

## Supplementary Materials

This document provides supplementary tables supporting the primary analyses reported in the main manuscript, including (i) ABIDE demographic information summarized by site and (ii) linear mixed-effects (LME) model outputs for key contrasts in the ACE cohort, specifically ASD versus CONN in the whole ACE population and ASD versus US in family pairs. These materials are provided as standalone tables in PDF format for completeness and transparency.

### **Supplementary Materials**

Table S1: ABIDE demographic information by site.

Site	1 (N=27)	2 (N=12)	4 (N=27)	5 (N=25)	6 (N=73)	7 (N=31)	9 (N=40)	12 (N=27)	13 (N=32)	14 (N=115)	15 (N=23)	16 (N=60)	17 (N=19)	18 (N=7)	Total (N=518)	p value	
Diagnoses																	
- ASD	14 (51.9%)	5 (41.7%)	8 (29.6%)	12 (48.0%)	30 (41.1%)	13 (41.9%)	21 (52.5%)	12 (44.4%)	11 (34.4%)	50 (43.5%)	11 (47.8%)	33 (55.0%)	9 (47.4%)	4 (57.1%)	233 (45.0%)	0.755	
- TDC	13 (48.1%)	7 (58.3%)	19 (70.4%)	13 (52.0%)	43 (58.9%)	18 (58.1%)	19 (47.5%)	15 (55.6%)	21 (65.6%)	65 (56.5%)	12 (52.2%)	27 (45.0%)	10 (52.6%)	3 (42.9%)	285 (55.0%)		
Sex																	
- Male	22 (81.5%)	10 (83.3%)	21 (77.8%)	25 (100.0%)	53 (72.6%)	29 (93.5%)	24 (60.0%)	21 (77.8%)	24 (75.0%)	90 (78.3%)	17 (73.9%)	52 (86.7%)	17 (89.5%)	7 (100.0%)	412 (79.5%)	0.010	
- Female	5 (18.5%)	2 (16.7%)	6 (22.2%)	0 (0.0%)	20 (27.4%)	2 (6.5%)	16 (40.0%)	6 (22.2%)	8 (25.0%)	25 (21.7%)	6 (26.1%)	8 (13.3%)	2 (10.5%)	0 (0.0%)	106 (20.5%)		
Age																	
- Mean (SD)	13.992 (2.005)	15.083 (1.443)	14.357 (1.928)	14.855 (1.588)	13.334 (2.602)	15.306 (1.569)	13.464 (2.470)	14.185 (1.508)	10.261 (1.259)	10.261 (1.259)	12.314 (2.679)	10.195 (1.539)	13.405 (2.370)	12.402 (1.715)	11.714 (1.976)	13.105 (2.565)	< 0.001
- Range	9.330 - 17.780	12.000 - 17.000	8.670 - 17.150	12.000 - 17.500	8.200 - 17.900	12.800 - 17.900	8.420 - 17.750	12.100 - 16.900	8.200 - 12.770	8.010 - 17.880	8.010 - 17.880	8.246 - 12.936	8.490 - 17.940	9.790 - 16.470	10.000 - 16.000	8.010 - 17.940	

Table S2: LME result of ASD vs CONN in the whole ACE population.

<i>Predictors</i>	<i>Estimates</i>	<b>INT</b>	
		<i>CI</i>	<i>p</i>
(Intercept)	1.99	1.89 – 2.08	< <b>0.001</b>
AGE AT SCAN	-0.00	-0.00 – 0.00	0.577
SITE SCR	0.01	-0.04 – 0.06	0.722
SITE UCL	0.01	-0.03 – 0.06	0.542
SITE YAL	-0.03	-0.07 – 0.02	0.306
DX GROUP [2]	0.01	-0.02 – 0.04	0.457
HL	0.00	0.00 – 0.00	< <b>0.001</b>
Female	-0.01	-0.04 – 0.02	0.411
MEAN FD	0.19	0.09 – 0.30	< <b>0.001</b>
CONN × HL	0.00	0.00 – 0.00	< <b>0.001</b>
<b>Random Effects</b>			
$\sigma^2$	0.02		
$\tau_{00}$ SUBJECT_ID	0.01		
ICC	0.35		
N SUBJECT_ID	196		
Observations	39200		
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	0.148 / 0.450		

Table S3: LME result of ASD vs US in family pair.

<i>Predictors</i>	<b>INT</b>				
	<i>Estimates std. Error</i>		<i>CI</i>	<i>Statistic</i>	<i>p</i>
(Intercept)	1.7950	0.0698	1.6583 – 1.9318	25.7343	<b>3.091e-140</b>
AGE AT SCAN	0.0009	0.0001	0.0007 – 0.0011	7.9971	<b>1.457e-15</b>
SITE SCR	0.0140	0.0755	-0.1340 – 0.1621	0.1858	8.526e-01
SITE UCL	-0.0135	0.0788	-0.1680 – 0.1409	-0.1718	8.636e-01
SITE YAL	0.0352	0.0788	-0.1192 – 0.1897	0.4470	6.549e-01
US	-0.0052	0.0085	-0.0218 – 0.0115	-0.6065	5.442e-01
Rank	0.0009	0.0000	0.0008 – 0.0010	17.5436	<b>1.313e-67</b>
Female	-0.0089	0.0059	-0.0205 – 0.0027	-1.5035	1.327e-01
MEAN FD	0.3215	0.0290	0.2647 – 0.3783	11.0977	<b>2.101e-28</b>
US × rank	0.0002	0.0001	0.0001 – 0.0003	3.0881	<b>2.021e-03</b>
<b>Random Effects</b>					
$\sigma^2$	0.03				
$\tau_{00}$ MOTHER_ID	0.01				
ICC	0.22				
N MOTHER_ID	19				
Observations	7800				
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	0.114 / 0.311				