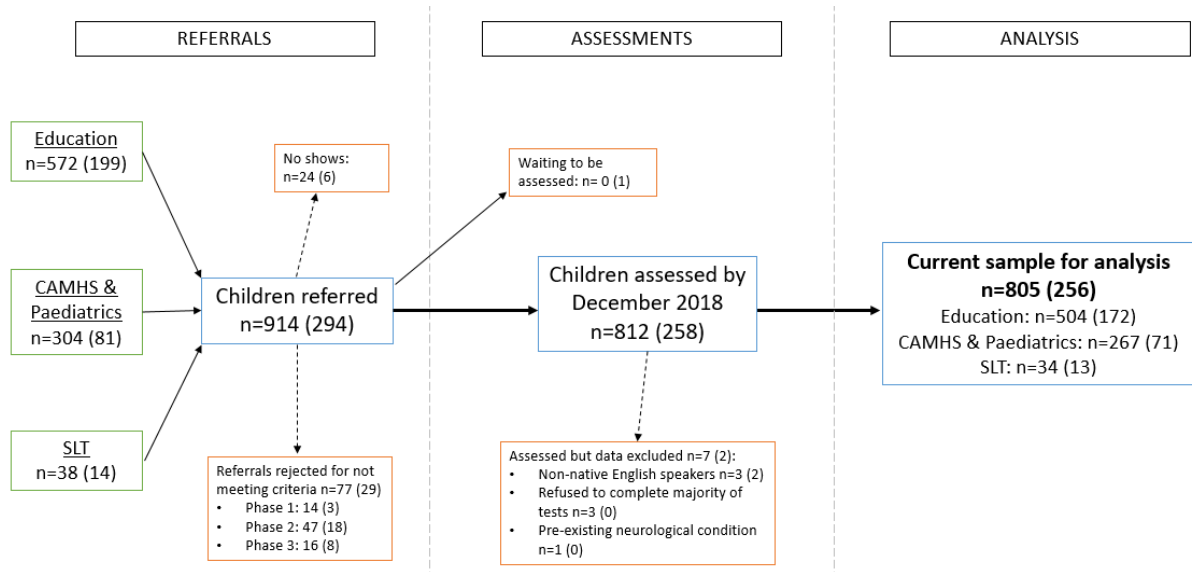


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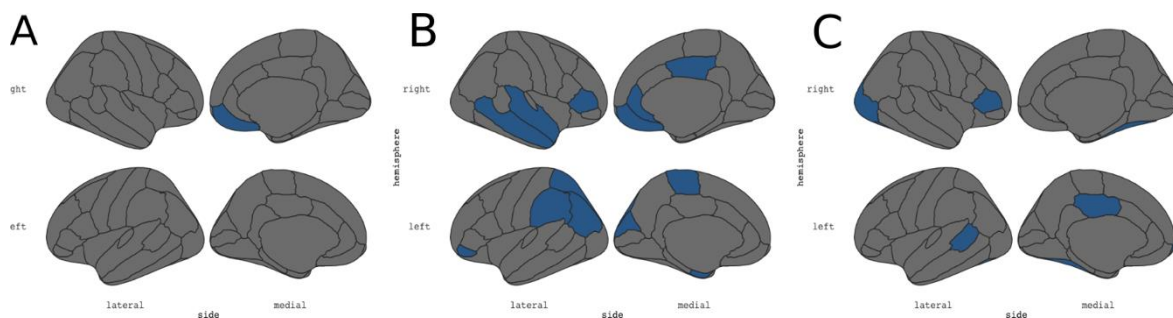
**Supplemental Information**

**Transdiagnostic Brain Mapping  
in Developmental Disorders**

**Roma Siugzdaite, Joe Bathelt, Joni Holmes, and Duncan E. Astle**



**Figure S1. Diagram showing recruitment avenues and exclusions for the referred sample. Related to Subjects details section in STAR Methods.**

