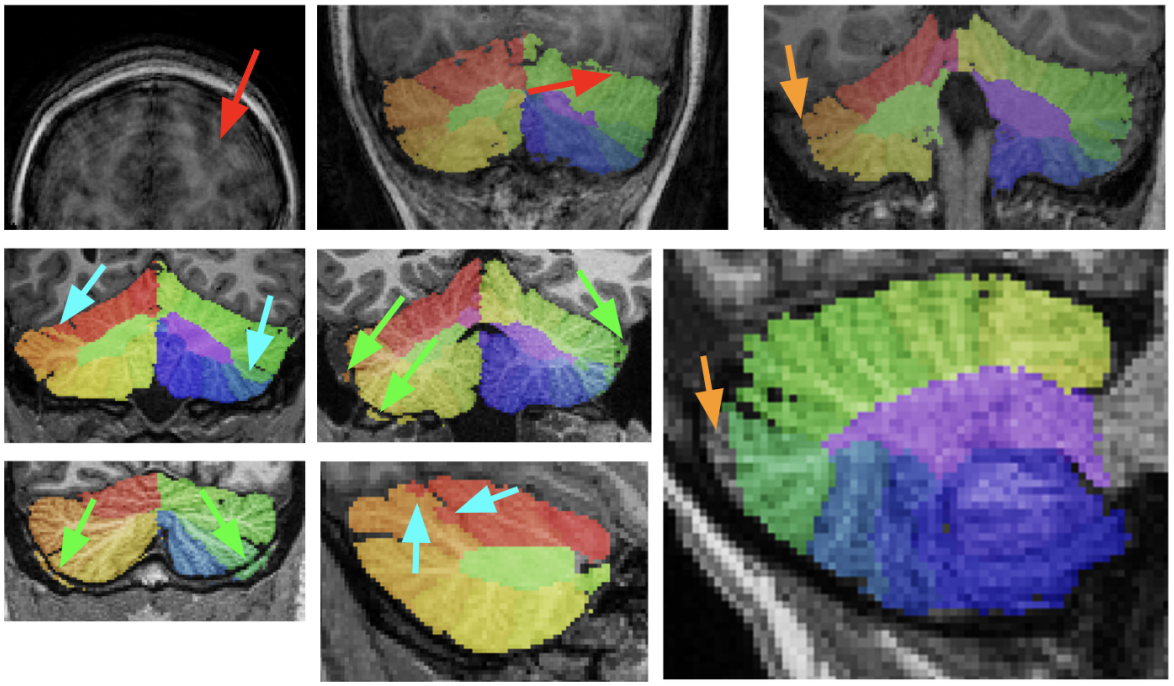
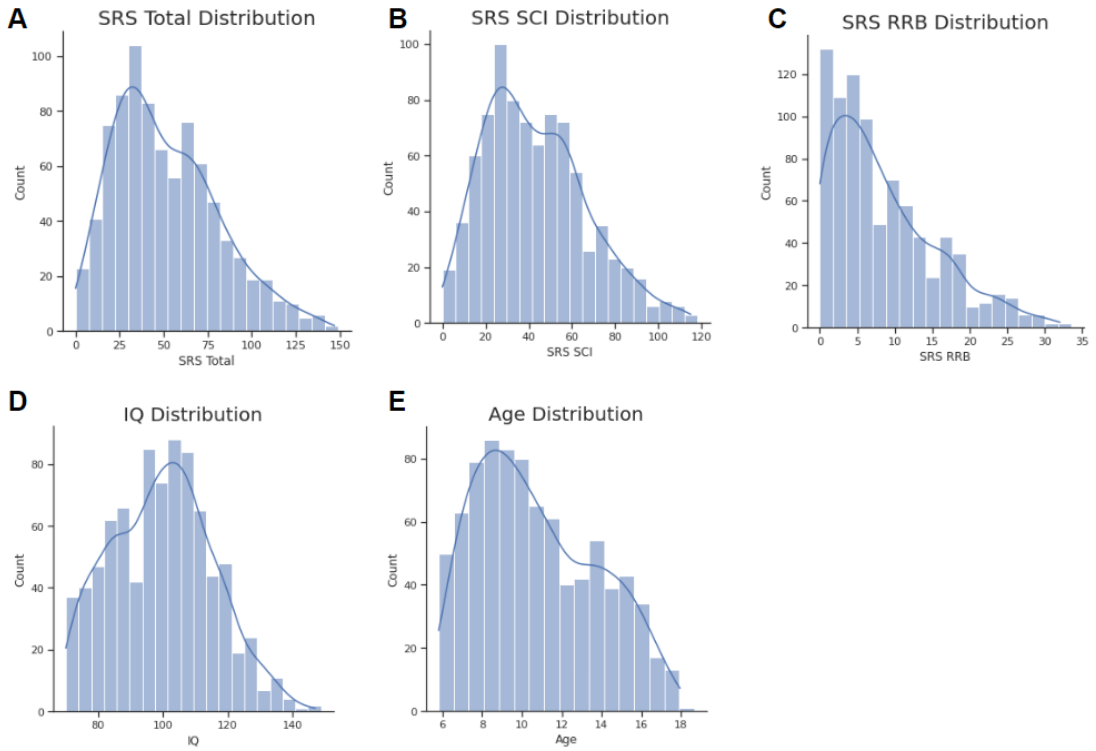
SUPPLEMENTARY MATERIAL

