579	0.620	42	No
SLF2_L	1.27	1.01	1.62	0.021	0.063	15	No
SLF2_R	1.20	0.95	1.53	0.062	0.127	22	No
SLF3_L	1.32	1.05	1.68	0.009	0.030	14	Yes
SLF3_R	1.07	0.85	1.37	0.270	0.357	34	No
FAT_L	1.26	1.00	1.62	0.023	0.065	16	No
FAT_R	1.17	0.93	1.50	0.092	0.147	28	No
PF_L	1.05	0.84	1.34	0.331	0.392	38	No
PF_R	1.15	0.92	1.47	0.114	0.171	30	No
CGB_L	1.19	0.94	1.52	0.074	0.133	25	No
CGB_R	1.39	1.11	1.78	0.002	0.010	11	Yes
CGH_L	0.97	0.77	1.25	0.575	0.631	41	No
CGH_R	1.24	0.99	1.59	0.032	0.077	19	No
FX_L	1.32	1.05	1.69	0.008	0.029	13	Yes
FX_R	1.33	1.06	1.70	0.007	0.027	12	Yes
ST_L	0.76	0.61	0.97	0.985	0.985	45	No
ST_R	0.89	0.71	1.14	0.819	0.837	44	No
UF_L	1.16	0.92	1.48	0.108	0.167	29	No
UF_R	1.50	1.19	1.92	<0.001	0.002	6	Yes
IFOF_L	1.23	0.98	1.57	0.039	0.083	21	No
IFOF_R	1.47	1.17	1.88	<0.001	0.003	7	Yes
ILF_L	0.99	0.79	1.27	0.527	0.593	40	No
ILF_R	1.05	0.84	1.35	0.324	0.394	37	No
FS_PFC_L	1.24	0.98	1.59	0.034	0.076	20	No
FS_PFC_R	1.46	1.16	1.87	0.001	0.003	9	Yes
FS_M_L	1.41	1.12	1.81	0.001	0.007	10	Yes

FS_M_R	1.17	0.93	1.50	0.091	0.151	27	No
TR_PFC_L	1.53	1.22	1.96	<0.001	0.001	5	Yes
TR_PFC_R	1.80	1.43	2.31	<0.001	<0.001	2	Yes
TR_SM_L	1.02	0.81	1.30	0.433	0.500	39	No
TR_SM_R	1.10	0.87	1.40	0.217	0.305	32	No
TR_aud_L	1.07	0.85	1.37	0.269	0.367	33	No
TR_aud_R	1.06	0.84	1.36	0.299	0.385	35	No
TR_opt_L	0.96	0.76	1.23	0.619	0.648	43	No
TR_opt_R	1.15	0.91	1.47	0.117	0.170	31	No
CST_L	1.25	1.00	1.60	0.027	0.067	18	No
CST_R	1.19	0.94	1.52	0.073	0.136	24	No
CC_PFC	1.82	1.45	2.33	<0.001	<0.001	1	Yes
CC_SM	1.76	1.39	2.25	<0.001	<0.001	3	Yes
CC_pariet	1.46	1.16	1.87	0.001	0.003	8	Yes
CC_temp	1.06	0.84	1.35	0.311	0.389	36	No
CC_splen	1.19	0.94	1.52	0.070	0.138	23	No

Result S4-3: Idiosyncrasy of siblings of people with ADHD

F-ratio of siblings of people with ADHD, lower and upper bound of confidence interval. The p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	F-ratio	CI_low	CI_up	p	p_adj	rank	Significance
AF_L	0.95	0.73	1.28	0.619	0.819	34	No
AF_R	0.88	0.67	1.17	0.813	0.892	41	No
SLF1_L	0.91	0.70	1.22	0.724	0.835	39	No
SLF1_R	0.66	0.51	0.89	0.997	0.997	45	No
SLF2_L	1.20	0.92	1.60	0.090	0.289	14	No
SLF2_R	0.94	0.72	1.26	0.659	0.824	36	No
SLF3_L	1.34	1.03	1.79	0.015	0.347	2	No
SLF3_R	1.11	0.85	1.49	0.215	0.460	21	No
FAT_L	0.75	0.58	1.00	0.974	1.000	43	No
FAT_R	0.70	0.53	0.93	0.993	1.000	44	No
PF_L	1.08	0.83	1.44	0.284	0.581	22	No
PF_R	0.92	0.70	1.23	0.717	0.850	38	No
CGB_L	1.27	0.97	1.69	0.040	0.182	10	No
CGB_R	1.33	1.02	1.77	0.018	0.200	4	No
CGH_L	1.13	0.86	1.51	0.189	0.472	18	No
CGH_R	1.12	0.86	1.50	0.193	0.456	19	No
FX_L	1.11	0.85	1.49	0.211	0.475	20	No
FX_R	1.28	0.98	1.71	0.034	0.192	8	No
ST_L	1.03	0.79	1.38	0.395	0.711	25	No
ST_R	1.06	0.81	1.42	0.326	0.638	23	No
UF_L	1.21	0.93	1.62	0.079	0.272	13	No
UF_R	1.02	0.78	1.36	0.440	0.707	28	No
IFOF_L	1.03	0.79	1.37	0.412	0.714	26	No
IFOF_R	1.14	0.87	1.52	0.171	0.452	17	No
ILF_L	1.33	1.02	1.78	0.016	0.242	3	No
ILF_R	1.30	1.00	1.73	0.027	0.244	5	No
FS_PFC_L	1.02	0.79	1.37	0.422	0.704	27	No
FS_PFC_R	1.00	0.77	1.34	0.491	0.713	31	No
FS_M_L	1.15	0.88	1.54	0.149	0.420	16	No

FS_M_R	1.23	0.95	1.65	0.061	0.228	12	No
TR_PFC_L	0.99	0.76	1.33	0.503	0.707	32	No
TR_PFC_R	0.99	0.76	1.32	0.525	0.716	33	No
TR_SM_L	0.95	0.73	1.27	0.634	0.815	35	No
TR_SM_R	0.80	0.62	1.08	0.930	0.996	42	No
TR_aud_L	1.18	0.91	1.58	0.109	0.327	15	No
TR_aud_R	1.28	0.98	1.71	0.034	0.172	9	No
TR_opt_L	0.92	0.71	1.23	0.710	0.863	37	No
TR_opt_R	1.25	0.96	1.67	0.048	0.197	11	No
CST_L	0.91	0.70	1.22	0.730	0.822	40	No
CST_R	1.05	0.81	1.41	0.341	0.640	24	No
CC_PFC	1.28	0.98	1.71	0.033	0.213	7	No
CC_SM	1.01	0.78	1.35	0.457	0.708	29	No
CC_pariet	1.29	0.99	1.73	0.028	0.211	6	No
CC_temp	1.00	0.77	1.34	0.490	0.736	30	No
CC_splen	1.39	1.07	1.86	0.007	0.320	1	No

Result S4-4: Idiosyncrasy of siblings of people with ASD

F-ratio of siblings of people with ASD, lower and upper bound of the confidence interval. The p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	F-ratio	CI_low	CI_up	p	p_adj	rank	Significance
AF_L	1.84	1.33	2.68	<0.001	0.002	2	Yes
AF_R	1.43	1.03	2.07	0.016	0.089	8	No
SLF1_L	1.53	1.10	2.22	0.005	0.055	4	No
SLF1_R	0.99	0.71	1.43	0.513	0.577	40	No
SLF2_L	1.24	0.90	1.80	0.098	0.258	17	No
SLF2_R	1.11	0.80	1.62	0.257	0.398	29	No
SLF3_L	1.33	0.96	1.94	0.041	0.154	12	No
SLF3_R	1.07	0.77	1.55	0.339	0.462	33	No
FAT_L	1.30	0.94	1.89	0.056	0.179	14	No
FAT_R	1.05	0.76	1.53	0.373	0.479	35	No
PF_L	0.92	0.66	1.33	0.667	0.715	42	No
PF_R	1.47	1.06	2.13	0.010	0.066	7	No
CGB_L	1.10	0.79	1.59	0.286	0.429	30	No
CGB_R	1.17	0.84	1.69	0.176	0.331	24	No
CGH_L	1.00	0.72	1.45	0.483	0.558	39	No
CGH_R	1.24	0.89	1.80	0.102	0.254	18	No
FX_L	0.83	0.60	1.21	0.837	0.837	45	No
FX_R	1.20	0.87	1.75	0.131	0.280	21	No
ST_L	0.91	0.66	1.32	0.684	0.716	43	No
ST_R	1.39	1.00	2.01	0.025	0.123	9	No
UF_L	1.26	0.91	1.83	0.081	0.227	16	No
UF_R	0.91	0.66	1.32	0.688	0.704	44	No
IFOF_L	1.37	0.99	1.99	0.029	0.118	11	No
IFOF_R	1.29	0.93	1.88	0.062	0.187	15	No
ILF_L	0.95	0.69	1.38	0.597	0.655	41	No
ILF_R	1.23	0.89	1.79	0.103	0.243	19	No
FS_PFC_L	1.07	0.77	1.56	0.329	0.478	31	No
FS_PFC_R	1.19	0.86	1.73	0.148	0.289	23	No
FS_M_L	1.01	0.73	1.47	0.461	0.560	37	No

