

Appendix 1 to Chiang H-Y, Chen Y-J, Lo Y-C, et al. Altered white matter tract property related to impaired focused attention, sustained attention, cognitive impulsivity and vigilance in attention-deficit hyperactivity disorder

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Table S1: Comparison of the generalized fractional anisotropy values of 10 fibre tracts between youths with ADHD and healthy controls for whom a 32-channel phased array head coil was used

Target tracts	Group, mean ± SD		<i>t</i>	<i>p</i> value	Cohen <i>d</i>
	ADHD, <i>n</i> = 47	Control, <i>n</i> = 47			
L caudate–VLPFC	0.236 ± 0.017	0.242 ± 0.015	-2.21	0.032	-0.374
R caudate–VLPFC	0.234 ± 0.019	0.238 ± 0.017	-1.21	0.23	-0.222
L caudate–DLPFC	0.221 ± 0.017	0.228 ± 0.017	-2.14	0.037	-0.412
R caudate–DLPFC	0.227 ± 0.023	0.232 ± 0.020	-1.52	0.14	-0.232
L caudate–OFC	0.213 ± 0.012	0.217 ± 0.011	-2.08	0.043	-0.347
R caudate–OFC	0.212 ± 0.016	0.216 ± 0.015	-1.47	0.15	-0.258
L SLF	0.198 ± 0.024	0.206 ± 0.023	-2.21	0.032	-0.340
R SLF	0.223 ± 0.025	0.231 ± 0.022	-2.14	0.038	-0.340
L cingulum	0.302 ± 0.028	0.308 ± 0.024	-1.37	0.18	-0.230
R cingulum	0.279 ± 0.029	0.288 ± 0.020	-2.32	0.025	-0.361

ADHD = attention-deficit/hyperactivity disorder; DLPFC = dorsolateral prefrontal cortex; L = left; OFC = orbitofrontal cortex; R = right; SD = standard deviation; SLF = superior longitudinal fasciculus; VLPFC = ventrolateral prefrontal cortex.

Table S2: Correlations between fibre tract microstructural property and ADHD symptoms in youths with ADHD (*n* = 50)

Fibre tract	Symptom, correlation (<i>p</i> value)			
	Inattention		Hyperactivity/impulsivity	
	Left	Right	Left	Right
Caudate–VLPFC	-0.268 (0.06)	-0.285 (0.044)	-0.122 (0.40)	-0.092 (0.52)
Caudate–DLPFC	-0.287 (0.043)	-0.298 (0.036)	-0.013 (0.93)	0.025 (0.86)
Caudate–OFC	-0.262 (0.07)	-0.255 (0.08)	-0.085 (0.56)	-0.019 (0.89)
SLF	-0.410 (0.003)	-0.483 (< 0.001)	0.204 (0.16)	0.092 (0.53)
Cingulum	-0.434 (0.002)	-0.417 (0.003)	0.037 (0.80)	0.088 (0.55)

ADHD = attention-deficit/hyperactivity disorder; DLPFC = dorsolateral prefrontal cortex; OFC = orbitofrontal cortex; SLF = superior longitudinal fasciculus; VLPFC = ventrolateral prefrontal cortex.

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Table S3: Comparison of the generalized fractional anisotropy values of 10 fibre tracts between right-handed youths with ADHD and healthy controls

Target tracts	Group, mean ± SD		<i>t</i>	<i>p</i> value	Cohen <i>d</i>
	ADHD, <i>n</i> = 49	Control, <i>n</i> = 49			
L caudate–VLPFC	0.236 ± 0.016	0.242 ± 0.015	-2.34	0.024	-0.387
R caudate–VLPFC	0.235 ± 0.019	0.238 ± 0.017	-1.24	0.22	-0.166
L caudate–DLPFC	0.221 ± 0.017	0.227 ± 0.017	-2.18	0.034	-0.353
R caudate–DLPFC	0.227 ± 0.023	0.232 ± 0.019	-1.38	0.18	-0.237
L caudate–OFC	0.213 ± 0.018	0.217 ± 0.011	-1.97	0.06	-0.268
R caudate–OFC	0.212 ± 0.015	0.216 ± 0.015	-1.55	0.13	-0.267
L SLF	0.197 ± 0.023	0.206 ± 0.022	-2.71	0.009	-0.400
R SLF	0.223 ± 0.026	0.231 ± 0.021	-2.53	0.015	-0.339
L cingulum	0.301 ± 0.028	0.307 ± 0.023	-1.26	0.21	-0.234
R cingulum	0.278 ± 0.029	0.288 ± 0.019	-2.38	0.022	-0.408