Supplementary Figure 1. Illustrations of common parcellation errors and motion artifacts



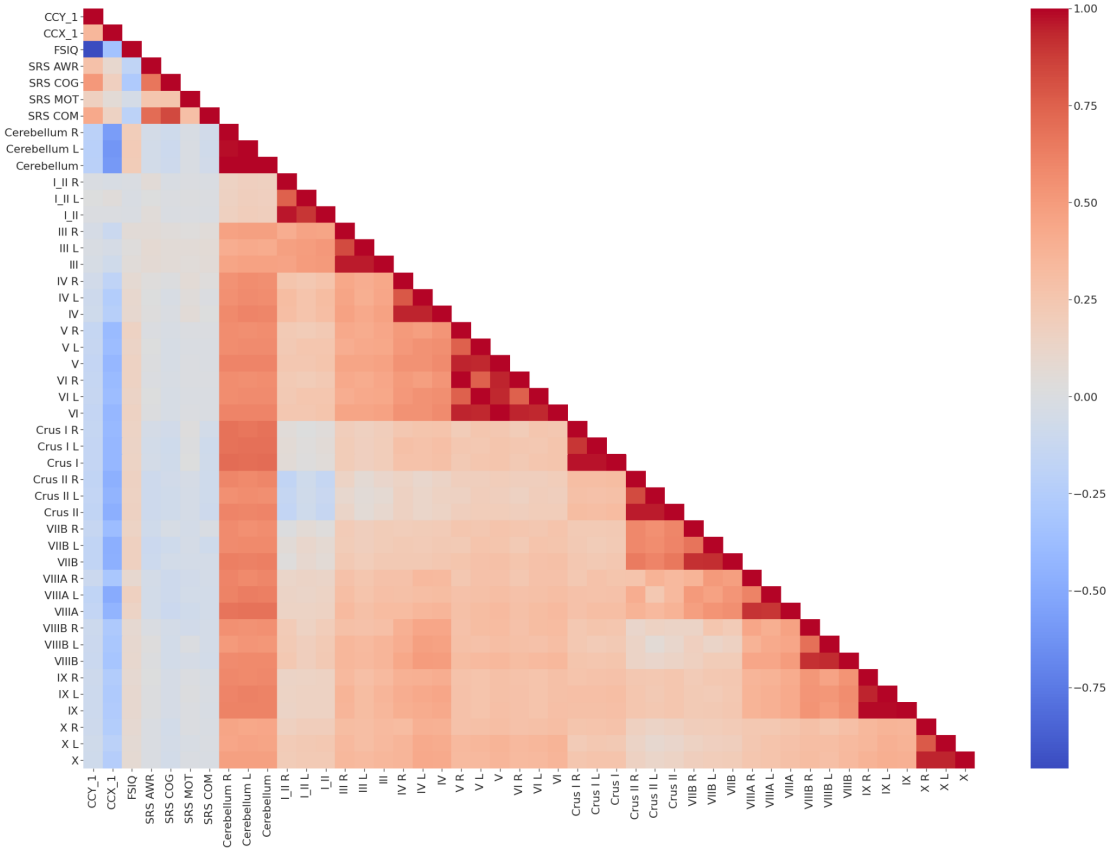
Red arrows: motion related artifacts (ghosting); Orange: Non segmented cerebellar tissue; Cyan: Parcellation errors ; Green : non cerebellar tissue labeled as cerebellar tissue

