

Supplementary Information for:

Longitudinal EEG power in the first postnatal year differentiates autism outcomes by three years

Gabard-Durnam et al.

Supplementary Table 1: Whole-head 3 – 12 months EEG power models

Parameters	ASD vs. HRA-		ASD vs. LRC		HRA- vs. LRC	
	B Coefficient (SE)	p value	B Coefficient (SE)	p value	B Coefficient (SE)	p value
Model intercept	-14.15 (4.11)	0.001	8.54 (6.29)	0.175	11.14 (3.23)	0.001
Sex	-	-	1.13 (0.78)	0.149	-	-
Parental Education 1	-	-	-0.16 (1.27)	0.903	-1.96 (0.94)	0.037
Parental Education 2	-	-	-2.26 (1.2)	0.06	-2.2 (0.85)	0.009
6-month Intercept						
Delta	-	-	-	-	-9.61 (5.49)	0.08
Theta	-	-	-7.34 (4.22)	0.082	9 (5.91)	0.128
Low Alpha	10.21 (3.04)	0.001	-	-	-5.51 (2.78)	0.047
High Alpha	-	-	8.88 (6.65)	0.182	-	-
Beta	-	-	-5.95 (5.47)	0.276	-	-
Gamma	-	-	-	-	-	-
Slope 3-12 months						
Delta	-	-	-	-	-	-
Theta	9.19 (2.82)	0.001	-	-	-3.23 (1.08)	0.003
Low Alpha	-	-	-	-	-	-
High Alpha	-9.65 (3.68)	0.009	-16.68 (14.22)	0.241	-	-
Beta	-	-	13.01 (13.23)	0.326	-	-
Gamma	3.86 (2.14)	0.072	-	-	-	-
Intercept x Slope						
Delta	-	-	-	-	-	-
Theta	-	-	-	-	-	-
Low Alpha	-	-	-	-	-	-
High Alpha	-	-	16.86 (11.74)	0.151	-	-
Beta	-	-	-13.06 (8.69)	0.133	-	-
Gamma	-	-	-	-	-	-

SE = Standard Error; bold values indicate statistically-significant parameters (determined by Student's t-test) within each model at the level of $p < 0.05$

Supplementary Table 2: Whole-head 12 – 24 months EEG power models

Parameters	ASD vs. HRA-		ASD vs. LRC		HRA- vs. LRC	
	B Coefficient (SE)	p value	B Coefficient (SE)	p value	B Coefficient (SE)	p value
Model intercept	-3.59 (6.32)	0.57	16.46 (7.81)	0.035	16.06 (4.90)	0.001
Sex	1.62 (0.92)	0.078	1.53 (0.95)	0.11	-	-
Parental Education 1	-	-	0.12 (1.49)	0.93	-	-
Parental Education 2	-	-	-3.27 (1.43)	0.023	-	-
12-month Intercept						
Delta	43.19 (18.52)	0.020	10.99 (12.33)	0.37	-17.75 (8.05)	0.027
Theta	-49.47 (19.48)	0.011	-27.39 (13.60)	0.044	8.57 (8.47)	0.31
Low Alpha	-	-	12.28 (6.65)	0.065	-0.43 (3.98)	0.91
High Alpha	12.67 (6.11)	0.038	-	-	-	-
Beta	-3.31 (7.50)	0.66	-	-	-	-
Gamma	-3.32 (6.43)	0.61	-7.68 (4.42)	0.08	-	-
Slope 12-24 months						
Delta	30.84 (11.80)	0.009	-15.85 (13.82)	0.25	-12.66 (4.93)	0.010
Theta	-56.95 (21.34)	0.008	-	-	37.06 (13.69)	0.007
Low Alpha	-	-	-	-	-32.40 (13.67)	0.018
High Alpha	12.67 (6.11)	0.038	-10.51 (5.35)	0.049	-	-
Beta	-47.52 (30.90)	0.12	10.85 (5.51)	0.049	-	-
Gamma	21.67 (14.58)	0.14	-6.00 (4.05)	0.14	2.00 (1.42)	0.16
Intercept x Slope						
Delta	-	-	11.20 (8.77)	0.20	-	-
Theta	20.52 (10.19)	0.044	-	-	-14.60 (7.48)	0.051
Low Alpha	-	-	-	-	15.09 (8.35)	0.071
High Alpha	-	-	-	-	-	-
Beta	29.91 (18.58)	0.11	-	-	-	-
Gamma	-17.44 (10.28)	0.090	-	-	-	-

SE = Standard error; bold values indicate statistically-significant parameters (determined by Student's t-test) within each model at the level of $p < 0.05$

