Supplemental Data

Inter-scanner post-processing steps

The stability of image acquisition in longitudinal and/or multi-site studies is critical but may be compromised in several ways, including instrument-related differences between sites, and instrument/software upgrades within sites (1). In the current study, steps were employed to address errors that are known to result from multi-site and/or longitudinal scanning (2). Firstly, images were corrected for tissue signal inhomogeneity, which has been shown to result from geometric distortion (2). This was achieved via a nonparametric non-uniformity intensity normalization method optimised for 3 Tesla images (3). Secondly, voxel dimension drift was corrected using linear registration procedures employed by the longitudinal processing stream in Freesurfer (Version 4.5) (http://surfer.nmr.mgh.harvard.edu/fswiki/LongitudinalProcessing), which involves the creation of an unbiased within-subject template space and average image using robust, inverse consistent registration (4).

Inter-scanner reliability and volume corrections

To investigate the possibility of inter-scanner bias, and the need for further correction, four individuals were scanned on both scanner platforms within a three week period, using the same acquisition parameters as described for the study sample. Post-processing steps were applied to the resulting T1-weighted images, and regional volume and thickness measures were estimated, as described in the manuscript. Volume/thickness measures differed between scanners to a small degree (see Table S1); differences ranged from 0.07% (average whole brain gray matter thickness) to 7.5% (right pallidum). For some structures, BRI measures were larger, and for others, RCH measures were larger. It is of note that these differences are not notably different (and considerably lower in some cases) to those differences reported within-scanner (e.g., Jovicich et al. (5) reported amygdala differences of 6.1 to 8%, within-scanner). Reliability of measures from the two platforms was assessed via the calculation of intraclass correlation coefficients (ICC's). To compensate for the measurement discrepancies (see Table S1), and as per a recently suggested procedure for correcting inter-scanner differences (6) , we derived a linear regression correction function (RCF) for each volume/thickness measure. The linear fit of BRI on RCH volume was computed and the slope and intercept were used to transform the BRI volume (volume BRI^{RCF} = [volume BRI – intercept]/slope). Applying this correction improved ICC's for left and right hippocampus, left and right amygdala, left and right nucleus accumbens, left and right pallidum, left and right caudate, whole brain volume, right dorsolateral prefrontal cortex, right ventrolateral prefrontal cortex, left orbitofrontal cortex, and average whole brain thickness. These improvements, which were modest to strong, contribute to the removal of linear, systematic inter-scanner variation in ROI volumes, and it is likely that any remaining variation between volumes or thickness estimates from the two scanners, while creating noise, would not interact with Group.

Thus, we applied this same formula to the raw BRI (i.e., baseline) volume and thickness measures mentioned above, for our whole sample.

TABLE S1. Interscanner statistics (percentage difference, intraclass correlation coefficients before and after linear correction) for all region of interest thickness/volumetric estimates

Region	BRI>RCH %	ICC before correction	ICC after correction
average thickness	0.07	0.79	0.78
LACC	0.6	0.82	0.82
RACC	0.6	0.41	0.30
LdlPFC	0.9	0.93	0.93
RdlPFC	-0.9	0.69	0.80
LvlPFC	1.2	0.81	0.81
RvlPFC	-1.3	0.80	0.83
Lofc	3.9	0.83	0.98
Rofc	1.5	0.29	0.24
WBV	-2.3	0.97	0.99
Lamyg	2.7	0.89	0.98
Ramyg	-3.3	0.78	0.92
LHipp	1.6	0.68	0.78
RHipp	-1.2	0.61	0.73
LNacc	-3.6	0.97	0.98
RNacc	4.5	0.75	0.86
LPut	-0.5	0.95	0.95
RPut	3.5	0.86	0.87
LPal	-3.0	0.89	0.91
RPal	-7.5	0.67	0.81
LCaud	0.7	0.28	0.74
RCaud	-0.5	0.26	0.99

Creation of prefrontal cortical regions

A customized anterior cingulate cortex region was created by combining the rostral and caudal anterior cingulate labels defined by FreeSurfer's automated cortical parcellation procedure. An orbitofrontal cortex region was created by combining lateral and medial orbitofrontal labels. A dorsolateral prefrontal cortex region was created by combining the superior frontal, rostral middle frontal and caudal middle frontal gyri, while the ventrolateral prefrontal cortex region was created by combining the pars opercularis, pars triangularis and pars orbitalis labels. A coronal cut was applied at Talairach coordinate y=26 to these two latter regions so that only *prefrontal* regions were included. In addition, another cut was made along the superior edge of medial wall of the brain for the dorsolateral prefrontal region, in order to exclude the medial surface of the brain.