FS_M_R	1.32	0.95	1.91	0.049	0.169	13	No
TR_PFC_L	1.04	0.75	1.51	0.398	0.498	36	No
TR_PFC_R	1.05	0.76	1.53	0.368	0.487	34	No
TR_SM_L	1.07	0.77	1.56	0.333	0.468	32	No
TR_SM_R	1.15	0.83	1.67	0.202	0.325	28	No
TR_aud_L	1.16	0.84	1.69	0.183	0.329	25	No
TR_aud_R	1.20	0.86	1.74	0.140	0.287	22	No
TR_opt_L	1.52	1.10	2.21	0.006	0.050	5	No
TR_opt_R	1.15	0.83	1.67	0.201	0.334	27	No
CST_L	1.15	0.83	1.67	0.201	0.347	26	No
CST_R	1.00	0.72	1.45	0.481	0.569	38	No
CC_PFC	1.38	1.00	2.01	0.026	0.117	10	No
CC_SM	1.79	1.29	2.60	<0.001	0.002	3	Yes
CC_pariet	1.89	1.37	2.75	<0.001	0.002	1	Yes
CC_temp	1.47	1.07	2.14	0.009	0.070	6	No
CC_splen	1.21	0.87	1.76	0.125	0.282	20	No

Result S5-1: Idiosyncrasy of children with ADHD

F-ratio of children with ADHD, lower and upper bound of the confidence interval. The p-value and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	F-ratio	CI_low	CI_up	p	p_adj	rank	Significance
AF_L	1.33	1.04	1.74	0.011	0.237	2	No
AF_R	1.14	0.89	1.49	0.146	0.549	12	No
SLF1_L	1.41	1.11	1.84	0.003	0.122	1	No
SLF1_R	0.95	0.74	1.24	0.645	0.853	34	No
SLF2_L	1.11	0.86	1.44	0.211	0.633	15	No
SLF2_R	1.00	0.78	1.31	0.485	0.872	25	No
SLF3_L	1.19	0.93	1.55	0.085	0.381	10	No
SLF3_R	1.08	0.85	1.41	0.265	0.701	17	No
FAT_L	0.94	0.73	1.22	0.680	0.875	35	No
FAT_R	0.78	0.61	1.02	0.965	0.987	44	No
PF_L	0.92	0.72	1.20	0.729	0.863	38	No
PF_R	1.11	0.87	1.45	0.195	0.676	13	No
CGB_L	0.88	0.69	1.15	0.825	0.928	40	No
CGB_R	1.19	0.93	1.55	0.081	0.455	8	No
CGH_L	0.93	0.73	1.22	0.692	0.865	36	No
CGH_R	0.84	0.66	1.10	0.894	0.981	41	No
FX_L	1.02	0.80	1.33	0.419	0.786	24	No
FX_R	1.11	0.87	1.45	0.196	0.632	14	No
ST_L	0.70	0.55	0.91	0.996	0.996	45	No
ST_R	0.83	0.65	1.09	0.910	0.975	42	No
UF_L	1.05	0.82	1.37	0.340	0.728	21	No
UF_R	1.20	0.94	1.56	0.074	0.662	5	No
IFOF_L	0.96	0.75	1.25	0.614	0.838	33	No
IFOF_R	1.19	0.93	1.55	0.082	0.409	9	No
ILF_L	1.00	0.78	1.30	0.494	0.855	26	No
ILF_R	1.22	0.95	1.59	0.057	0.640	4	No
FS_PFC_L	0.99	0.78	1.29	0.512	0.853	27	No
FS_PFC_R	0.93	0.73	1.21	0.707	0.860	37	No
FS_M_L	0.98	0.77	1.28	0.556	0.808	31	No

FS_M_R	0.79	0.62	1.03	0.959	1.000	43	No
TR_PFC_L	1.10	0.86	1.44	0.219	0.616	16	No
TR_PFC_R	1.20	0.94	1.56	0.077	0.495	7	No
TR_SM_L	1.05	0.82	1.38	0.332	0.746	20	No
TR_SM_R	1.08	0.84	1.40	0.275	0.686	18	No
TR_aud_L	1.25	0.98	1.63	0.036	0.544	3	No
TR_aud_R	1.03	0.81	1.34	0.400	0.783	23	No
TR_opt_L	0.92	0.72	1.20	0.735	0.848	39	No
TR_opt_R	0.99	0.77	1.29	0.533	0.800	30	No
CST_L	0.99	0.77	1.29	0.525	0.815	29	No
CST_R	0.96	0.75	1.26	0.605	0.851	32	No
CC_PFC	1.20	0.94	1.56	0.075	0.559	6	No
CC_SM	1.07	0.84	1.40	0.281	0.666	19	No
CC_pariet	1.15	0.90	1.50	0.133	0.544	11	No
CC_temp	1.04	0.81	1.35	0.377	0.772	22	No
CC_splen	0.99	0.77	1.29	0.524	0.842	28	No

Result S5-2: Idiosyncrasy of adults with ADHD

F-ratio of adults with ADHD, lower and upper bound of the confidence interval. The p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	F-ratio	CI_low	CI_up	p	p_adj	rank	Significance
AF_L	1.29	1.00	1.70	0.026	0.073	16	No
AF_R	1.27	0.98	1.68	0.034	0.082	19	No
SLF1_L	1.04	0.81	1.38	0.369	0.426	39	No
SLF1_R	1.09	0.85	1.45	0.243	0.304	36	No
SLF2_L	1.42	1.10	1.88	0.003	0.026	6	Yes
SLF2_R	1.16	0.90	1.53	0.132	0.186	32	No
SLF3_L	1.48	1.15	1.96	0.001	0.014	4	Yes
SLF3_R	1.16	0.90	1.53	0.131	0.190	31	No
FAT_L	1.18	0.91	1.56	0.104	0.157	30	No
FAT_R	1.24	0.96	1.64	0.047	0.092	23	No
PF_L	0.96	0.74	1.27	0.606	0.649	42	No
PF_R	1.11	0.86	1.46	0.218	0.280	35	No
CGB_L	1.14	0.88	1.51	0.154	0.203	34	No
CGB_R	1.26	0.98	1.67	0.037	0.083	20	No
CGH_L	1.14	0.89	1.51	0.150	0.205	33	No
CGH_R	1.34	1.03	1.77	0.013	0.058	10	No
FX_L	1.01	0.78	1.33	0.463	0.521	40	No
FX_R	0.96	0.74	1.26	0.619	0.647	43	No
ST_L	0.87	0.67	1.15	0.839	0.839	45	No
ST_R	0.95	0.74	1.26	0.634	0.649	44	No
UF_L	1.33	1.03	1.76	0.015	0.060	11	No
UF_R	1.25	0.97	1.65	0.043	0.087	22	No
IFOF_L	1.23	0.96	1.63	0.054	0.097	25	No
IFOF_R	1.19	0.92	1.57	0.095	0.148	29	No
ILF_L	1.19	0.92	1.58	0.090	0.144	28	No
ILF_R	1.24	0.96	1.64	0.049	0.093	24	No
FS_PFC_L	1.30	1.01	1.72	0.023	0.068	15	No
FS_PFC_R	1.36	1.05	1.80	0.009	0.045	9	Yes
FS_M_L	1.52	1.18	2.01	0.001	0.012	2	Yes

FS_M_R	1.33	1.03	1.75	0.015	0.057	12	No
TR_PFC_L	1.27	0.98	1.68	0.034	0.085	18	No
TR_PFC_R	1.44	1.12	1.90	0.002	0.022	5	Yes
TR_SM_L	1.09	0.85	1.44	0.248	0.301	37	No
TR_SM_R	1.26	0.97	1.66	0.040	0.086	21	No
TR_aud_L	1.37	1.06	1.81	0.008	0.043	8	Yes
TR_aud_R	1.22	0.94	1.61	0.068	0.117	26	No
TR_opt_L	1.08	0.84	1.43	0.270	0.320	38	No
TR_opt_R	1.21	0.94	1.60	0.070	0.116	27	No
CST_L	1.31	1.02	1.73	0.019	0.065	13	No
CST_R	1.53	1.18	2.02	<0.001	0.022	1	Yes
CC_PFC	1.30	1.01	1.72	0.021	0.067	14	No
CC_SM	1.38	1.07	1.83	0.006	0.040	7	Yes
CC_pariet	1.52	1.18	2.01	0.001	0.008	3	Yes
CC_temp	1.27	0.99	1.68	0.032	0.085	17	No
CC_splen	0.99	0.77	1.31	0.505	0.554	41	No