Supplementary Table 3: Whole-head 3 – 36 months EEG power models

Parameters	ASD vs. HRA-		ASD vs. LRC		HRA- vs. LRC	
	B Coefficient (SE)	p value	B Coefficient (SE)	p value	B Coefficient (SE)	p value
Model intercept	-11.95 (4.83)	0.013	-2.96 (5.71)	0.604	9.57 (3.15)	0.002
Sex	1.19 (0.75)	0.113	1.17 (0.75)	0.117	-	-
Parental Education 1	0.44 (0.90)	0.622	-0.76 (1.11)	0.495	-0.98 (0.83)	0.235
Parental Education 2	-1.41 (0.87)	0.103	-2.37 (1.04)	0.022	-1.49 (0.74)	0.043
6-month Intercept						
Delta	3.03 (11.55)	0.793	-	-	-	-
Theta	10.5 (13.63)	0.440	-7.35 (6.25)	0.240	-4.78 (2.24)	0.033
Low Alpha	-16.10 (7.52)	0.032	5.69 (6.20)	0.359	-	-
High Alpha	20.73 (7.89)	0.009	13.13 (6.29)	0.037	-	-
Beta	-5.66 (3.57)	0.113	-	-	-	-
Gamma	-	-	-7.51 (3.88)	0.053	-1.61 (1.90)	0.400
Slope 3-12 months						
Delta	114.33 (50.61)	0.024	-	-	-	-
Theta	-141.71 (56.55)	0.012	-59.40 (31.17)	0.057	35.39 (11.85)	0.003
Low Alpha	32.20 (20.77)	0.121	80.58 (29.82)	0.007	-	-
High Alpha	20.73 (7.89)	0.009	-	-	-	-
Beta	-	-	-	-	-	-
Gamma	-	-	-8.35 (6.92)	0.228	-5.60 (4.21)	0.184
Intercept x Slope						
Delta	-79.21 (37.73)	0.036	-	-	-	-
Theta	125.56 (48.44)	0.010	48.41 (22.39)	0.031	-29.52 (9.13)	0.001
Low Alpha	-42.36 (16.58)	0.011	-65.16 (22.83)	0.004	-	-
High Alpha	-	-	-	-	-	-
Beta	-	-	-	-	-	-
Gamma	-	-	6.62 (6.05)	0.273	4.66 (3.49)	0.181

SE = Standard Error; bold values indicate statistically-significant parameters (determined by Student's t-test) within each model at the level of $p < 0.05$

Supplementary Table 4: Temporal-Parietal 3 – 12 months EEG power models

Parameters	ASD vs. HRA-		ASD vs. LRC		HRA- vs. LRC	
	B Coefficient (SE)	p value	B Coefficient (SE)	p value	B Coefficient (SE)	p value
Model intercept	-10.75 (3.86)	0.005	2.63 (6.07)	0.66	9.53 (3.12)	0.002
Sex	-	-	-	-	-	-
Parental Education 1	-	-	-0.32 (1.29)	0.80	-1.98 (0.93)	0.03
Parental Education 2	-	-	-2.61 (1.31)	0.046	-2.28 (0.83)	0.006
6-month Intercept						
Delta	-3.04 (4.63)	0.51	-	-	-1.14 (7.94)	0.89
Theta	-	-	-	-	4.15 (7.62)	0.59
Low Alpha	11.21 (5.15)	0.029	-9.82 (8.89)	0.27	-5.64 (2.94)	0.060
High Alpha	-	-	19.12 (11.00)	0.082	-	-
Beta	-	-	-	-	-	-
Gamma	-	-	-8.57 (4.24)	0.043	-3.03 (2.36)	0.20
Slope 3-12 months						
Delta	-4.67 (5.23)	0.37	-	-	23.28 (10.60)	0.028
Theta	-	-	-	-	-15.62 (7.44)	0.036
Low Alpha	3.96 (2.75)	0.15	-44.15 (22.16)	0.046	-	-
High Alpha	-8.60 (3.02)	0.004	58.52 (25.08)	0.020	-	-
Beta	-	-	-	-	-	-
Gamma	-	-	-4.48 (2.34)	0.055	-4.32 (3.19)	0.18
Intercept x Slope						
Delta	7.17 (3.43)	0.036	-	-	-17.07 (7.62)	0.025
Theta	-	-	-	-	10.00 (5.35)	0.062
Low Alpha	-	-	31.33 (16.16)	0.053	-	-
High Alpha	-	-	-43.83 (19.13)	0.022	-	-
Beta	-	-	-	-	-	-
Gamma	-	-	-	-	3.76 (2.27)	0.097

