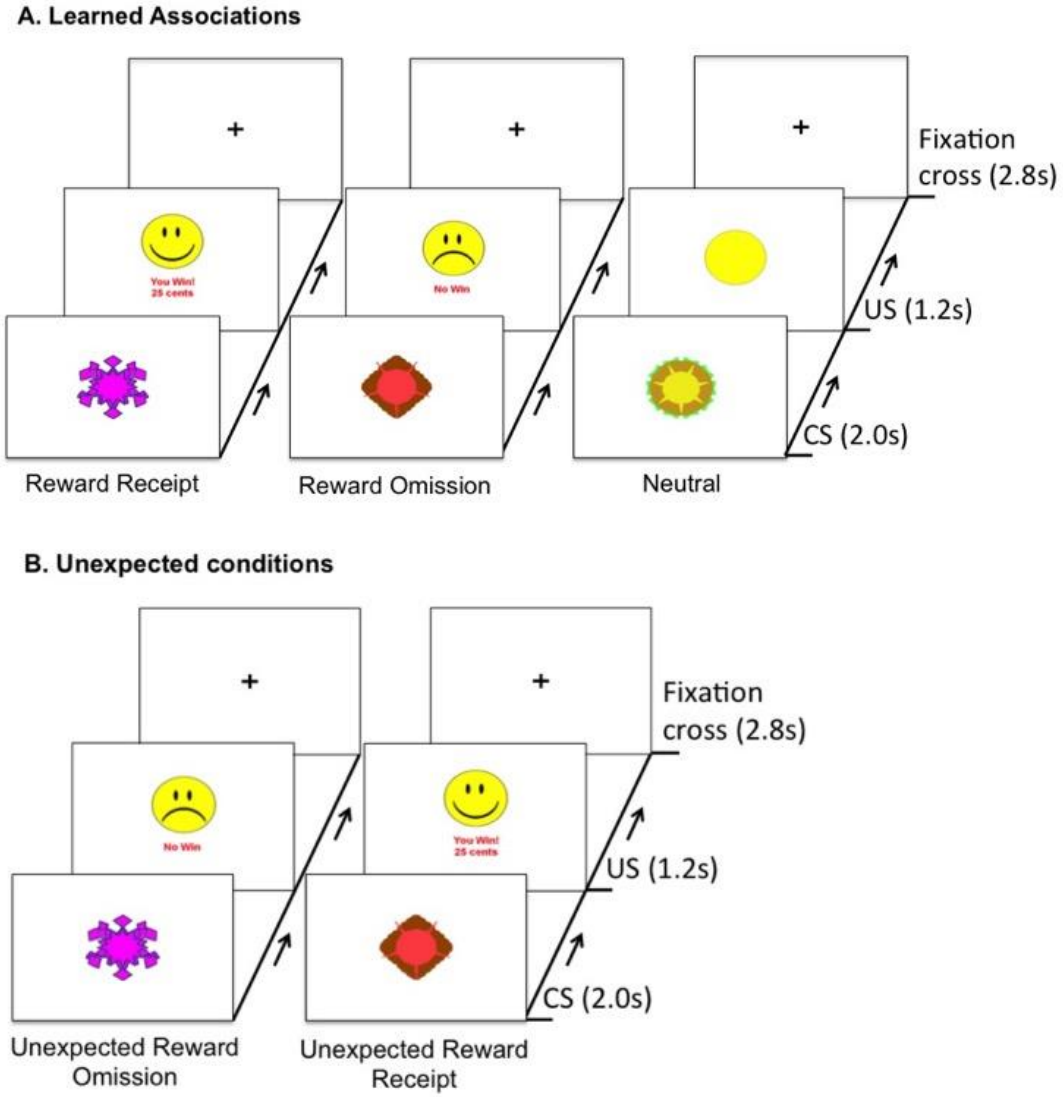
Data supplement for DeGuzman et al., Association of Elevated Reward Prediction Error Response With Weight Gain in Adolescent Anorexia Nervosa. Am J Psychiatry (doi: 10.1176/appi.ajp.2016.16060671)