Supplementary Figure 2. Distribution of clinical variables



SRS; Social Responsiveness Scale; SCI, social and communication SRS's subscale; RRB, RRB, repetitive behavior SRS's subscale; IQ, Intelligence Quotient.

Supplementary Figure 3. Heatmap of correlations between clinical canonical component, anatomical canonical component and individual variables.



CCY1, Clinical Canonical Variable; CCX1, Anatomical Canonical Variable; FSIQ, Full-Scale Intelligence Quotient; SRS AWR, Social Awareness SRS's subscale; SRS COG, Social Cognition SRS's subscale; SRS COM, Social Communication SRS's subscale; SRS MOT, Social Motivation SRS's subscale

Supplementary Table 1. Comparison of subjects included and excluded from the analyses after quality control

Demographics	Included (N = 850)	Excluded (N = 559)	Statistics	P-val
Mean Age (SD)***	10.8 (3.0)	10.0 (3.1)	Student Z = -4.7	< 0.0001***
Sex (%of M)***	354/496 (58%)	164/395 (71%)	Chi2 T = 21.5	< 0.0001***
SRS Total (SD)*	51.5 (29.8)	55.1 (31.3)	Student Z = 2.1	0.037*
SCI (SD)	43.0 (23.6)	45.6 (24.7)	Student Z = 1.9	0.061
RRB (SD)*	8.5 (7.1)	9.5 (7.5)	Student Z = 2.5	0.011*
FSIQ (SD)	99.7 (15.7)	99.2 (15.0)	Student Z = -1.0	0.328

SD, standard deviation; M, male; SRS Total, Social Responsiveness Scale total score; SCI, social and communication SRS's subscale; RRB, RRB, repetitive behavior SRS's subscale; IQ Total, Intelligence Quotient; significant differences are marked by P-val threshold: < 0.05 (*) or < 0.001 (***).

Supplementary Table 2. Association between volumes of the cerebellum and social communication impairment scale (SCI), age, sex, IQ, intracranial volume (ICV) and interactions between SCI and covariates.