Result S5-3: Idiosyncrasy of children with ASD

F-ratio of children with ASD, lower and upper bound of the confidence interval. The p-value and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	F-ratio	CI_low	CI_up	p	p_adj	rank	Significance
AF_L	1.25	0.94	1.70	0.062	0.154	18	No
AF_R	1.35	1.02	1.85	0.017	0.071	11	No
SLF1_L	1.38	1.04	1.89	0.012	0.059	9	No
SLF1_R	0.90	0.68	1.23	0.735	0.788	42	No
SLF2_L	1.21	0.91	1.65	0.095	0.203	21	No
SLF2_R	1.04	0.79	1.42	0.378	0.532	32	No
SLF3_L	1.22	0.92	1.67	0.079	0.179	20	No
SLF3_R	1.06	0.80	1.45	0.337	0.505	30	No
FAT_L	1.20	0.90	1.63	0.105	0.206	23	No
FAT_R	1.04	0.79	1.42	0.383	0.522	33	No
PF_L	1.16	0.88	1.59	0.146	0.273	24	No
PF_R	1.14	0.86	1.56	0.172	0.310	25	No
CGB_L	1.01	0.77	1.39	0.447	0.559	36	No
CGB_R	1.39	1.05	1.90	0.010	0.059	8	No
CGH_L	0.97	0.74	1.33	0.558	0.643	39	No
CGH_R	1.07	0.81	1.46	0.318	0.512	28	No
FX_L	1.45	1.10	1.99	0.004	0.027	7	Yes
FX_R	1.51	1.14	2.06	0.002	0.021	4	Yes
ST_L	0.74	0.56	1.01	0.970	0.970	45	No
ST_R	0.98	0.74	1.33	0.551	0.652	38	No
UF_L	1.00	0.76	1.37	0.486	0.591	37	No
UF_R	1.32	1.00	1.80	0.026	0.091	13	No
IFOF_L	1.29	0.97	1.76	0.038	0.121	14	No
IFOF_R	1.50	1.13	2.05	0.002	0.019	5	Yes
ILF_L	0.97	0.73	1.32	0.568	0.639	40	No
ILF_R	1.02	0.77	1.39	0.435	0.560	35	No
FS_PFC_L	1.26	0.95	1.72	0.054	0.163	15	No
FS_PFC_R	1.57	1.19	2.15	0.001	0.010	3	Yes
FS_M_L	1.25	0.95	1.71	0.058	0.164	16	No

FS_M_R	0.84	0.64	1.15	0.857	0.876	44	No
TR_PFC_L	1.34	1.02	1.84	0.019	0.073	12	No
TR_PFC_R	1.80	1.36	2.45	<0.001	<0.001	2	Yes
TR_SM_L	0.97	0.73	1.32	0.577	0.634	41	No
TR_SM_R	1.13	0.85	1.54	0.201	0.348	26	No
TR_aud_L	1.04	0.79	1.43	0.373	0.542	31	No
TR_aud_R	0.90	0.68	1.23	0.751	0.786	43	No
TR_opt_L	1.02	0.77	1.40	0.428	0.567	34	No
TR_opt_R	1.07	0.81	1.46	0.311	0.518	27	No
CST_L	1.23	0.93	1.68	0.074	0.176	19	No
CST_R	1.20	0.91	1.64	0.098	0.200	22	No
CC_PFC	1.88	1.42	2.56	<0.001	<0.001	1	Yes
CC_SM	1.48	1.12	2.03	0.003	0.021	6	Yes
CC_pariet	1.36	1.02	1.85	0.016	0.074	10	No
CC_temp	1.06	0.80	1.45	0.329	0.510	29	No
CC_splen	1.25	0.94	1.71	0.060	0.158	17	No

Result S5-4: Idiosyncrasy of adults with ASD

F-ratio of adults with ASD, lower and upper bound of the confidence interval. The p value and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	F-ratio	CI_low	CI_up	pvalue	p_corrected	rank	pass
AF_L	1.09	0.79	1.59	0.292	0.398	33	No
AF_R	1.15	0.83	1.68	0.195	0.314	28	No
SLF1_L	1.89	1.36	2.76	<0.001	0.001	2	Yes
SLF1_R	1.07	0.77	1.56	0.337	0.433	35	No
SLF2_L	1.38	0.99	2.01	0.028	0.078	16	No
SLF2_R	1.44	1.04	2.10	0.014	0.053	12	No
SLF3_L	1.47	1.06	2.14	0.010	0.043	11	Yes
SLF3_R	1.11	0.80	1.62	0.261	0.392	30	No
FAT_L	1.37	0.99	2.00	0.029	0.073	18	No
FAT_R	1.38	0.99	2.01	0.028	0.074	17	No
PF_L	0.90	0.65	1.31	0.702	0.752	42	No
PF_R	1.16	0.84	1.69	0.182	0.315	26	No
CGB_L	1.44	1.04	2.09	0.015	0.051	13	No
CGB_R	1.41	1.02	2.06	0.019	0.061	14	No
CGH_L	0.99	0.71	1.44	0.506	0.570	40	No
CGH_R	1.52	1.09	2.21	0.006	0.027	10	Yes
FX_L	1.13	0.82	1.65	0.228	0.354	29	No
FX_R	1.08	0.78	1.57	0.320	0.424	34	No
ST_L	0.74	0.53	1.08	0.942	0.964	44	No
ST_R	0.73	0.53	1.06	0.950	0.950	45	No
UF_L	1.38	0.99	2.01	0.027	0.081	15	No
UF_R	1.69	1.22	2.47	0.001	0.005	6	Yes
IFOF_L	1.16	0.84	1.69	0.187	0.311	27	No
IFOF_R	1.37	0.99	1.99	0.031	0.073	19	No
ILF_L	0.94	0.68	1.37	0.619	0.679	41	No
ILF_R	1.05	0.76	1.53	0.374	0.431	39	No
FS_PFC_L	1.23	0.89	1.79	0.108	0.212	23	No
FS_PFC_R	1.31	0.95	1.91	0.053	0.113	21	No
FS_M_L	1.67	1.21	2.44	0.001	0.006	7	Yes

FS_M_R	1.65	1.19	2.41	0.001	0.006	8	Yes
TR_PFC_L	1.82	1.32	2.66	<0.001	0.001	4	Yes
TR_PFC_R	1.83	1.32	2.66	<0.001	0.002	3	Yes
TR_SM_L	1.10	0.79	1.60	0.277	0.390	32	No
TR_SM_R	1.07	0.77	1.55	0.340	0.426	36	No
TR_aud_L	1.06	0.77	1.55	0.351	0.416	38	No
TR_aud_R	1.32	0.95	1.93	0.048	0.107	20	No
TR_opt_L	0.88	0.63	1.28	0.745	0.780	43	No
TR_opt_R	1.16	0.84	1.70	0.181	0.325	25	No
CST_L	1.31	0.94	1.90	0.055	0.112	22	No
CST_R	1.18	0.85	1.72	0.163	0.305	24	No
CC_PFC	1.76	1.27	2.56	<0.001	0.003	5	Yes
CC_SM	2.08	1.50	3.03	<0.001	<0.001	1	Yes
CC_pariet	1.62	1.17	2.37	0.002	0.008	9	Yes
CC_temp	1.06	0.77	1.55	0.348	0.423	37	No
CC_splen	1.11	0.80	1.62	0.262	0.381	31	No

Result S6-1: Mean deviation difference in people with ADHD and people with ASD

The effect size of two-sample t-test of deviation of people with ADHD and people with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	0.12	-0.07	0.31	1.21	0.226	0.849	12	No
AF_R	0.04	-0.14	0.23	0.47	0.641	0.801	36	No
SLF1_L	-0.02	-0.21	0.17	-0.25	0.805	0.884	41	No
SLF1_R	-0.15	-0.34	0.04	-1.60	0.111	0.829	6	No
SLF2_L	0.11	-0.08	0.30	1.18	0.239	0.826	13	No
SLF2_R	0.10	-0.09	0.29	1.03	0.305	0.807	17	No
SLF3_L	0.09	-0.10	0.28	0.94	0.348	0.783	20	No
SLF3_R	0.13	-0.06	0.31	1.30	0.194	0.873	10	No
FAT_L	0.26	0.07	0.45	2.72	0.007	0.151	2	No
FAT_R	0.05	-0.14	0.24	0.55	0.582	0.819	32	No
PF_L	0.15	-0.04	0.33	1.51	0.132	0.744	8	No
PF_R	0.08	-0.10	0.27	0.87	0.383	0.783	22	No
CGB_L	0.12	-0.07	0.31	1.27	0.204	0.833	11	No
CGB_R	0.09	-0.10	0.28	0.95	0.340	0.806	19	No
CGH_L	0.08	-0.11	0.26	0.78	0.434	0.782	25	No
CGH_R	0.11	-0.08	0.30	1.17	0.242	0.779	14	No
FX_L	0.03	-0.16	0.22	0.35	0.726	0.838	39	No
FX_R	0.13	-0.05	0.32	1.40	0.162	0.811	9	No
ST_L	0.07	-0.12	0.26	0.72	0.474	0.761	28	No
ST_R	-0.03	-0.22	0.16	-0.33	0.742	0.834	40	No
UF_L	0.18	-0.01	0.37	1.89	0.059	0.666	4	No
UF_R	0.15	-0.04	0.34	1.58	0.115	0.738	7	No
IFOF_L	0.09	-0.10	0.28	0.97	0.334	0.836	18	No
IFOF_R	0.06	-0.13	0.25	0.64	0.523	0.760	31	No
ILF_L	0.01	-0.18	0.20	0.09	0.931	0.975	43	No
ILF_R	0.10	-0.09	0.29	1.08	0.283	0.848	15	No
FS_PFC_L	0.10	-0.09	0.29	1.06	0.290	0.816	16	No
FS_PFC_R	0.07	-0.12	0.26	0.75	0.454	0.757	27	No