ADHD = attention-deficit/hyperactivity disorder; DLPFC = dorsolateral prefrontal cortex; L = left; OFC = orbitofrontal cortex; R = right; SD = standard deviation; SLF = superior longitudinal fasciculus; VLPFC = ventrolateral prefrontal cortex.

Table S4: Comparison of the generalized fractional anisotropy values of 10 fibre tracts between youths with ADHD and healthy controls, excluding the 10 medicated children with ADHD and their matched controls

Target tracts	Group, mean ± SD		<i>t</i>	<i>p</i> value	Cohen <i>d</i>
	ADHD, <i>n</i> = 40	Control, <i>n</i> = 40			
L caudate–VLPFC	0.234 ± 0.016	0.242 ± 0.015	-2.67	0.011	-0.516
R caudate–VLPFC	0.232 ± 0.018	0.239 ± 0.017	-2.25	0.030	-0.400
L caudate–DLPFC	0.220 ± 0.017	0.228 ± 0.016	-2.45	0.019	-0.485
R caudate–DLPFC	0.224 ± 0.022	0.233 ± 0.019	-2.19	0.034	-0.438
L caudate–OFC	0.212 ± 0.011	0.217 ± 0.010	-2.30	0.027	-0.476
R caudate–OFC	0.210 ± 0.015	0.217 ± 0.015	-2.41	0.021	-0.467
L SLF	0.193 ± 0.020	0.203 ± 0.021	-3.10	0.004	-0.488
R SLF	0.220 ± 0.024	0.229 ± 0.021	-2.48	0.017	-0.399
L cingulum	0.300 ± 0.025	0.304 ± 0.024	-1.01	0.32	-0.163
R cingulum	0.276 ± 0.026	0.285 ± 0.019	-2.01	0.05	-0.395

ADHD = attention-deficit/hyperactivity disorder; DLPFC = dorsolateral prefrontal cortex; L = left; OFC = orbitofrontal cortex; R = right; SD = standard deviation; SLF = superior longitudinal fasciculus; VLPFC = ventrolateral prefrontal cortex.

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Table S5: Final model of significant correlates from white matter fibre tracts for the attention dimensions as assessed using the CCPT in medication-naïve children with ADHD

Fibre tract	CCPT dimension, β (p value)											
	Focused attention			Impulsivity					Sustained attention		Vigilance	
	Omission	RT SE	Variability	Detectability	Commission	RT	Response style	Perseveration	RT BC	RT SE BC	RT ISI BC	RT SE ISI BC
L caudate–DLPFC	313.16 (0.08)	—	–474.35 (0.013)	10.20 (0.001)	–233.02 (< 0.001)	—	—	—	–1.17 (0.001)	—	—	—
L caudate–OFC	—	—	—	—	—	—	—	—	—	—	—	–6.28 (0.023)
R caudate–OFC	–781.28 (0.003)	–197.55 (0.025)	—	—	—	—	–7.87 (0.042)	–434.95 (0.06)	—	—	—	—
L SLF	377.24 (0.010)	242.89 (0.034)	581.78 (0.07)	–6.13 (0.020)	132.82 (0.018)	3078.36 (0.021)	—	—	1.12 (0.043)	—	1.62 (0.011)	4.29 (0.06)
R SLF	—	–208.68 (0.029)	–533.40 (0.044)	—	—	–4072.62 (< 0.001)	—	—	–1.28 (0.010)	—	—	—
L cingulum	—	—	—	—	—	—	—	—	0.56 (0.07)	—	—	—
R cingulum	–263.91 (0.023)	—	—	—	—	—	—	—	—	—	–1.51 (0.002)	–4.27 (0.016)
<i>F</i> (p value)	$F_{4,35} = 5.42$ (0.002)	$F_{3,36} = 4.34$ (0.010)	$F_{3,36} = 3.65$ (0.021)	$F_{2,37} = 6.91$ (0.033)	$F_{2,37} = 7.68$ (0.002)	$F_{2,37} = 8.96$ (< 0.001)	$F_{1,38} = 4.44$ (0.001)	$F_{1,38} = 3.67$ (0.063)	$F_{4,45} = 4.17$ (0.007)	—	$F_{2,37} = 5.42$ (0.009)	$F_{3,36} = 4.8$ (0.007)
R^2	0.38	0.27	0.23	0.27	0.29	0.10	0.27	0.09	0.32	—	0.23	0.29