LOBULE	SCI p-value (p-value corr)	SCI coef [95 IC]	AGE p-value	AGE coef [95 IC]	SEX p-value	SEX coef [95 IC]	IQ p-value	IQ coef [95 IC]	ICV p-value	ICV coef [95 IC]	SCI*AGE p-value	SCI*AGE coef [95 IC]	SCI*SEX p-value	SCI*SEX coef [95 IC]	SCI*IQ p-value	SCI*IQ coef [95 IC]	SCI*ICV p-value	SCI*ICV coef [95 IC]	Out.
Cerebellum	0.0034 (0.0239*)	0.547 [0.181; 0.914]	0.0064	0.612 [0.145; 1.078]	0.0269	-3.204 [-6.402; -0.006]	0.0804	0.086 [-0.006; 0.178]	<0.0001	0.074 [0.062; 0.086]	0.0767	-0.008 [-0.017; 0.002]	0.4276	0.018 [-0.047; 0.082]	0.0766	-0.002 [-0.003; 0.000]	0.1177	-0.000 [-0.000; 0.000]	4
Lobe Ant	0.1059 (0.1483)	0.051 [-0.011; 0.113]	0.0339	0.087 [0.008; 0.166]	0.0575	-0.577 [-1.128; -0.026]	0.2445	0.012 [-0.003; 0.028]	<0.0001	0.008 [0.006; 0.010]	0.1576	-0.001 [-0.003; 0.000]	0.5236	0.004 [-0.007; 0.015]	0.2706	-0.000 [-0.001; 0.000]	0.4082	-0.000 [-0.000; 0.000]	3
Lobule VI	0.0117 (0.0280*)	0.104 [0.023; 0.185]	0.4769	0.039 [-0.065; 0.142]	0.8570	0.129 [-0.592; 0.850]	0.6843	-0.001 [-0.021; 0.020]	<0.0001	0.012 [0.009; 0.015]	0.6060	-0.001 [-0.003; 0.002]	0.9638	-0.001 [-0.016; 0.013]	0.9979	-0.000 [-0.000; 0.000]	0.0194	-0.000 [-0.000; 0.000]	2
Crus I	0.1737 (0.1736)	0.092 [-0.041; 0.225]	0.6614	0.011 [-0.159; 0.181]	0.0965	-0.621 [-1.799; 0.557]	0.3029	0.015 [-0.018; 0.049]	<0.0001	0.016 [0.011; 0.020]	0.7069	-0.000 [-0.004; 0.003]	0.3953	0.004 [-0.020; 0.028]	0.3970	-0.000 [-0.001; 0.000]	0.6269	-0.000 [-0.000; 0.000]	2
Crus II	0.0120 (0.0280*)	0.120 [0.026; 0.214]	0.1955	0.059 [-0.062; 0.180]	0.5929	-0.059 [-0.892; 0.775]	0.0204	0.026 [0.002; 0.050]	<0.0001	0.010 [0.006; 0.013]	0.1692	-0.001 [-0.004; 0.001]	0.5249	-0.009 [-0.026; 0.008]	0.0777	-0.000 [-0.001; 0.000]	0.2762	-0.000 [-0.000; 0.000]	5
Lobule VIIB	0.0736 (0.1289)	0.027 [-0.004; 0.093]	0.3418	0.027 [-0.035; 0.089]	0.0718	-0.418 [-0.849; 0.013]	0.0038	0.018 [0.006; 0.030]	<0.0001	0.005 [0.003; 0.006]	0.5662	-0.000 [-0.002; 0.001]	0.1883	0.006 [-0.003; 0.015]	0.0370	-0.000 [-0.001; 0.000]	0.4869	-0.000 [-0.000; 0.000]	5
Lobe Post-Inf	0.1451 (0.1693)	0.088 [-0.031; 0.207]	0.0039	0.228 [0.076; 0.380]	0.0017	-1.789 [-2.848; -0.731]	0.1538	0.022 [-0.008; 0.052]	<0.0001	0.015 [0.011; 0.019]	0.0218	-0.004 [-0.007;-0.001]	0.2926	0.013 [-0.009; 0.034]	0.1128	-0.000 [-0.001; 0.000]	0.7459	-0.000 [-0.000; 0.000]	1

P-value for each variate and interaction terms (P-value after Benjamini-Hochberg FDR correction is added between brackets for the SCI variable).

SCI, social and communication SRS's subscale; IQ, Intelligence Quotient; ICV, intracranial volume. CI95%, Confidence Interval

Supplementary Table 3. Association between volumes of the cerebellum and SRS Total and RRB.

LOBULE	SRS Total		RRB	
	P-value	Corrected P-value	P-value	Corrected P-value
Cerebellum	0.0105	0.0732	0.3236	0.6789
Lobe Ant	0.3593	0.3593	0.5819	0.6789
Lobule VI	0.0247	0.0863	0.5775	0.6789
Crus I	0.2553	0.2979	0.8342	0.8342
Crus II	0.0422	0.0986	0.1325	0.6789
Lobule VIIB	0.1014	0.1775	0.4276	0.6789
Lobe Post-Inf	0.1904	0.2665	0.5731	0.6789

SRS Total, Social Responsiveness Scale total score; RRB, RRB, repetitive behavior SRS's subscale; Benjamini-Hochberg FDR correction.