FS_M_L	-0.07	-0.26	0.12	-0.69	0.489	0.759	29	No
FS_M_R	-0.07	-0.26	0.12	-0.76	0.446	0.771	26	No
TR_PFC_L	0.08	-0.11	0.27	0.80	0.426	0.800	24	No
TR_PFC_R	0.08	-0.10	0.27	0.87	0.383	0.749	23	No
TR_SM_L	-0.07	-0.25	0.12	-0.68	0.499	0.748	30	No
TR_SM_R	-0.05	-0.24	0.14	-0.54	0.586	0.799	33	No
TR_aud_L	0.05	-0.14	0.24	0.49	0.623	0.824	34	No
TR_aud_R	-0.02	-0.21	0.17	-0.21	0.835	0.895	42	No
TR_opt_L	-0.03	-0.22	0.15	-0.36	0.717	0.849	38	No
TR_opt_R	0.00	-0.19	0.19	0.02	0.984	0.984	45	No
CST_L	-0.16	-0.35	0.03	-1.67	0.095	0.857	5	No
CST_R	-0.18	-0.37	0.00	-1.91	0.056	0.844	3	No
CC_PFC	0.36	0.17	0.55	3.74	<0.001	0.009	1	Yes
CC_SM	0.05	-0.14	0.24	0.48	0.629	0.808	35	No
CC_pariet	0.01	-0.18	0.20	0.08	0.939	0.960	44	No
CC_temp	0.04	-0.15	0.23	0.41	0.682	0.829	37	No
CC_splen	-0.09	-0.28	0.10	-0.90	0.369	0.791	21	No

Result S6-2: Mean deviation difference in people with ADHD and siblings of people with ADHD

The effect size of two-sample t-test of deviation of people with ADHD and siblings of people with ADHD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.22	-0.44	-0.01	-2.06	0.040	0.597	3	No
AF_R	-0.12	-0.34	0.09	-1.13	0.257	0.482	24	No
SLF1_L	-0.12	-0.33	0.10	-1.09	0.278	0.481	26	No
SLF1_R	-0.22	-0.43	0.00	-2.01	0.045	0.510	4	No
SLF2_L	-0.07	-0.29	0.14	-0.66	0.510	0.656	35	No
SLF2_R	-0.13	-0.34	0.08	-1.20	0.229	0.469	22	No
SLF3_L	-0.06	-0.27	0.15	-0.56	0.576	0.683	38	No
SLF3_R	-0.07	-0.29	0.14	-0.69	0.492	0.671	33	No
FAT_L	-0.14	-0.36	0.07	-1.32	0.189	0.473	18	No
FAT_R	-0.06	-0.28	0.15	-0.59	0.553	0.672	37	No
PF_L	-0.10	-0.31	0.12	-0.90	0.367	0.550	30	No
PF_R	-0.13	-0.35	0.08	-1.21	0.226	0.484	21	No
CGB_L	-0.10	-0.31	0.11	-0.93	0.355	0.570	28	No
CGB_R	-0.17	-0.38	0.05	-1.54	0.125	0.401	14	No
CGH_L	-0.02	-0.23	0.20	-0.15	0.879	0.965	41	No
CGH_R	-0.15	-0.37	0.06	-1.41	0.159	0.421	17	No
FX_L	-0.02	-0.23	0.20	-0.14	0.887	0.929	43	No
FX_R	-0.02	-0.23	0.20	-0.15	0.882	0.945	42	No
ST_L	-0.14	-0.35	0.08	-1.24	0.216	0.485	20	No
ST_R	-0.08	-0.29	0.14	-0.70	0.483	0.680	32	No
UF_L	-0.20	-0.41	0.02	-1.81	0.070	0.396	8	No
UF_R	-0.10	-0.31	0.11	-0.92	0.358	0.555	29	No
IFOF_L	-0.21	-0.42	0.00	-1.93	0.054	0.404	6	No
IFOF_R	-0.04	-0.26	0.17	-0.41	0.682	0.787	39	No
ILF_L	-0.14	-0.35	0.07	-1.29	0.196	0.465	19	No
ILF_R	-0.09	-0.30	0.13	-0.79	0.428	0.622	31	No
FS_PFC_L	-0.16	-0.37	0.06	-1.45	0.147	0.414	16	No

FS_PFC_R	-0.13	-0.34	0.08	-1.20	0.230	0.450	23	No
FS_M_L	-0.01	-0.22	0.20	-0.09	0.928	0.928	45	No
FS_M_R	-0.12	-0.33	0.09	-1.09	0.274	0.494	25	No
TR_PFC_L	-0.28	-0.50	-0.07	-2.61	0.009	0.427	1	No
TR_PFC_R	-0.19	-0.40	0.03	-1.72	0.086	0.353	11	No
TR_SM_L	-0.07	-0.28	0.15	-0.62	0.536	0.670	36	No
TR_SM_R	-0.03	-0.24	0.19	-0.26	0.795	0.894	40	No
TR_aud_L	-0.25	-0.46	-0.03	-2.28	0.023	0.523	2	No
TR_aud_R	-0.19	-0.40	0.02	-1.74	0.082	0.411	9	No
TR_opt_L	-0.18	-0.39	0.04	-1.64	0.103	0.355	13	No
TR_opt_R	0.01	-0.20	0.22	0.10	0.924	0.945	44	No
CST_L	-0.18	-0.40	0.03	-1.67	0.096	0.361	12	No
CST_R	-0.21	-0.43	0.00	-1.96	0.050	0.454	5	No
CC_PFC	-0.07	-0.29	0.14	-0.67	0.504	0.667	34	No
CC_SM	-0.11	-0.33	0.10	-1.03	0.301	0.502	27	No
CC_pariet	-0.19	-0.40	0.03	-1.73	0.084	0.378	10	No
CC_temp	-0.21	-0.42	0.00	-1.93	0.055	0.352	7	No
CC_splen	-0.16	-0.38	0.05	-1.48	0.139	0.417	15	No

Result S6-3: Mean deviation difference in people with ASD and siblings of people with ASD

The effect size of the two-sample t-test of deviation of people with ASD and siblings of people with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.14	-0.42	0.13	-1.01	0.316	1.000	10	No
AF_R	-0.05	-0.32	0.23	-0.34	0.735	1.000	33	No
SLF1_L	0.09	-0.18	0.37	0.65	0.515	1.000	18	No
SLF1_R	0.06	-0.21	0.34	0.45	0.655	1.000	26	No
SLF2_L	0.08	-0.20	0.35	0.55	0.582	1.000	22	No
SLF2_R	0.18	-0.09	0.46	1.31	0.190	1.000	5	No
SLF3_L	0.08	-0.20	0.35	0.55	0.581	1.000	21	No
SLF3_R	-0.05	-0.32	0.23	-0.34	0.732	1.000	32	No
FAT_L	0.08	-0.19	0.36	0.60	0.549	1.000	19	No
FAT_R	0.13	-0.15	0.40	0.92	0.359	1.000	11	No
PF_L	-0.17	-0.44	0.10	-1.21	0.226	1.000	6	No
PF_R	0.11	-0.17	0.38	0.77	0.444	1.000	14	No
CGB_L	-0.04	-0.31	0.24	-0.28	0.783	0.952	37	No
CGB_R	0.02	-0.25	0.29	0.14	0.889	0.976	41	No
CGH_L	0.11	-0.16	0.39	0.79	0.428	1.000	13	No
CGH_R	-0.02	-0.30	0.25	-0.18	0.860	0.993	39	No
FX_L	-0.21	-0.49	0.06	-1.50	0.134	1.000	2	No
FX_R	-0.06	-0.33	0.22	-0.40	0.692	1.000	28	No
ST_L	-0.19	-0.46	0.09	-1.35	0.179	1.000	4	No
ST_R	-0.01	-0.28	0.27	-0.04	0.971	0.971	45	No
UF_L	-0.05	-0.33	0.22	-0.37	0.711	1.000	30	No
UF_R	-0.16	-0.43	0.12	-1.12	0.262	1.000	7	No
IFOF_L	0.04	-0.23	0.32	0.29	0.771	0.964	36	No
IFOF_R	0.10	-0.17	0.37	0.71	0.477	1.000	15	No
ILF_L	0.07	-0.20	0.34	0.50	0.620	1.000	24	No
ILF_R	-0.08	-0.35	0.19	-0.57	0.570	1.000	20	No
FS_PFC_L	0.12	-0.16	0.39	0.83	0.408	1.000	12	No