Descriptive statistics

Means and standard deviations of all region of interest volume and thickness estimates (corrected for interscanner bias) are presented in Tables S2 and S3, respectively. Pearson's bivariate correlations between continuous selection variables (i.e., affective temperament), demographic variables and covariates are reported in Table S4. Tables S5 and S6 show Pearson's correlations between the aforementioned continuous variables and prefrontal cortical thickness estimates, and limbic/striatal volume estimates, respectively.

TABLE S2. Means and standard deviations of region of interest volume estimates (corrected for interscanner bias)

	T1		T2	
Region	Mean	Std. Deviation	Mean	Std. Deviation
R_hipp	4608.42	245.92	4716.70	382.74
L_hipp	4069.37	665.93	4570.11	373.11
R_amyg	1583.16	382.14	1676.27	174.32
L_amyg	1414.86	295.88	1697.49	194.91
R_caud	5057.62	748.36	4307.85	494.85
L_caud	4165.18	106.71	4290.55	478.20
R_puta	7193.00	746.28	7228.26	692.28
L_puta	7468.95	609.41	7149.13	608.50
R_pall	2427.64	504.87	2024.05	232.45
L_pall	2265.11	248.57	2374.01	275.76
R_nacc	687.53	93.44	680.61	85.43
L_nacc	523.07	93.63	535.76	84.40

R = right, L = left, hipp = hippocampus, amyg = amygdala, caud = caudate, puta = putamen, pall = pallidum, nacc = nucleus accumbens, T1 = Time 1 (baseline), T2 = Time 2 (follow-up).

TABLE S3. Means and standard deviations of region of interest thickness estimates (corrected for interscanner bias)

	T1		T2	
Region	Mean	SD	Mean	SD
R_vlPFC	3.15	0.17	3.03	0.14
L_vlPFC	3.14	0.22	2.82	0.15
R_dlPFC	3.04	0.14	2.98	0.14
L_dlPFC	3.00	0.15	2.92	0.14
R_OFC	3.00	0.07	2.86	0.10
L_OFC	3.07	0.10	2.77	0.13
R_ACC	3.23	0.23	3.15	0.21
L_ACC	3.27	0.23	3.22	0.22

R = right, L = left, vlPFC = ventrolateral prefrontal cortex, dlPFC = dorsolateral prefrontal cortex, OFC = orbitofrontal cortex, ACC = anterior cingulate cortex, T1 = Time 1 (baseline), T2 = Time 2 (follow-up).

TABLE S4. Pearson's bivariate correlations between continuous selection variables (i.e., affective temperament), demographic variables and covariates

		Age at T1	Time T1-T2	CESD	BAI	CBCL	SES	FSIQ	Tanner stage	EC	NA
Age at T1	*r*	1	.063	-.154	-.158	**-.253***	-.069	**-.259***	.101	.108	-.198
	p		.562	.156	.146	.019	.527	.016	.354	.323	.069
Time T1-T2	*r*		1	.119	.144	.011	.055	.038	**.280****	-.016	.096
	p			.277	.187	.922	.616	.730	.009	.886	.382
CESD	*r*			1	**.583****	**.343****	-.083	-.022	**.214***	**-.583****	**.438****
	p				.000	.001	.445	.841	.048	.000	.000
BAI	*r*				1	**.234***	-.011	.034	**.253***	**-.410****	**.476****
	p					.030	.918	.755	.019	.000	.000
CBCL	*r*					1	-.001	-.068	-.062	**-.472****	**.363****
	p						.989	.531	.573	.000	.001
SES	*r*						1	.097	-.047	-.031	.043
	p							.372	.667	.775	.696
FSIQ	*r*							1	-.167	.162	.063
	p								.125	.140	.564
Tanner stage	*r*								1	-.019	.041
	p									.865	.708
EC	*r*									1	**-.591****
	p										.000
NA	*r*										1
	p										

** Correlation is significant at the 0.01 level (2-tailed), *.Correlation is significant at the 0.05 level (2-tailed). Significant correlations are highlighted in bold.

T1 = Time 1 (baseline), T2 = Time 2 (follow-up), CESD = Centre for Epidemiological Studies - Depression scale, BAI = Beck Anxiety Inventory, CBCL - Child Behavior Checklist - parent report (externalizing), SES = socioeconoic status, FSIQ = full scale intelligence quotient, EC = Effortful Control, NA = Negative Affectivity.