SE = Standard error; bold values indicate statistically-significant parameters (determined by Student's t-test) within each model at the level of $p < 0.05$

Supplementary Table 5: Temporal-Parietal 12 – 24 months EEG power models

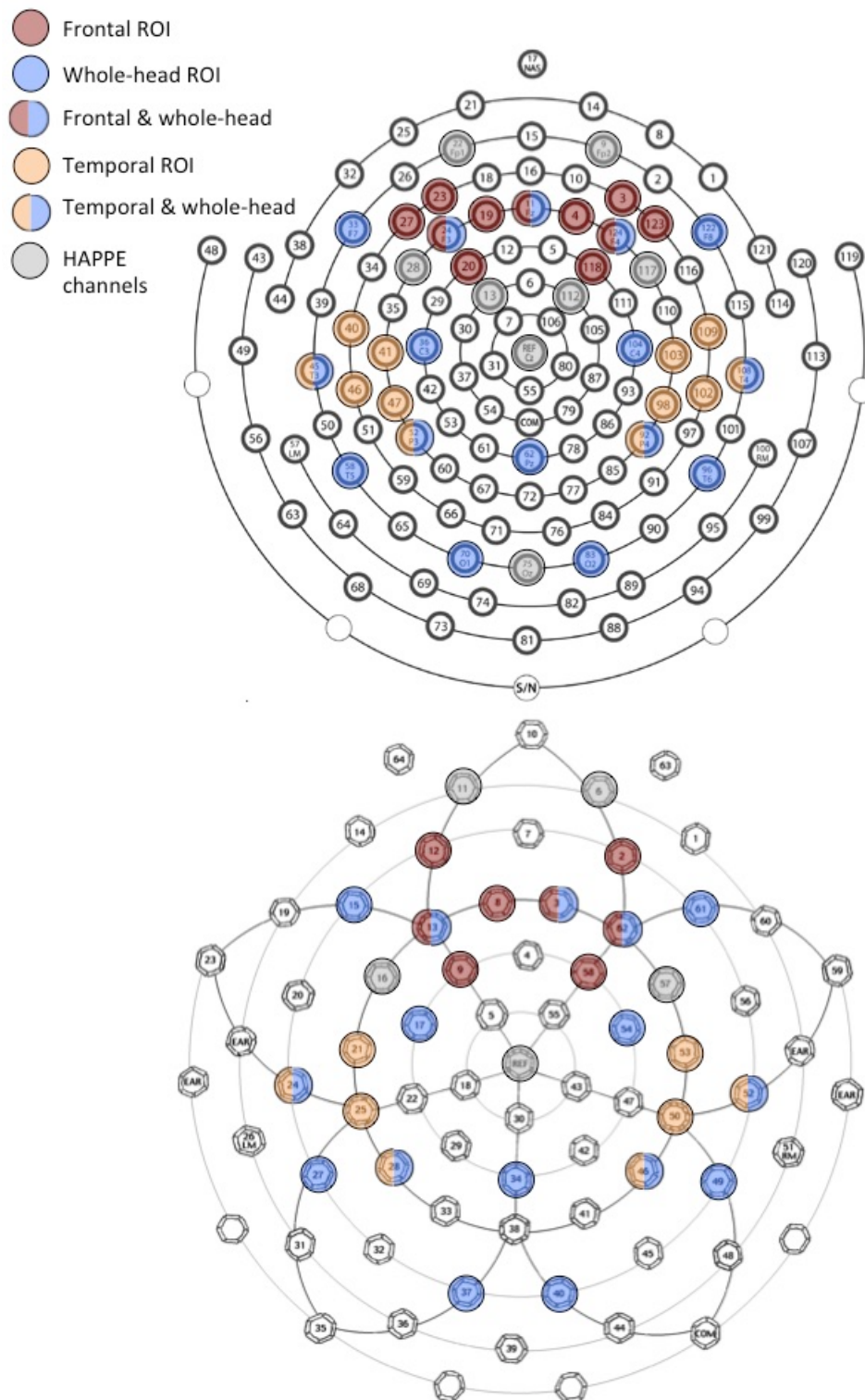
Parameters	ASD vs. HRA-		ASD vs. LRC		HRA- vs. LRC	
	B Coefficient (SE)	p value	B Coefficient (SE)	p value	B Coefficient (SE)	p value
Model intercept	-5.16 (4.02)	0.20	9.31 (6.58)	0.16	14.02 (4.09)	0.0006
Sex	1.40 (0.67)	0.036	-	-	-	-
Parental Education 1	-	-	0.73 (1.40)	0.60	-	-
Parental Education 2	-	-	-2.21 (1.29)	0.087	-	-
12-month Intercept						
Delta	25.36 (10.30)	0.014	26.57 (13.54)	0.050	-14.60 (7.71)	0.058
Theta	-23.30 (11.16)	0.037	-38.17 (13.92)	0.006	4.26 (7.90)	0.59
Low Alpha	-0.61 (5.09)	0.91	-	-	-3.08 (3.74)	0.41
High Alpha	-	-	10.72 (6.15)	0.081	-	-
Beta	-	-	-	-	3.68 (2.39)	0.12
Gamma	-	-	-5.78 (4.42)	0.19	-	-
Slope 12-24 months						
Delta	11.40 (5.83)	0.051	-	-	-60.50 (21.33)	0.005
Theta	-43.65 (19.08)	0.022	-	-	66.60 (21.43)	0.002
Low Alpha	22.77 (15.20)	0.13	-	-	-21.22 (10.94)	0.052
High Alpha	-	-	-32.67 (17.98)	0.069	-	-
Beta	-	-	-	-	2.62 (1.55)	0.091
Gamma	-	-	28.05 (13.46)	0.037	-	-
Intercept x Slope						
Delta	-	-	-	-	33.82 (13.81)	0.014
Theta	23.70 (11.19)	0.034	-	-	-39.64 (14.05)	0.005
Low Alpha	-15.94 (9.11)	0.080	-	-	9.68 (6.72)	0.15
High Alpha	-	-	22.85 (13.01)	0.079	-	-
Beta	-	-	-	-	-	-
Gamma	-	-	-17.77 (8.37)	0.034	-	-