FS_PFC_R	0.14	-0.13	0.42	1.03	0.306	1.000	9	No
FS_M_L	0.06	-0.22	0.33	0.40	0.687	1.000	27	No
FS_M_R	-0.02	-0.30	0.25	-0.17	0.868	0.977	40	No
TR_PFC_L	0.05	-0.22	0.33	0.39	0.696	1.000	29	No
TR_PFC_R	0.03	-0.24	0.31	0.23	0.815	0.966	38	No
TR_SM_L	0.23	-0.05	0.50	1.61	0.109	1.000	1	No
TR_SM_R	0.02	-0.25	0.29	0.14	0.889	0.953	42	No
TR_aud_L	0.05	-0.22	0.33	0.36	0.717	1.000	31	No
TR_aud_R	-0.20	-0.48	0.07	-1.45	0.149	1.000	3	No
TR_opt_L	-0.01	-0.29	0.26	-0.08	0.938	0.959	44	No
TR_opt_R	-0.09	-0.37	0.18	-0.66	0.510	1.000	17	No
CST_L	0.10	-0.18	0.37	0.70	0.485	1.000	16	No
CST_R	0.04	-0.23	0.32	0.32	0.749	0.991	34	No
CC_PFC	-0.07	-0.35	0.20	-0.53	0.596	1.000	23	No
CC_SM	-0.07	-0.34	0.21	-0.50	0.620	1.000	25	No
CC_pariet	-0.15	-0.42	0.13	-1.06	0.290	1.000	8	No
CC_temp	-0.02	-0.29	0.26	-0.13	0.896	0.938	43	No
CC_splen	-0.04	-0.32	0.23	-0.30	0.767	0.986	35	No

Result S6-4: Mean deviation difference in siblings of people with ADHD and siblings of people with ASD

The effect size of two-sample t-test of deviation of siblings of people with ADHD and siblings of people with ASD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	0.19	-0.10	0.48	1.26	0.210	0.410	23	No
AF_R	0.12	-0.17	0.41	0.81	0.418	0.649	29	No
SLF1_L	0.20	-0.09	0.49	1.34	0.182	0.391	21	No
SLF1_R	0.13	-0.16	0.42	0.88	0.378	0.630	27	No
SLF2_L	0.27	-0.03	0.56	1.79	0.075	0.240	14	No
SLF2_R	0.44	0.14	0.73	2.93	0.004	0.056	3	No
SLF3_L	0.23	-0.07	0.52	1.53	0.128	0.339	17	No
SLF3_R	0.15	-0.14	0.45	1.04	0.302	0.522	26	No
FAT_L	0.53	0.23	0.82	3.54	0.001	0.023	1	Yes
FAT_R	0.28	-0.01	0.57	1.87	0.063	0.217	13	No
PF_L	0.07	-0.22	0.36	0.47	0.640	0.778	37	No
PF_R	0.33	0.03	0.62	2.19	0.030	0.135	10	No
CGB_L	0.17	-0.12	0.47	1.17	0.244	0.440	25	No
CGB_R	0.28	-0.01	0.57	1.88	0.062	0.232	12	No
CGH_L	0.20	-0.10	0.49	1.32	0.189	0.387	22	No
CGH_R	0.23	-0.06	0.53	1.58	0.117	0.350	15	No
FX_L	-0.18	-0.47	0.12	-1.18	0.238	0.447	24	No
FX_R	0.09	-0.20	0.38	0.59	0.555	0.734	34	No
ST_L	0.02	-0.28	0.31	0.11	0.911	0.954	43	No
ST_R	0.04	-0.26	0.33	0.24	0.809	0.958	38	No
UF_L	0.32	0.03	0.61	2.16	0.032	0.131	11	No
UF_R	0.10	-0.19	0.40	0.69	0.489	0.688	32	No
IFOF_L	0.34	0.04	0.63	2.27	0.024	0.121	9	No
IFOF_R	0.22	-0.08	0.51	1.46	0.147	0.348	19	No
ILF_L	0.21	-0.08	0.50	1.41	0.159	0.357	20	No
ILF_R	0.11	-0.18	0.40	0.74	0.458	0.665	31	No
FS_PFC_L	0.40	0.10	0.69	2.65	0.009	0.097	4	No

FS_PFC_R	0.37	0.08	0.67	2.51	0.013	0.116	5	No
FS_M_L	0.00	-0.29	0.29	-0.01	0.995	0.995	45	No
FS_M_R	0.02	-0.27	0.31	0.13	0.893	0.957	42	No
TR_PFC_L	0.45	0.16	0.75	3.03	0.003	0.063	2	No
TR_PFC_R	0.35	0.05	0.64	2.34	0.020	0.113	8	No
TR_SM_L	0.23	-0.06	0.52	1.55	0.122	0.344	16	No
TR_SM_R	-0.01	-0.30	0.29	-0.04	0.965	0.987	44	No
TR_aud_L	0.36	0.06	0.65	2.39	0.018	0.115	7	No
TR_aud_R	-0.03	-0.32	0.27	-0.18	0.860	0.944	41	No
TR_opt_L	0.12	-0.17	0.41	0.82	0.415	0.668	28	No
TR_opt_R	-0.10	-0.39	0.19	-0.66	0.510	0.696	33	No
CST_L	0.12	-0.17	0.41	0.81	0.419	0.628	30	No
CST_R	0.07	-0.22	0.37	0.50	0.616	0.792	35	No
CC_PFC	0.37	0.07	0.66	2.47	0.014	0.107	6	No
CC_SM	0.07	-0.22	0.37	0.50	0.619	0.774	36	No
CC_pariet	0.03	-0.26	0.32	0.21	0.837	0.965	39	No
CC_temp	0.22	-0.07	0.52	1.50	0.136	0.339	18	No
CC_splen	0.03	-0.26	0.32	0.20	0.838	0.943	40	No

Result S7-1: Mean deviation difference in children with ADHD and adults with ADHD

The effect size of two-sample t-test of deviation of children with ADHD and adults with ADHD, lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	0.03	-0.21	0.26	0.22	0.830	0.982	38	No
AF_R	-0.20	-0.43	0.04	-1.65	0.101	0.754	6	No
SLF1_L	-0.02	-0.25	0.22	-0.14	0.889	0.976	41	No
SLF1_R	0.14	-0.10	0.37	1.16	0.247	1.000	10	No
SLF2_L	-0.09	-0.32	0.15	-0.73	0.465	1.000	20	No
SLF2_R	-0.10	-0.33	0.14	-0.80	0.424	1.000	18	No
SLF3_L	-0.05	-0.29	0.18	-0.44	0.658	0.956	31	No
SLF3_R	-0.20	-0.43	0.04	-1.63	0.104	0.668	7	No
FAT_L	-0.03	-0.26	0.21	-0.22	0.827	1.000	37	No
FAT_R	-0.09	-0.33	0.14	-0.79	0.429	1.000	19	No
PF_L	-0.12	-0.36	0.11	-1.00	0.316	1.000	14	No
PF_R	0.03	-0.21	0.26	0.23	0.822	1.000	36	No
CGB_L	-0.12	-0.36	0.11	-1.02	0.307	1.000	12	No
CGB_R	0.12	-0.12	0.35	0.99	0.325	0.976	15	No
CGH_L	-0.32	-0.55	-0.08	-2.65	0.008	0.190	2	No
CGH_R	0.07	-0.16	0.31	0.62	0.539	1.000	23	No
FX_L	0.06	-0.18	0.29	0.47	0.638	0.956	30	No
FX_R	0.07	-0.17	0.30	0.56	0.574	0.957	27	No
ST_L	-0.07	-0.31	0.16	-0.60	0.550	0.990	25	No
ST_R	-0.33	-0.57	-0.09	-2.75	0.006	0.286	1	No
UF_L	-0.09	-0.32	0.15	-0.73	0.466	0.998	21	No
UF_R	-0.01	-0.25	0.22	-0.11	0.915	0.981	42	No
IFOF_L	-0.14	-0.37	0.10	-1.16	0.247	1.000	11	No
IFOF_R	-0.06	-0.30	0.17	-0.52	0.605	0.973	28	No
ILF_L	-0.25	-0.48	-0.01	-2.06	0.040	0.601	3	No
ILF_R	-0.16	-0.39	0.08	-1.31	0.191	1.000	8	No
FS_PFC_L	-0.11	-0.35	0.12	-0.93	0.352	0.991	16	No