Supplemental Material

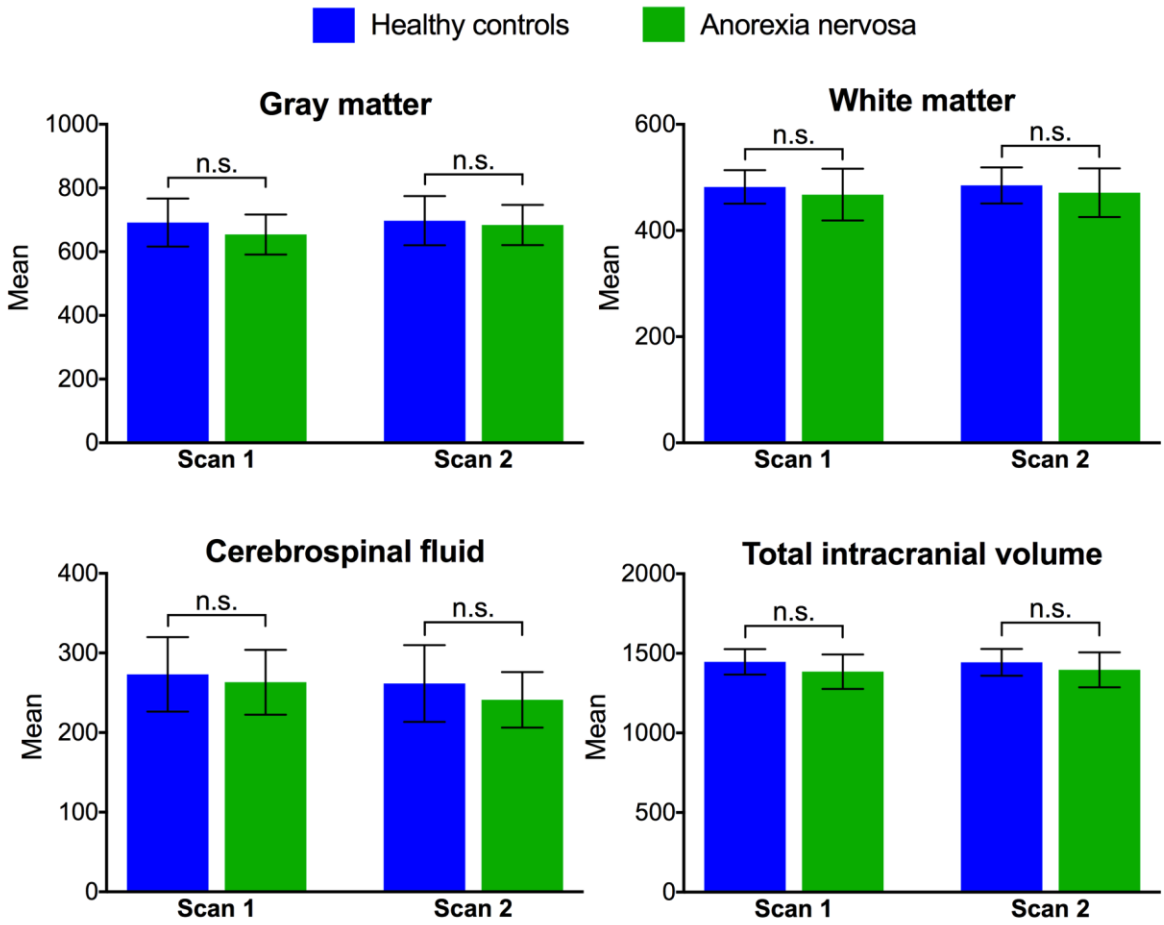
1. Figure S1: Monetary Reward Task Paradigm
2. Figure S2: Brain Volume Measures
3. Figure S3: Sensitivity to Reward and Punishment Between Groups
4. Table S1: Parameter estimates across scans and task conditions
5. Table S2: Parameter estimates across scans and task conditions excluding 1 anorexia nervosa binge subtype patient
6. Table S3: Parameter estimates across scans and task conditions excluding 5 patients with anorexia nervosa on antipsychotics
7. Table S4: Expectation and Sensitivity to Reward/Punishment Correlations
8. Further studies to identify the effect of high versus low PE brain response and in relation to BMI
9. Temporal difference learning algorithm and rationale for temporal difference model learning rate selection
10. References