SE = Standard error; bold values indicate statistically-significant parameters (determined by Student's t-test) within each model at the level of $p < 0.05$

Supplementary Table 6: Temporal-Parietal 3 – 36 months EEG power models

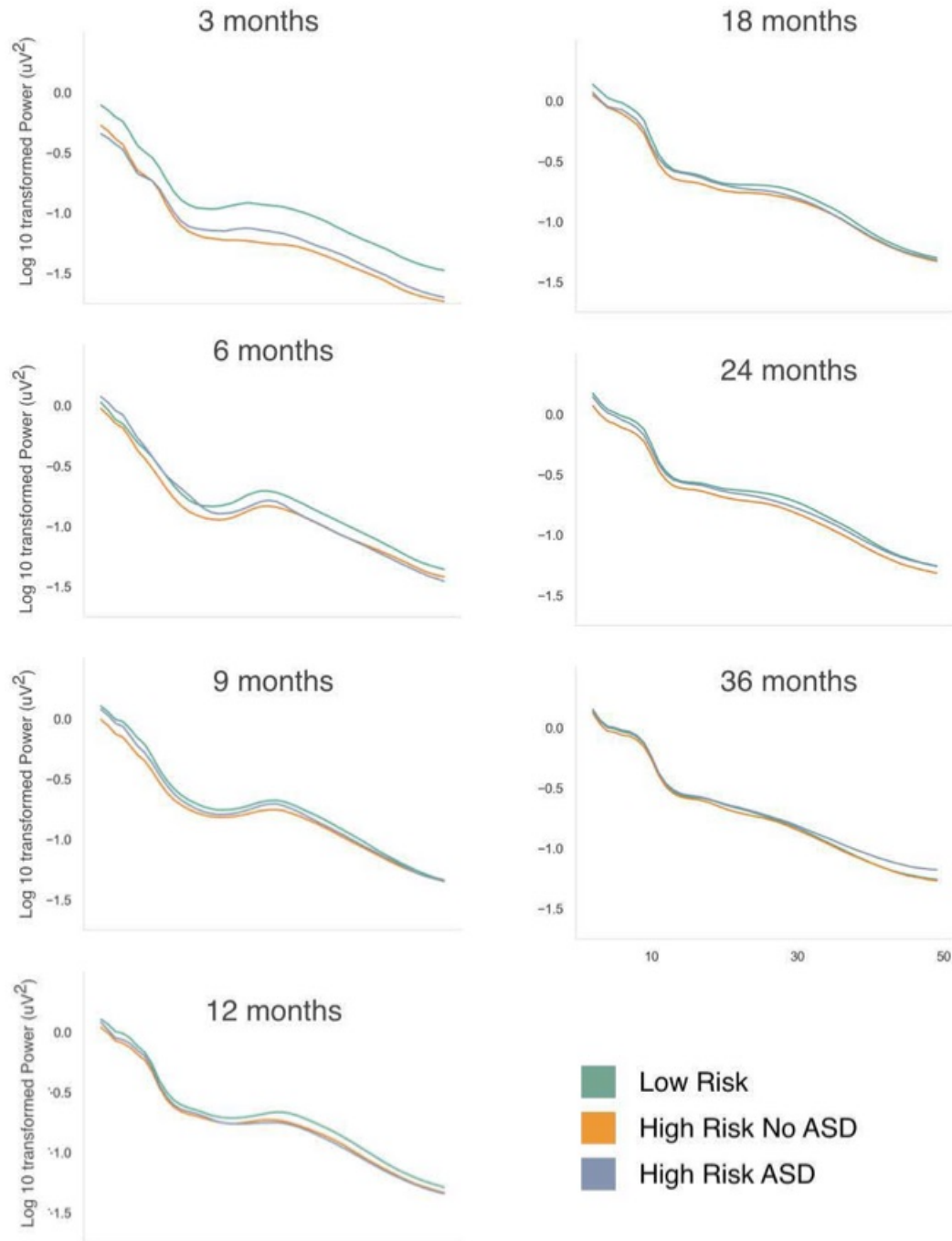
Parameters	ASD vs. HRA-		ASD vs. LRC		HRA- vs. LRC	
	B Coefficient (SE)	p value	B Coefficient (SE)	p value	B Coefficient (SE)	p value
Model intercept	-17.12 (5.91)	0.0037	3.50 (7.53)	0.64	8.89 (2.42)	0.0002
Sex	1.00 (0.63)	0.11	-	-	-	-
Parental Education 1	-	-	-2.52 (1.61)	0.12	-1.24 (0.83)	0.14
Parental Education 2	-	-	-4.15 (1.59)	0.009	-1.62 (0.74)	0.029
6-month Intercept						
Delta	11.22 (9.87)	0.26	20.67 (12.72)	0.10	-	-
Theta	0.44 (9.25)	0.96	-22.76 (13.94)	0.10	-5.80 (1.70)	0.0007
Low Alpha	-	-	7.47 (7.54)	0.32	-	-
High Alpha	5.87 (7.24)	0.42	-3.24 (10.46)	0.76	-	-
Beta	-1.66 (5.08)	0.74	-	-	-	-
Gamma	-1.82 (5.24)	0.73	-4.63 (4.78)	0.33	-	-
Slope 3-36 months						
Delta	114.70 (34.00)	0.0007	218.45 (91.21)	0.017	-	-
Theta	-142.52 (42.16)	0.0007	-256.37 (101.69)	0.012	15.76 (7.78)	0.043
Low Alpha	-	-	101.54 (43.65)	0.020	-	-
High Alpha	59.62 (38.18)	0.12	-81.04 (46.73)	0.083	-	-
Beta	-50.12 (26.82)	0.062	15.59 (8.60)	0.070	-	-
Gamma	25.79 (15.78)	0.10	-19.14 (9.52)	0.044	-	-
Intercept x Slope						
Delta	-80.50 (24.92)	0.001	-149.48 (63.78)	0.019	-	-
Theta	120.76 (34.94)	0.0005	179.84 (71.88)	0.012	-14.08 (5.53)	0.011