FS_PFC_R	0.00	-0.24	0.23	-0.03	0.980	1.000	44	No
FS_M_L	0.04	-0.19	0.28	0.33	0.738	0.977	34	No
FS_M_R	-0.15	-0.39	0.09	-1.25	0.212	1.000	9	No
TR_PFC_L	-0.03	-0.27	0.20	-0.26	0.794	1.000	35	No
TR_PFC_R	0.12	-0.11	0.36	1.01	0.314	1.000	13	No
TR_SM_L	-0.07	-0.31	0.16	-0.61	0.543	1.000	24	No
TR_SM_R	-0.01	-0.24	0.23	-0.06	0.952	0.996	43	No
TR_aud_L	-0.07	-0.31	0.16	-0.59	0.559	0.967	26	No
TR_aud_R	0.00	-0.24	0.23	-0.01	0.990	0.990	45	No
TR_opt_L	-0.21	-0.44	0.03	-1.74	0.083	0.749	5	No
TR_opt_R	-0.06	-0.29	0.18	-0.48	0.629	0.976	29	No
CST_L	0.08	-0.15	0.32	0.70	0.486	0.993	22	No
CST_R	-0.04	-0.28	0.19	-0.37	0.708	0.996	32	No
CC_PFC	0.21	-0.02	0.45	1.78	0.076	0.855	4	No
CC_SM	0.11	-0.13	0.34	0.89	0.374	0.989	17	No
CC_pariet	-0.03	-0.26	0.21	-0.21	0.835	0.963	39	No
CC_temp	0.04	-0.19	0.28	0.34	0.732	0.998	33	No
CC_splen	0.02	-0.22	0.25	0.16	0.876	0.985	40	No

Result S7-2: Mean deviation difference in children with ASD and adults with ASD

Effect size of two-sample t-test of deviation of children with ASD and adults with ASD, lower and upper bound of confidence interval. The t-statistics, p value, and adjusted p value by Benjamini correction (FDR q=0.05), the rank of p value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	pass
AF_L	0.07	-0.23	0.37	0.44	0.657	1.000	28	No
AF_R	-0.01	-0.31	0.29	-0.08	0.940	0.961	44	No
SLF1_L	0.25	-0.05	0.55	1.62	0.108	0.486	10	No
SLF1_R	0.19	-0.11	0.49	1.25	0.213	0.872	11	No
SLF2_L	-0.06	-0.36	0.24	-0.38	0.704	1.000	29	No
SLF2_R	0.08	-0.22	0.38	0.51	0.609	1.000	25	No
SLF3_L	0.07	-0.23	0.37	0.46	0.644	1.000	27	No
SLF3_R	0.03	-0.28	0.33	0.16	0.870	1.000	39	No
FAT_L	0.12	-0.18	0.42	0.77	0.441	1.000	18	No
FAT_R	0.01	-0.29	0.32	0.09	0.929	0.973	43	No
PF_L	-0.05	-0.35	0.25	-0.34	0.732	0.941	35	No
PF_R	-0.16	-0.46	0.14	-1.03	0.306	0.983	14	No
CGB_L	0.15	-0.15	0.45	0.99	0.324	0.972	15	No
CGB_R	-0.05	-0.36	0.25	-0.35	0.729	0.965	34	No
CGH_L	-0.06	-0.36	0.25	-0.36	0.716	1.000	32	No
CGH_R	0.02	-0.28	0.33	0.16	0.876	0.986	40	No
FX_L	-0.16	-0.47	0.14	-1.07	0.288	0.997	13	No
FX_R	-0.14	-0.45	0.16	-0.94	0.349	0.981	16	No
ST_L	-0.38	-0.68	-0.07	-2.44	0.016	0.236	3	No
ST_R	-0.31	-0.61	-0.01	-2.01	0.046	0.256	8	No
UF_L	-0.19	-0.49	0.11	-1.23	0.222	0.832	12	No
UF_R	-0.34	-0.64	-0.03	-2.20	0.029	0.329	4	No
IFOF_L	-0.06	-0.36	0.25	-0.37	0.713	1.000	31	No
IFOF_R	-0.29	-0.60	0.01	-1.92	0.057	0.285	9	No
ILF_L	-0.40	-0.71	-0.10	-2.61	0.010	0.221	2	No
ILF_R	-0.34	-0.64	-0.03	-2.18	0.031	0.229	6	No
FS_PFC_L	-0.02	-0.32	0.28	-0.13	0.900	0.988	41	No
FS_PFC_R	-0.03	-0.33	0.27	-0.19	0.850	1.000	38	No

FS_M_L	-0.06	-0.36	0.24	-0.38	0.708	1.000	30	No
FS_M_R	-0.14	-0.44	0.17	-0.88	0.380	1.000	17	No
TR_PFC_L	0.05	-0.25	0.36	0.35	0.724	0.987	33	No
TR_PFC_R	-0.11	-0.41	0.19	-0.73	0.469	1.000	20	No
TR_SM_L	0.12	-0.18	0.42	0.76	0.447	1.000	19	No
TR_SM_R	-0.01	-0.31	0.30	-0.03	0.974	0.974	45	No
TR_aud_L	0.34	0.03	0.64	2.20	0.029	0.265	5	No
TR_aud_R	0.01	-0.29	0.32	0.10	0.924	0.990	42	No
TR_opt_L	-0.09	-0.40	0.21	-0.62	0.539	1.000	23	No
TR_opt_R	-0.42	-0.73	-0.12	-2.74	0.007	0.302	1	No
CST_L	-0.04	-0.34	0.26	-0.27	0.787	0.957	37	No
CST_R	-0.05	-0.35	0.25	-0.31	0.760	0.950	36	No
CC_PFC	0.08	-0.22	0.38	0.53	0.594	1.000	24	No
CC_SM	0.31	0.01	0.61	2.02	0.045	0.289	7	No
CC_pariet	0.10	-0.20	0.40	0.63	0.527	1.000	22	No
CC_temp	-0.08	-0.38	0.22	-0.51	0.611	1.000	26	No
CC_splen	-0.10	-0.41	0.20	-0.67	0.504	1.000	21	No

Result S8-1: Mean deviation difference of sex in people with ADHD

The effect size of the two-sample t-test of deviation of sex in people with ADHD (Male vs. Female), lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	0.29	0.02	0.56	2.13	0.034	0.096	16	No
AF_R	0.09	-0.18	0.35	0.63	0.528	0.742	32	No
SLF1_L	0.08	-0.18	0.35	0.60	0.547	0.724	34	No
SLF1_R	0.13	-0.13	0.40	0.98	0.327	0.525	28	No
SLF2_L	0.41	0.14	0.68	3.01	0.003	0.032	4	Yes
SLF2_R	0.26	-0.01	0.53	1.93	0.055	0.130	19	No
SLF3_L	0.44	0.17	0.71	3.23	0.001	0.020	3	Yes
SLF3_R	0.01	-0.25	0.28	0.11	0.916	0.982	42	No
FAT_L	0.30	0.03	0.57	2.22	0.027	0.103	12	No
FAT_R	0.03	-0.23	0.30	0.24	0.813	0.963	38	No
PF_L	0.03	-0.24	0.29	0.20	0.844	0.926	41	No
PF_R	0.00	-0.26	0.27	0.02	0.981	0.981	45	No
CGB_L	0.29	0.02	0.56	2.14	0.033	0.100	15	No
CGB_R	0.30	0.03	0.57	2.20	0.029	0.100	13	No
CGH_L	0.15	-0.11	0.42	1.13	0.259	0.431	27	No
CGH_R	0.29	0.02	0.56	2.14	0.033	0.107	14	No
FX_L	0.23	-0.03	0.50	1.73	0.086	0.183	21	No
FX_R	-0.01	-0.27	0.26	-0.06	0.950	0.972	44	No
ST_L	-0.08	-0.35	0.18	-0.61	0.542	0.739	33	No
ST_R	-0.10	-0.36	0.17	-0.71	0.481	0.699	31	No
UF_L	0.28	0.01	0.55	2.07	0.039	0.103	17	No
UF_R	0.19	-0.08	0.45	1.39	0.166	0.324	23	No
IFOF_L	0.34	0.07	0.60	2.47	0.014	0.063	10	No
IFOF_R	0.36	0.09	0.63	2.65	0.009	0.048	8	Yes
ILF_L	-0.03	-0.30	0.23	-0.23	0.816	0.941	39	No
ILF_R	0.06	-0.21	0.33	0.44	0.659	0.802	37	No
FS_PFC_L	0.40	0.13	0.67	2.96	0.003	0.025	6	Yes
FS_PFC_R	0.37	0.11	0.64	2.76	0.006	0.040	7	Yes

FS_M_L	0.23	-0.04	0.50	1.69	0.093	0.190	22	No
FS_M_R	0.25	-0.02	0.52	1.85	0.066	0.148	20	No
TR_PFC_L	0.35	0.08	0.61	2.56	0.011	0.055	9	No
TR_PFC_R	0.31	0.05	0.58	2.31	0.022	0.089	11	No
TR_SM_L	-0.01	-0.28	0.25	-0.10	0.922	0.964	43	No
TR_SM_R	-0.18	-0.45	0.08	-1.35	0.178	0.321	25	No
TR_aud_L	0.06	-0.20	0.33	0.46	0.648	0.810	36	No
TR_aud_R	0.12	-0.15	0.39	0.88	0.379	0.569	30	No
TR_opt_L	0.07	-0.19	0.34	0.54	0.589	0.757	35	No
TR_opt_R	0.03	-0.24	0.30	0.22	0.823	0.926	40	No
CST_L	0.17	-0.09	0.44	1.27	0.206	0.357	26	No
CST_R	0.13	-0.14	0.39	0.94	0.347	0.538	29	No
CC_PFC	0.45	0.18	0.72	3.33	0.001	0.023	2	Yes
CC_SM	0.26	0.00	0.53	1.95	0.052	0.130	18	No
CC_pariet	0.40	0.13	0.67	2.96	0.003	0.030	5	Yes
CC_temp	0.19	-0.08	0.45	1.38	0.170	0.318	24	No
CC_splen	0.50	0.23	0.77	3.68	<0.001	0.013	1	Yes