Figure S1. Monetary Reward Task Paradigm[a]



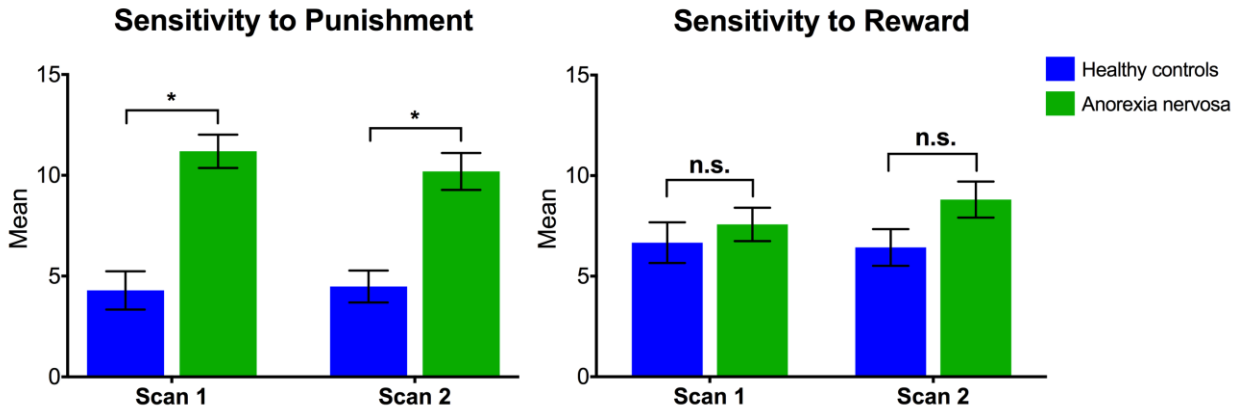
[a]Panel A depicts the learned associations between the conditioned stimulus (CS, colored geometric shape, presented for 2.8 seconds (s)) and the unconditioned stimulus (US, money reward, presented for 1.2s). Intertrial interval was 6s. Panel B depicts the unexpected conditions where learned associations were violated during 20% of the trials.

Figure S2. Brain Volume Measures[a]



[a]Bar graphs depict brain volume differences between groups were not significant (n.s.) for whole brain gray matter, white matter, cerebrospinal fluid, or total intracranial volume. Healthy control means (N=21) are indicated by blue bars, anorexia nervosa group means (N=21) are indicated by green bars. Error bars = +/- 1 standard error of the mean.

Figure S3. Sensitivity to Reward and Punishment between groups[a]



[a]Independent t-tests revealed sensitivity to punishment was significantly higher in the anorexia nervosa group at both time points, while the difference in sensitivity to reward was not significant (n.s.) between groups at either time point. Healthy control means (N=21) are indicated by blue bars, anorexia nervosa means (N=21) are indicated by green bars. Error bars indicate +/- 1 standard error.
*p<0.001

Table S1. Parameter estimates across scans and task conditions.