TABLE S5. Pearson's bivariate correlations between continuous variables and limbic/striatal volumetric estimates

		Age at T1	Time T1-T2	CESD	BAI	CBCL	SES	FSIQ	Tanner stage	EC	NA
R_hipp_T1	*r*	.200	.055	.165	.186	.144	-.005	-.190	.188	-.089	-.020
	p	.065	.618	.129	.087	.187	.964	.079	.083	.417	.856
L_hipp_T1	*r*	.196	.108	.040	.185	.107	.007	**-.235***	.186	-.058	.011
	p	.070	.320	.716	.089	.327	.949	.029	.086	.599	.918
R_hipp_T2	*r*	.194	.035	.097	.120	.034	-.061	**-.221***	.166	-.012	-.039
	p	.074	.751	.376	.270	.758	.579	.041	.126	.913	.723
L_hipp_T2	*r*	**.279****	.076	-.098	.064	.002	.015	-.186	.199	.059	-.154
	p	.009	.485	.368	.558	.989	.891	.086	.067	.589	.161
R_amyg_T1	*r*	.030	.020	.066	.152	.120	-.176	-.120	.038	.071	.095
	p	.782	.858	.546	.162	.272	.105	.271	.727	.519	.387
L_amyg_T1	*r*	.114	-.112	-.035	.127	.109	-.117	-.006	-.107	.147	.052
	p	.297	.305	.749	.245	.316	.284	.959	.325	.178	.633
R_amyg_T2	*r*	.074	.047	-.066	.020	-.033	-.033	-.041	.113	.152	-.004
	p	.498	.668	.543	.855	.764	.761	.711	.301	.165	.968
L_amyg_T2	*r*	.033	-.024	-.023	.112	.011	-.077	-.054	-.090	**.247***	.084
	p	.760	.829	.833	.307	.922	.479	.620	.408	.023	.442
R_caud_T1	*r*	.210	.041	-.124	.063	**-.303****	.011	-.147	.086	.185	-.081
	p	.053	.710	.255	.562	.005	.920	.176	.431	.089	.463
L_caud_T1	*r*	**.253***	.092	-.169	.034	**-.326****	.090	-.098	.144	.192	-.134
	p	.019	.401	.120	.753	.002	.407	.368	.187	.079	.221
R_caud_T2	*r*	**.243***	.025	-.050	.026	**-.318****	.025	-.134	.114	.124	-.110
	p	.024	.820	.648	.813	.003	.816	.218	.297	.259	.318
L_caud_T2	*r*	.211	.047	-.113	.029	**-.324****	.078	-.106	.157	.166	-.122
	p	.051	.667	.300	.789	.002	.476	.332	.149	.129	.265
R_puta_T1	*r*	.135	-.002	-.039	-.119	-.184	-.125	-.054	.080	**.267***	-.037
	p	.214	.986	.720	.275	.090	.252	.620	.466	.013	.737
L_puta_T1	*r*	.130	.058	-.057	.004	-.169	-.124	-.073	.104	**.277***	.024
	p	.232	.599	.602	.970	.119	.256	.506	.340	.010	.829

R_puta_T2	*r*	.118	-.005	-.027	-.159	-.141	-.092	-.050	.043	**.284****	-.034
	p	.278	.960	.803	.143	.197	.399	.645	.695	.008	.760
L_puta_T2	*r*	.098	.030	-.022	-.050	-.136	-.172	-.054	.083	**.314****	.024
	p	.368	.787	.839	.651	.213	.112	.622	.446	.003	.828
R_pall_T1	*r*	.067	-.019	.051	.163	-.009	-.043	-.071	.171	-.173	.140
	p	.542	.859	.641	.133	.931	.695	.513	.115	.113	.201
L_pall_T1	*r*	.189	.201	.058	.046	-.035	-.166	-.027	.204	-.023	.157
	p	.081	.064	.597	.671	.746	.127	.803	.060	.837	.151
R_pall_T2	*r*	.042	.095	.040	.075	-.047	-.058	.011	.071	-.203	.152
	p	.702	.386	.714	.495	.664	.597	.917	.515	.062	.165
L_pall_T2	*r*	.191	.190	.017	-.044	-.057	-.185	-.094	.110	.011	.069
	p	.079	.079	.879	.688	.604	.087	.391	.313	.919	.532
R_nacc_T1	*r*	.129	.069	.039	-.114	-.172	-.127	-.129	.132	.128	-.133
	p	.236	.526	.723	.296	.113	.244	.238	.226	.242	.223
L_nacc_T1	*r*	.157	.012	-.048	-.077	-.136	-.153	.076	-.014	.088	-.067
	p	.148	.916	.664	.479	.213	.160	.486	.900	.422	.544
R_nacc_T2	*r*	.058	-.094	.019	-.175	-.097	**-.214***	-.105	.070	.173	-.203
	p	.597	.387	.863	.107	.372	.048	.335	.522	.113	.062
L_nacc_T2	*r*	-.021	-.132	.003	-.115	-.113	**-.343****	.002	-.082	.144	**-.225***
	p	.849	.224	.977	.291	.299	.001	.984	.450	.188	.038

** Correlation is significant at the 0.01 level (2-tailed), *.Correlation is significant at the 0.05 level (2-tailed). Significant correlations are highlighted in bold.