Result S8-2: Mean deviation difference of sex in people with ASD

The effect size of two-sample t-test of deviation of sex in people with ASD (Male vs. Female), lower and upper bound of the confidence interval. The t-statistics, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	ES	CI_low	CI_up	t	p	p_adj	rank	Significance
AF_L	-0.09	-0.59	0.41	-0.34	0.735	0.919	36	No
AF_R	0.14	-0.36	0.64	0.56	0.576	0.959	27	No
SLF1_L	0.20	-0.30	0.70	0.79	0.433	1.000	17	No
SLF1_R	0.04	-0.46	0.54	0.17	0.866	0.974	40	No
SLF2_L	-0.13	-0.63	0.37	-0.51	0.612	0.918	30	No
SLF2_R	-0.04	-0.54	0.47	-0.14	0.890	0.954	42	No
SLF3_L	-0.21	-0.71	0.29	-0.83	0.409	1.000	14	No
SLF3_R	-0.21	-0.71	0.29	-0.81	0.420	1.000	15	No
FAT_L	0.04	-0.46	0.54	0.16	0.872	0.957	41	No
FAT_R	-0.37	-0.87	0.13	-1.44	0.152	1.000	5	No
PF_L	-0.40	-0.90	0.11	-1.55	0.123	1.000	4	No
PF_R	-0.28	-0.78	0.22	-1.10	0.275	1.000	7	No
CGB_L	-0.53	-1.04	-0.03	-2.09	0.038	0.854	2	No
CGB_R	-0.14	-0.64	0.36	-0.53	0.594	0.922	29	No
CGH_L	-0.07	-0.57	0.43	-0.27	0.789	0.935	38	No
CGH_R	0.03	-0.47	0.53	0.13	0.894	0.936	43	No
FX_L	-0.22	-0.72	0.28	-0.87	0.384	1.000	13	No
FX_R	-0.15	-0.65	0.35	-0.58	0.559	0.968	26	No
ST_L	0.13	-0.37	0.63	0.51	0.613	0.890	31	No
ST_R	-0.14	-0.64	0.36	-0.55	0.582	0.935	28	No
UF_L	-0.25	-0.75	0.25	-0.98	0.328	1.000	9	No
UF_R	-0.01	-0.51	0.49	-0.05	0.959	0.981	44	No
IFOF_L	-0.23	-0.73	0.27	-0.89	0.374	1.000	12	No
IFOF_R	-0.16	-0.66	0.34	-0.64	0.525	0.985	24	No
ILF_L	0.09	-0.41	0.59	0.36	0.716	0.947	34	No
ILF_R	0.09	-0.41	0.59	0.35	0.726	0.934	35	No
FS_PFC_L	-0.12	-0.62	0.38	-0.49	0.626	0.881	32	No
FS_PFC_R	-0.16	-0.66	0.34	-0.64	0.524	1.000	23	No

FS_M_L	-0.01	-0.51	0.49	-0.04	0.972	0.972	45	No
FS_M_R	-0.61	-1.11	-0.10	-2.37	0.019	0.848	1	No
TR_PFC_L	-0.20	-0.70	0.30	-0.78	0.439	1.000	18	No
TR_PFC_R	-0.19	-0.70	0.31	-0.76	0.448	1.000	19	No
TR_SM_L	-0.16	-0.67	0.34	-0.64	0.520	1.000	22	No
TR_SM_R	-0.10	-0.60	0.40	-0.39	0.699	0.953	33	No
TR_aud_L	-0.08	-0.58	0.42	-0.31	0.758	0.922	37	No
TR_aud_R	-0.06	-0.56	0.44	-0.24	0.807	0.931	39	No
TR_opt_L	-0.18	-0.68	0.32	-0.71	0.480	1.000	21	No
TR_opt_R	-0.19	-0.69	0.31	-0.75	0.454	1.000	20	No
CST_L	-0.16	-0.66	0.34	-0.62	0.535	0.963	25	No
CST_R	-0.28	-0.78	0.22	-1.10	0.272	1.000	6	No
CC_PFC	-0.26	-0.76	0.24	-1.03	0.304	1.000	8	No
CC_SM	-0.20	-0.70	0.30	-0.79	0.432	1.000	16	No
CC_pariet	0.42	-0.08	0.93	1.66	0.098	1.000	3	No
CC_temp	-0.23	-0.74	0.27	-0.92	0.359	1.000	10	No
CC_splen	-0.23	-0.73	0.27	-0.91	0.366	1.000	11	No

Result S9-1: Two-way ANOVA for diagnosis*age-group interactions.

Two-way ANOVA for diagnosis*age-group interactions in people with ASD and people with ADHD. The F-ratio, p value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	F	p	p_adj	rank	Significance
AF_L	0.04	0.838	0.992	38	No
AF_R	0.88	0.348	0.977	16	No
SLF1_L	2.11	0.147	1.000	5	No
SLF1_R	0.06	0.801	1.002	36	No
SLF2_L	0.02	0.883	1.000	39	No
SLF2_R	0.81	0.369	0.976	17	No
SLF3_L	0.41	0.524	0.943	25	No
SLF3_R	1.29	0.256	0.960	12	No
FAT_L	0.60	0.440	0.990	20	No
FAT_R	0.30	0.586	0.942	28	No
PF_L	0.10	0.747	0.961	35	No
PF_R	0.92	0.339	1.000	15	No
CGB_L	2.04	0.154	1.000	6	No
CGB_R	0.77	0.382	0.956	18	No
CGH_L	1.86	0.173	1.000	7	No
CGH_R	0.06	0.812	0.987	37	No
FX_L	1.40	0.238	0.973	11	No
FX_R	1.27	0.261	0.903	13	No
ST_L	2.32	0.129	1.000	4	No
ST_R	0.01	0.911	0.999	41	No
UF_L	0.26	0.611	0.887	31	No
UF_R	3.13	0.078	1.000	3	No
IFOF_L	0.15	0.695	0.920	34	No
IFOF_R	1.68	0.196	1.000	8	No
ILF_L	0.46	0.498	1.000	21	No
ILF_R	0.63	0.427	1.000	19	No
FS_PFC_L	0.21	0.646	0.908	32	No
FS_PFC_R	0.02	0.884	0.994	40	No
FS_M_L	0.26	0.611	0.916	30	No

FS_M_R	0.00	0.974	1.000	43	No
TR_PFC_L	0.21	0.650	0.886	33	No
TR_PFC_R	1.46	0.228	1.000	10	No
TR_SM_L	0.94	0.333	1.000	14	No
TR_SM_R	0.00	0.990	1.000	44	No
TR_aud_L	3.96	0.047	2.128	1	No
TR_aud_R	0.01	0.934	1.000	42	No
TR_opt_L	0.35	0.553	0.921	27	No
TR_opt_R	3.52	0.061	1.000	2	No
CST_L	0.41	0.522	0.979	24	No
CST_R	0.00	0.994	0.994	45	No
CC_PFC	0.29	0.590	0.916	29	No
CC_SM	1.57	0.212	1.000	9	No
CC_pariet	0.41	0.522	1.000	23	No
CC_temp	0.37	0.545	0.943	26	No
CC_splen	0.42	0.516	1.000	22	No

Result S9-2: Two-way ANOVA for diagnosis*sex interactions.

Two-way ANOVA for diagnosis*sex interactions in people with ASD and people with ADHD. The F-ratio, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

	F	p	p_adj	rank	pass
AF_L	1.71	0.192	0.411	21	No
AF_R	0.04	0.835	0.894	42	No
SLF1_L	0.23	0.631	0.767	37	No
SLF1_R	0.10	0.752	0.846	40	No
SLF2_L	3.43	0.065	0.363	8	No
SLF2_R	1.02	0.313	0.613	23	No
SLF3_L	5.05	0.025	0.226	5	No
SLF3_R	0.57	0.452	0.656	31	No
FAT_L	0.71	0.398	0.664	27	No
FAT_R	2.06	0.152	0.360	19	No
PF_L	2.26	0.134	0.376	16	No
PF_R	0.98	0.323	0.606	24	No
CGB_L	8.46	0.004	0.086	2	No
CGB_R	2.23	0.136	0.360	17	No
CGH_L	0.59	0.442	0.663	30	No
CGH_R	0.72	0.397	0.687	26	No
FX_L	2.56	0.110	0.331	15	No
FX_R	0.28	0.598	0.768	35	No
ST_L	0.54	0.465	0.653	32	No
ST_R	0.02	0.879	0.899	44	No
UF_L	3.38	0.067	0.334	9	No
UF_R	0.45	0.502	0.684	33	No
IFOF_L	3.80	0.052	0.389	6	No
IFOF_R	3.19	0.075	0.280	12	No
ILF_L	0.18	0.672	0.776	39	No
ILF_R	0.01	0.935	0.935	45	No
FS_PFC_L	3.25	0.072	0.294	11	No
FS_PFC_R	3.36	0.067	0.304	10	No
FS_M_L	0.64	0.424	0.681	28	No

FS_M_R	9.03	0.003	0.126	1	No
TR_PFC_L	3.52	0.061	0.394	7	No
TR_PFC_R	3.06	0.081	0.280	13	No
TR_SM_L	0.26	0.608	0.760	36	No
TR_SM_R	0.09	0.763	0.838	41	No
TR_aud_L	0.23	0.633	0.749	38	No
TR_aud_R	0.40	0.529	0.700	34	No
TR_opt_L	0.76	0.383	0.690	25	No
TR_opt_R	0.61	0.437	0.678	29	No
CST_L	1.32	0.251	0.514	22	No
CST_R	1.98	0.160	0.359	20	No
CC_PFC	6.00	0.015	0.165	4	No
CC_SM	2.62	0.106	0.341	14	No
CC_pariet	0.03	0.870	0.911	43	No
CC_temp	2.10	0.148	0.370	18	No
CC_splen	6.26	0.013	0.190	3	No

Result S9-3: Three-way ANOVA for diagnosis*sex*age-group interactions.