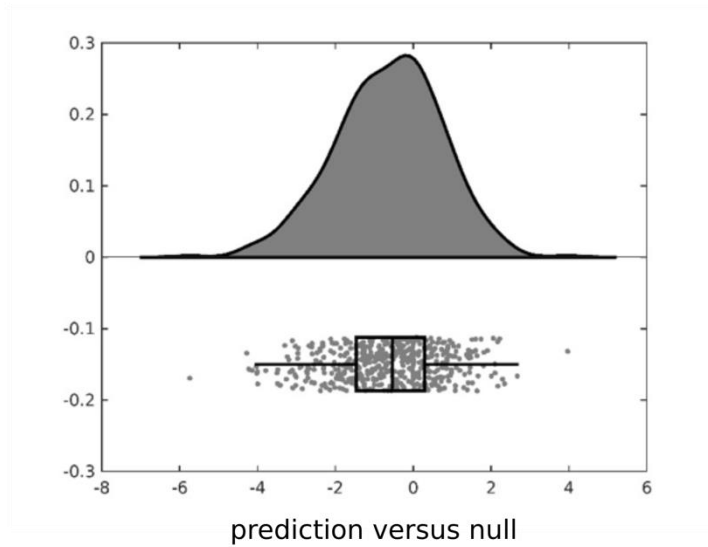


**Figure S2. Parcels identified by the feature selection. Related to STAR Methods.**

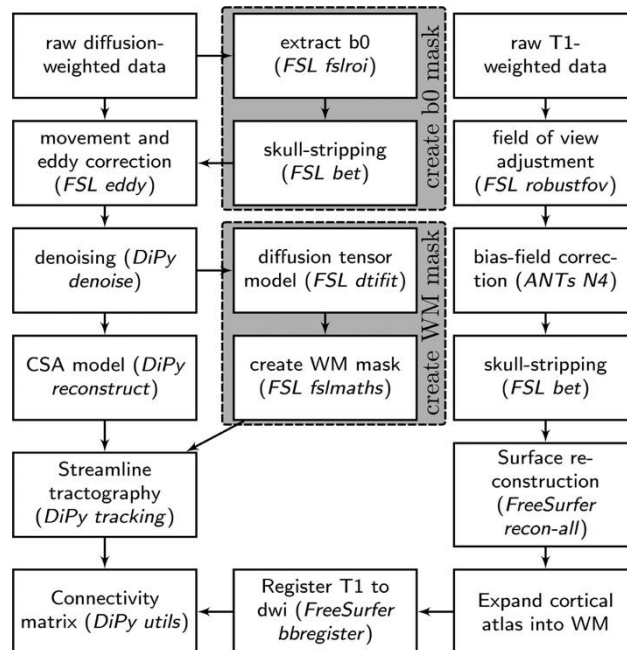
**(A) cortical thickness:** right medial orbito-frontal region;

**(B) gyrification:** left cuneus, left entorhinal, left inferior parietal, right medial orbito-frontal, right middle temporal, left paracentral, left pars orbitalis, right pars triangularis, right posterior cingulate, right rostral anterior cingulate, left superior parietal, right superior temporal, left supramarginal gyrus;

**(C) sulci depth:** left banks superior temporal, left and right fusiform, right lateral occipital, right pars triangularis, left posterior cingulate, left frontal pole.



**Figure S3.** The spread of this prediction accuracy for child's learning ability from their cognitive profile. Related to Figure 2A.



**Figure S4.** Diffusion weighted imaging (DWI) data preprocessing. Related to STAR Methods. Overview of processing steps to reconstruct a white matter connectome from diffusion-weighted and T1-weighted MRI data.

Group	Total	Boys	Age (mean±SEM)	Age range (months)
Referrals	337	232 (68.8%)	117.1±1.54	62-223
Controls	142	67 (47%)	119.1±1.51	81-189
Only with DWI data	205	119(58%)	115.2±1.7	66-215
Total	479	299 (62.4%)	117±1.52	62-223

Table S1. Demographic information of the whole sample and subsample with DWI data. Related to STAR Methods.

	Non-referred Mean ± SEM	Referred Mean ± SEM	t-test	P	Effect size Cohen's d
Matrix Reasoning	-0.01 ± 0.11	-0.61 ± 0.07	4.51	1.08x10 <sup>-5</sup>	0.66
Vocabulary	0.73 ± 0.12	-0.01 ± 0.1	5.22	4.33x10 <sup>-7</sup>	0.77
Alliteration	-0.06 ± 0.04	-0.57 ± 0.06	6.06	6.4x10 <sup>-9</sup>	0.89
Forwards Digit	0.32 ± 0.11	-0.38 ± 0.09	4.6	7.16x10 <sup>-6</sup>	0.68
Dot Matrix	0.32 ± 0.12	-0.36 ± 0.08	4.76	3.72x10 <sup>-6</sup>	0.70
Backward Span	0.26 ± 0.12	-0.5 ± 0.07	5.76	3.02x10 <sup>-8</sup>	0.85
Mister X	0.51 ± 0.12	-0.19 ± 0.08	4.96	1.51x10 <sup>-6</sup>	0.73
Literacy	0.33 ± 0.01	-1.22 ± 0.07	12.23	2.2x10 <sup>-16</sup>	1.80
Numeracy	0.01 ± 0.12	-1.03 ± 0.1	6.17	3.56x10 <sup>-9</sup>	0.91

Table S2. Data are represented as mean ± SEM for referred and non-referred sample. Related to the table in STAR Methods. Data only from subsample of children who had DWI data, N=205. All scores are given as z scores, relative to the age standardised normative sample for each test.