R = right, L = left, hipp = hippocampus, amyg = amygdala, caud = caudate, puta = putamen, pall = pallidum, nacc = nucleus accumbens, T1 = Time 1 (baseline), T2 = Time 2 (follow-up), CESD = Centre for Epidemiological Studies - Depression scale, BAI = Beck Anxiety Inventory, CBCL - Child Behavior Checklist - parent report (externalizing), SES = socioeconoic status, FSIQ = full scale intelligence quotient, EC = Effortful Control, NA = Negative Affectivity.

TABLE S6. Pearson's bivariate correlations between continuous variables and prefrontal thickness estimates

		Age at T1	Time T1-T2	CESD	BAI	CBCL	SES	FSIQ	Tanner stage	EC	NA
R_vlPFC_T1	*r*	-.175	.024	**.267***	**.261***	.144	.136	.060	.136	-.119	.228*
	p	.107	.823	.013	.015	.186	.212	.585	.212	.276	.036
L_vlPFC_T1	*r*	.030	.054	-.118	-.095	-.138	-.059	-.061	-.143	.139	.048
	p	.785	.620	.279	.385	.205	.591	.574	.191	.204	.661
R_vlPFC_T2	*r*	-.235*	-.156	.053	-.022	.040	.083	.144	-.203	.150	-.027
	p	.030	.151	.628	.841	.715	.447	.185	.060	.170	.806
L_vlPFC_T2	*r*	.077	.161	-.059	.085	.029	.208	**-.253***	.137	-.157	.175
	p	.480	.138	.587	.438	.789	.055	.019	.210	.152	.110
R_dlPFC_T1	*r*	.029	.038	-.156	-.197	.055	.000	.036	.019	.127	-.132
	p	.788	.730	.151	.070	.613	1.000	.741	.865	.246	.230
L_dlPFC_T1	*r*	-.108	-.045	-.126	-.135	.102	-.026	.022	-.119	.228*	-.006
	p	.323	.681	.248	.215	.349	.815	.842	.277	.036	.954
R_dlPFC_T2	*r*	-.143	.061	-.102	**-.296****	.050	.057	.033	-.174	.192	-.155
	p	.191	.574	.352	.006	.646	.603	.764	.109	.078	.157
L_dlPFC_T2	*r*	.176	**.219***	**-.214***	-.099	.041	.102	**-.249***	.112	.058	-.051
	p	.105	.042	.048	.364	.708	.352	.021	.302	.600	.643
R_OFC_T1	*r*	.116	.125	-.087	-.081	-.021	-.140	.033	-.008	.042	.015
	p	.288	.253	.426	.457	.846	.197	.759	.940	.704	.892
L_OFC_T1	*r*	.103	.028	.127	.136	-.117	-.089	-.015	-.037	.059	.017
	p	.347	.800	.242	.212	.285	.417	.891	.735	.589	.877
R_OFC_T2	*r*	-.041	.210	-.019	-.057	-.077	-.122	.143	-.033	-.002	.093
	p	.711	.052	.859	.604	.479	.264	.190	.760	.983	.395
L_OFC_T2	*r*	.050	**.224***	-.002	.108	.041	.039	.016	-.026	-.149	.116
	p	.649	.038	.985	.321	.705	.723	.883	.813	.174	.289
R_ACC_T1	*r*	**.283****	.118	.095	.129	.017	-.064	**-.220***	.121	.040	-.066
	p	.008	.277	.386	.235	.878	.561	.042	.266	.714	.550
L_ACC_T1	*r*	-.054	-.036	-.045	.076	.001	-.015	-.050	-.010	-.062	.151
	p	.621	.741	.684	.488	.992	.888	.650	.925	.575	.167

R_ACC_T2	*r*	.148	.156	.133	.147	-.117	.015	-.129	.100	.015	-.077
	p	.174	.152	.221	.178	.284	.894	.236	.358	.889	.486
L_ACC_T2	*r*	-.098	.085	.052	.048	-.040	-.025	-.072	.063	-.207	.111
	p	.370	.437	.636	.658	.714	.821	.512	.566	.057	.311

** Correlation is significant at the 0.01 level (2-tailed), *.Correlation is significant at the 0.05 level (2-tailed). Significant correlations are highlighted in bold.

R = right, L = left, vlPFC = ventrolateral prefrontal cortex, dlPFC = dorsolateral prefrontal cortex, OFC = orbitofrontal cortex, ACC = anterior cingulate cortex, T1 = Time 1 (baseline), T2 = Time 2 (follow-up), CESD = Centre for Epidemiological Studies - Depression scale, BAI = Beck Anxiety Inventory, CBCL - Child Behavior Checklist - parent report (externalizing), SES = socioeconoic status, FSIQ = full scale intelligence quotient, EC = Effortful Control, NA = Negative Affectivity.

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