Three-way ANOVA for diagnosis*sex*age-group interactions in people with ASD and people with ADHD. The F-ratio, p-value, and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value, and whether the tract is significant after multiple corrections.

	F	p	p_adj	rank	pass
AF_L	0.01	0.916	1.000	41	No
AF_R	2.26	0.134	0.430	14	No
SLF1_L	0.67	0.415	0.849	22	No
SLF1_R	2.33	0.128	0.442	13	No
SLF2_L	1.68	0.196	0.551	16	No
SLF2_R	0.37	0.545	1.000	24	No
SLF3_L	0.30	0.585	0.975	27	No
SLF3_R	1.37	0.243	0.575	19	No
FAT_L	0.00	0.975	0.975	45	No
FAT_R	0.23	0.631	0.979	29	No
PF_L	0.85	0.358	0.806	20	No
PF_R	0.15	0.698	1.000	30	No
CGB_L	0.11	0.742	1.000	32	No
CGB_R	0.05	0.821	1.000	35	No
CGH_L	6.51	0.011	0.166	3	No
CGH_R	0.05	0.825	1.000	36	No
FX_L	0.32	0.571	0.988	26	No
FX_R	0.02	0.885	0.995	40	No
ST_L	3.67	0.056	0.361	7	No
ST_R	10.87	0.001	0.048	1	Yes
UF_L	2.67	0.103	0.387	12	No
UF_R	3.11	0.079	0.354	10	No
IFOF_L	2.22	0.137	0.412	15	No
IFOF_R	4.22	0.041	0.305	6	No
ILF_L	10.51	0.001	0.029	2	Yes
ILF_R	6.15	0.014	0.152	4	No
FS_PFC_L	1.63	0.202	0.535	17	No
FS_PFC_R	0.29	0.593	0.953	28	No
FS_M_L	0.07	0.798	1.000	34	No

FS_M_R	2.86	0.092	0.375	11	No
TR_PFC_L	0.09	0.762	1.000	33	No
TR_PFC_R	0.00	0.968	0.990	44	No
TR_SM_L	0.00	0.968	1.000	43	No
TR_SM_R	0.04	0.850	0.981	39	No
TR_aud_L	0.54	0.465	0.909	23	No
TR_aud_R	0.01	0.934	1.000	42	No
TR_opt_L	3.33	0.069	0.386	8	No
TR_opt_R	4.33	0.038	0.342	5	No
CST_L	0.05	0.831	1.000	37	No
CST_R	0.32	0.570	1.000	25	No
CC_PFC	1.63	0.203	0.508	18	No
CC_SM	3.31	0.069	0.347	9	No
CC_pariet	0.14	0.709	1.000	31	No
CC_temp	0.04	0.842	0.997	38	No
CC_splen	0.71	0.399	0.856	21	No

Result S10: Spearman's correlations of deviation profiles and idiosyncrasy profiles.

The inter-group correlations of deviation profiles and idiosyncrasy profiles. The Spearman's correlation, 95% confidence interval, p-value (one-tailed), and adjusted p-value by Benjamini correction (FDR q=0.05), the rank of p-value and whether the tract is significant after multiple corrections.

Group1	Group2	Item	rho	CI_up	CI_low	p	p_adj	rank	Significance
ADHD	ASD	Deviation	0.54	0.72	0.30	<0.001	<0.001	3	Yes
ADHD	ADHD sibling	Deviation	0.51	0.70	0.26	<0.001	<0.001	4	Yes
ASD	ASD sibling	Deviation	0.69	0.82	0.50	<0.001	<0.001	1	Yes
ADHD sibling	ASD sibling	Deviation	0.29	0.54	0.00	0.025	0.041	5	Yes
ADHD	ASD	Idiosyncrasy	0.55	0.72	0.30	<0.001	<0.001	2	Yes
ADHD	ADHD sibling	Idiosyncrasy	0.15	0.42	-0.15	0.165	0.189	7	No
ASD	ASD sibling	Idiosyncrasy	0.19	0.46	-0.11	0.101	0.135	6	No
ADHD sibling	ASD sibling	Idiosyncrasy	0.01	0.31	-0.28	0.464	0.464	8	No

Supplementary Discussion

The shared brain-symptom relationship (Figure 4A)

In the 1st dimension, deviations of the tracts connecting the prefrontal and temporal cortex, cingulum-body, and frontal aslant tract exhibited associations linked with autistic symptoms, including social skills, communications, attention to details, and imagination. The left frontal aslant tract has been proved to be associated with speech and language (124), while the uncinate fasciculus has been associated with linguistic functions and social-emotional processing (114). The involvement of the cingulum-body is in accord with our expectations since impaired focused and sustained attention has been reported following the cingulotomy (110, 125). Most tracts in Papez circuit, i.e., the medial limbic circuit, which is implicated in emotional experiences and memory (126), were involved in the 1st mode, including cingulum, stria terminalis, and corpus callosum to the temporal cortex. However, tracts associated with memory processing, including hippocampus, fornix, and cingulum-hippocampus, were not involved. This echoes the notion that the limbic system may play an important role in autistic symptoms, but tracts associated with memory were relatively less affected in people with ASD (127). The 2nd dimension involved the link between tracts connecting the temporal and parietal cortex with the inflexibility of autistic symptoms, especially the unique mannerism of SRS and attention switching of Autism Spectrum Quotient. Among the involved tracts, the inferior longitudinal fasciculus has been associated with facial and object recognition, as well as lexical and semantic cognition (128), while the left arcuate fasciculus plays an important role in language, as damage of this tract leads to conduction aphasia (105). On the other hand, the cingulum-hippocampus was involved in the 2nd mode rather than the 1st mode. The association of these tracts with the inflexibility of autistic symptoms across neurodevelopmental conditions might be a new finding, but needs further investigations.

The shared brain-cognition relationship (Figure 4B)

The 1st dimension involved the link of visual memory and attention alongside processing speed with deviations in the arcuate fasciculus, thalamic radiations, corticospinal tracts, and hippocampal connections of Papez circuits (fornix, cingulum-hippocampal). The 2nd dimension comprised the link between cognitive function involving generalized intelligence, planning, inhibition and visuospatial (working) memory, and deviations in the cingulum and the left SLF-II&III. The lateralized brain network of SLFs in the visuospatial attention has been well-documented, and SLF II&III showed more lateralization than SLF I (106). The 3rd dimension illustrated associations of nonverbal intelligence and attention with the frontostriatal circuit-motor and SLF-I. The frontostriatal circuit is involved in goal-directed behaviors, which is formed by bi-directional communications of the cortex and basal ganglia (117). The 4th dimension was loaded

by working memory, attention, and verbal intelligence, driven by the corpus callosum, ventral association tracts (uncinate fasciculus, inferior fronto-occipital fasciculus), dorsal association tracts (SLF, AF), stria terminalis, and thalamic radiations. In fact, the language network (129) includes a dorsal pathway, consisting of the arcuate fasciculus and superior longitudinal fasciculus (105, 107), and a ventral pathway, comprising the uncinate fasciculus and inferior fronto-occipital fasciculus (115). Thus, this mode may highlight the association between language function and the language network. The 5th dimension comprised planning, set-shifting, response variability, and verbal IQ, linked with the corpus callosum-frontoparietal and thalamic radiations. The corpus callosum plays a major role in inter-connection and communication between cerebral hemispheres. It has been reported that both functional and anatomical cortical underconnectivity, especially in the frontal and parietal regions, exists in autism (130). In sum, cognitive constructs and white matter deviations selected by the CCA in different modes are largely consistent with the results from the previous univariate analysis on brain-cognition relationships in typically developing populations (131-133). Notably, the functional mappings of white matter tracts are still under active investigations via the lesion studies (113, 125) and MRI studies (108, 114). The current study reveals the shared multifaceted brain-behavior relationship among neurodevelopmental disorders (134), adding new value to our understanding of the functional role of white matter tracts.

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