		Cognitive profiles					
		Cog P1	Cog P2	Cog P3	Cog P4	Cog P5	Cog P6
Brain profiles	BP1	3	6	6	8	5	9
	BP2	6	3	8	10	2	4
	BP3	10	8	5	8	2	9
	BP4	9	11	7	7	4	8
	BP5	8	4	4	15	0	7
	BP6	7	8	5	8	1	8
	BP7	0	1	1	1	3	3
	BP8	1	2	1	4	2	3
	BP9	3	1	5	3	5	7
	BP10	1	2	12	5	11	11
	BP11	2	1	11	2	3	5
	BP12	14	1	7	7	5	5
	BP13	1	0	8	4	7	10
	BP14	0	2	6	6	7	10
	BP15	4	1	7	4	8	10

Table S3. Distribution of the participants per node in Morphology-Cognition mapping. Related to Figure 5A.

		Brain profiles		
		Brain P1	Brain P2	Brain P3
Cog Profiles	Cog P1			
	Cog P2			
	Cog P3	212	298	420
	Cog P4	288	202	80
	Cog P5			
	Cog P6			

**Table S4. Distribution of the participants per node showing changes in severity. Related to Figure 5B.**

		Brain profiles		
		Brain P1	Brain P2	Brain P3
Cog Profiles	Cog P1	10	23	31
	Cog P2	1	3	0
	Cog P3	437	377	323
	Cog P4	40	87	17
	Cog P5	3	2	12
	Cog P6	9	8	117

**Table S5. Distribution of the participants per node showing changes in location. Related to Figure 5C.**

Group\Node	Node 1	Node 2	Node 3	Node 4	Node 5	Node 6
<b>Referred</b>	35 (10.4%)	16 (4.7%)	74 (22%)	55 (16.3%)	65 (19.3%)	92 (27.2%)
<b>Controls</b>	34 (24%)	35 (25%)	19 (13%)	37 (26%)	0 (0%)	17(12%)
<b>Total</b>	69 (11.41%)	51 (10.65%)	93 (19.42%)	92 (19.21%)	65 (13.57%)	109 (22.76%)
<b>Only with DWI data</b>						
<b>Referred</b>	13(9.6%)	5(3.7%)	40(29.6%)	22(16.3%)	26(19.3%)	29(21.5)
<b>Controls</b>	17(24%)	14(20%)	10(14.3%)	17(24.3%)	0	12(17.1%)
<b>Total</b>	30(14.6%)	19(9.3%)	50(24.4%)	39(19%)	26(12.7%)	41(20%)

**Table S6. Distribution of participants in the whole sample and subsample with DWI data. Related to Figure 2A.**

	<b>Cog N1</b>	<b>Cog N2</b>	<b>Cog N3</b>	<b>Cog N4</b>	<b>Cog N5</b>	<b>Cog N6</b>
<b>Matrix</b>						
<b>Reasoning</b>	-0.10±0.08	1.15±0.12	-0.70±0.06	0.08±0.08	-1.46±0.08	-0.88±0.06
<b>Vocabulary</b>	0.72±0.08	1.41±0.11	-0.47±0.06	1.22±0.08	-1.34±0.12	0.11±0.05
<b>Alliteration</b>	-0.09±0.05	0.03±0.02	-0.66±0.07	-0.12±0.04	-1.14±0.08	-0.47±0.05
<b>Forwards Digit</b>	0.25±0.10	1.41±0.12	-0.53±0.09	0.14±0.09	-1.57±0.08	-0.45±0.08
<b>Dot Matrix</b>	0.58±0.09	0.88±0.12	0.16±0.06	-0.31±0.08	-1.30±0.09	-1.40±0.05
<b>Backward Span</b>	0.25±0.08	1.22±0.13	-0.46±0.06	-0.11±0.08	-1.15±0.07	-0.82±0.06
<b>Mister X</b>	1.36±0.08	1.27±0.11	0.01±0.08	-0.26±0.07	-1.05±0.09	-0.42±0.07
<b>Literacy</b>	-0.14±0.10	0.50±0.11	-1.12±0.08	-0.31±0.12	-1.65±0.10	-0.95±0.08
<b>Numeracy</b>	0.21±0.12	0.78±0.13	-1.11±0.10	0.16±0.10	-1.77±0.13	-0.78±0.09

**Table S7. Data are represented as mean ± SEM for each of cognitive groupings. Related to Figure 2B.**