Low Alpha	-	-	-68.32 (29.42)	0.020	-	-
High Alpha	-70.23 (33.67)	0.037	58.24 (36.64)	0.11	-	-
Beta	32.83 (15.17)	0.030	-	-	-	-
Gamma	-16.48 (9.53)	0.084	9.69 (6.66)	0.15	-	-

SE = Standard Error; bold values indicate statistically-significant parameters (determined by Student's t-test) within each model at the level of $p < 0.05$



Supplementary Figure 1: EEG Acquisition Net Layouts

The 128-channel EGI HydroCel Geodesic Sensor Net (version 1.0), top panel, and 64-channel EGI Geodesic Sensor Net (version 2.0), bottom panel, used in the study. Each region of interest (ROI) in the main and supplemental analyses is color-coded, with the frontal ROI shown in red, the whole-head ROI shown in blue, and the temporal-parietal (abbreviated to T-P in the figure) ROI shown in orange. HAPPE channels (shown in light grey) refer to the channels selected for preprocessing as part of the HAPPE analysis pipeline.



Supplementary Figure 2: EEG Power Distributions Across Age for Frontal Electrodes

The distribution of log-transformed power for all groups, low-risk control (LRC, shown in green), high-risk without ASD (HRA-, shown in orange), and high-risk with ASD (ASD, shown in blue), at each age (in months) for the frontal region of interest. EEG frequency in Hertz is shown on each x-axis (for scale, see 36-month axis). Log (base ten) transformed EEG power in micro-volts squared is provided on each y-axis.