ADHD = attention-deficit/hyperactivity disorder; BC = block change; DLPFC = dorsolateral prefrontal cortex; ISI = interstimulus interval; L = left; OFC = orbitofrontal cortex; R = right; RT = reaction time; SD = standard deviation; SE = standard error; SLF = superior longitudinal fasciculus.

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Table S6: Comparison of the 3 ex-Gaussian parameters between the ADHD and control groups as a function of ISI conditions

Condition	Group, mean \pm SD		<i>t</i>	<i>p</i> value	Cohen <i>d</i>
	ADHD, <i>n</i> = 44	Control, <i>n</i> = 47			
ISI = 1 s					
μ	232.61 \pm 47.68	260.88 \pm 50.89	-2.72	0.010	-0.572
σ	49.10 \pm 24.33	37.47 \pm 16.39	2.79	0.008	0.561
τ	109.88 \pm 42.26	79.48 \pm 36.58	3.74	< 0.001	0.767
ISI = 2 s					
μ	260.24 \pm 61.75	286.15 \pm 47.56	-2.25	0.030	-0.470
σ	50.18 \pm 27.82	38.75 \pm 13.84	2.61	0.013	0.520
τ	144.07 \pm 75.10	84.44 \pm 42.10	4.71	< 0.001	0.978
ISI = 4 s					
μ	297.59 \pm 61.86	317.39 \pm 61.26	-1.53	0.13	-0.322
σ	54.07 \pm 20.83	39.21 \pm 18.80	4.06	< 0.001	0.749
τ	180.77 \pm 129.39	96.51 \pm 47.32	4.24	< 0.001	2.137

ADHD = attention-deficit/hyperactivity disorder; ISI = interstimulus interval; SD = standard deviation.

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Table S7 : Final model of significant correlates from white matter fibre tracts for the attention dimensions as assessed using the CCPT									
Fibre tract	ISI, β (p value)								
	μ			σ			τ		
	ISI = 1 s	ISI = 2 s	ISI = 4 s	ISI = 1 s	ISI = 2 s	ISI = 4 s	ISI = 1 s	ISI = 2 s	ISI = 4 s
Control									
L caudate–VLPFC	—	-1533.80 (0.040)	-1803.73 (0.046)	—	—	-611.42 (0.07)	-676.32 (0.09)	-687.43 (0.09)	—
R caudate–VLPFC	—	1528.15 (0.06)	—	—	—	—	—	—	—
L caudate–DLPFC	1451.41 (0.038)	2199.97 (0.003)	2082.73 (0.012)	—	—	—	—	—	—
R caudate–DLPFC	-1378.26 (0.031)	-1794.95 (0.017)	—	—	—	—	—	—	—
L caudate–OFC	—	—	—	—	—	1700.06 (0.002)	—	—	—
R caudate–OFC	—	—	—	—	—	-852.50 (0.011)	—	—	-1544.17 (0.006)
L SLF	—	—	—	—	—	—	689.74 (0.22)	—	603.39 (0.08)
R SLF	—	—	—	—	—	268.32 (0.09)	—	—	—
L cingulum	—	—	—	—	—	—	-499.92 (0.10)	—	—
<i>F</i> (p value)	$F_{2,43} = 2.73$ (0.08)	$F_{4,42} = 3.13$ (0.024)	$F_{2,44} = 3.44$ (0.041)	—	—	$F_{4,42} = 3.3$ (0.020)	$F_{3,42} = 3.03$ (0.040)	$F_{1,45} = 2.96$ (0.09)	$F_{2,44} = 4.15$ (0.022)
R^2	0.11	0.23	0.14	—	—	0.24	0.18	0.06	0.16
ADHD									
L caudate–VLPFC	—	-1967.44 (0.035)	-1688.61 (0.056)	-899.46 (0.032)	—	—	—	—	—
R caudate–VLPFC	—	—	—	769.32 (0.049)	—	—	—	—	—
L caudate–DLPFC	963.18 (0.027)	2450.02 (0.006)	2851.26 (0.001)	—	511.69 (0.07)	—	—	—	—
L caudate–OFC	—	—	—	1582.3 (0.018)	—	710.10 (0.027)	—	—	—
R caudate–OFC	—	—	—	-1084.54	—	—	—	-2183.65 (0.005)	-2785.14 (0.044)
R SLF	-751.99 (0.010)	—	—	—	—	-349.30 (0.010)	—	—	—
L cingulum	—	—	—	—	-398.67 (0.021)	—	—	—	—
<i>F</i> (p value)	$F_{2,41} = 5.04$ (0.011)	$F_{2,41} = 4.22$ (0.022)	$F_{2,41} = 7.11$ (0.002)	$F_{4,39} = 2.51$ (0.06)	$F_{2,41} = 3.19$ (0.05)	$F_{2,41} = 4.56$ (0.016)	—	$F_{1,42} = 8.59$ (0.005)	$F_{1,42} = 4.31$ (0.044)
R^2	0.20	0.17	0.26	0.20	0.13	0.18	—	0.17	0.09

ADHD = attention-deficit/hyperactivity disorder; DLPFC = dorsolateral prefrontal cortex; ISI = interstimulus interval; L = left; OFC = orbitofrontal cortex; R = right; SLF = superior longitudinal fasciculus.

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Table S8: Interactions between attention dimensions and mean generalized fractional anisotropy values of fibre tracts (part 1 of 2)			
Dimension	Fibre tract	<i>t</i>	<i>p</i> value
Omission	L caudate–VLPFC	-1.71	0.09
	L caudate–OFC	-2.19	0.031
	R caudate–OFC	-2.72	0.008
RE SE	R caudate–OFC	-2.02	0.046
Variability	L caudate–DLPFC	-1.67	0.09
Detectability	L caudate–DLPFC	2.53	0.013
	R caudate–OFC	1.97	0.05
	L caudate–VLPFC	-2.39	0.019
Commission	L caudate–DLPFC	-2.08	0.040
	R SLF	-1.01	0.32
	R caudate–DLPFC	-0.34	0.73
RT	L caudate–OFC	0.2	0.84
	L cingulum	-0.68	0.50
	L caudate–DLPFC	-0.65	0.52
Response style	R caudate–DLPFC	-1.33	0.19
	L caudate–OFC	0.43	0.67
	R caudate–OFC	-0.67	0.50
Perseveration	R cingulum	0.91	0.37
	R caudate–VLPFC	-0.96	0.34
	L caudate–DLPFC	-1.12	0.27
RT BC	R caudate–DLPFC	-0.55	0.58
	L caudate–OFC	-1.5	0.14
	R SLF	-0.93	0.36
RT SE BC	R cingulum	-0.5	0.62
	L caudate–VLPFC	-3.14	0.002
	L caudate–DLPFC	-2.83	0.006
RT BC	R caudate–DLPFC	-2.71	0.008
	L caudate–OFC	-2.26	0.026
	R SLF	-1.65	0.10
RT SE BC	R cingulum	-1.1	0.27
	R caudate–DLPFC	-1.74	0.09
	L cingulum	0.39	0.70
	R cingulum	0.6	0.55

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Table S8: Interactions between attention dimensions and mean generalized fractional anisotropy values of fibre tracts (part 2 of 2)

Dimension	Fibre tract	<i>t</i>	<i>p</i> value
RT ISI BC	L cingulum	-2.3	0.024
RT SE ISI BC	L caudate-DLPFC	-1.29	0.20
	R cingulum	-1.72	0.09

ADHD = attention-deficit/hyperactivity disorder; BC = block change; DLPFC = dorsolateral prefrontal cortex; ISI = interstimulus interval; L = left; OFC = orbitofrontal cortex; R = right; RT = reaction time; SD = standard deviation; SE = standard error; SLF = superior longitudinal fasciculus.