		Scan 1							Scan 2							Mixed ANCOVA Group Effect		
		Healthy Controls (n=21)		Anorexia Nervosa (n=21)		ANCOVA[a]			Healthy Controls (n=21)		Anorexia Nervosa (n=21)		ANCOVA					
Condition	**Region of Interest[b]**	**Mean**	**SD[c]**	**Mean**	**SD**	***F* (1,35)**	***p*[d]**	**η_p^2**	**Mean**	**SD**	**Mean**	**SD**	***F* (1,35)**	***p***	**η_p^2**	***F* (1,35)**	***p***	**η_p^2**
Expectation	R caudate body	19.05	12.75	23.95	11.54	1.39	0.246	0.04	20.95	12.56	22.05	12.25	0.45	0.509	0.01	1.18	0.286	0.03
	L caudate body	18.71	12.11	24.29	12.07	2.74	0.107	0.07	20.43	12.55	22.57	12.19	0.05	0.821	0.00	0.81	0.375	0.02
	R caudate head	18.10	11.92	24.90	11.92	2.65	0.112	0.07	20.43	14.15	22.57	10.28	0.08	0.785	0.00	1.11	0.299	0.03
	L caudate head	20.52	13.11	22.48	11.60	0.68	0.416	0.02	21.43	12.58	21.57	12.26	0.49	0.488	0.01	0.00	0.947	0.00
	R inferior orbitofrontal cortex	21.14	12.27	21.86	12.56	0.13	0.721	0.00	20.57	11.20	22.43	13.46	0.11	0.746	0.00	0.18	0.675	0.01
	L inferior orbitofrontal cortex	21.57	11.92	21.43	12.90	0.18	0.672	0.01	21.38	11.82	21.62	12.99	0.00	0.968	0.00	0.07	0.786	0.00
	R medial orbitofrontal cortex	22.00	11.32	21.00	13.41	0.00	0.968	0.00	22.00	11.42	21.00	13.32	0.48	0.494	0.01	0.76	0.388	0.02
	L medial orbitofrontal cortex	23.24	11.25	19.76	13.25	0.12	0.733	0.00	20.48	10.67	22.52	13.88	1.57	0.219	0.04	1.28	0.266	0.04
	R middle orbitofrontal cortex	20.19	12.38	22.81	12.32	1.88	0.179	0.05	21.86	12.80	21.14	12.02	0.09	0.765	0.00	0.62	0.435	0.02
	L middle orbitofrontal cortex	20.00	11.86	23.00	12.77	0.30	0.590	0.01	21.48	11.48	21.52	13.29	0.02	0.898	0.00	0.04	0.843	0.00
	R dorsal anterior insula	20.05	12.55	22.95	12.11	2.62	0.114	0.07	20.81	12.94	22.19	11.83	0.12	0.729	0.00	1.29	0.263	0.04
	L dorsal anterior insula	20.10	12.93	22.90	11.71	0.65	0.425	0.02	21.86	12.11	21.14	12.71	0.11	0.738	0.00	0.06	0.811	0.00
	R posterior insula	18.10	12.34	24.90	11.49	3.62	0.065	0.09	18.67	13.17	24.33	10.87	2.51	0.122	0.07	6.24	0.017	0.15
	L posterior insula	19.90	12.89	23.10	11.71	3.47	0.071	0.09	19.57	13.43	23.43	10.97	1.19	0.282	0.03	2.78	0.105	0.07
	R ventral anterior insula	21.14	12.68	21.86	12.14	0.59	0.447	0.02	20.76	12.57	22.24	12.23	0.01	0.932	0.00	0.22	0.643	0.01
	L ventral anterior insula	19.95	13.22	23.05	11.35	1.27	0.267	0.04	21.52	12.56	21.48	12.28	0.00	0.990	0.00	0.30	0.585	0.01
	R ventral caudate/nucleus accumbens	19.95	12.83	23.05	11.78	0.31	0.579	0.01	21.95	14.33	21.05	10.14	0.40	0.532	0.01	0.06	0.811	0.00
	L ventral caudate/nucleus accumbens	19.48	12.87	23.52	11.59	0.50	0.486	0.01	21.52	12.41	21.48	12.43	1.71	0.199	0.05	0.47	0.500	0.01
	R substantia nigra	21.38	14.17	21.62	10.38	0.34	0.564	0.01	23.48	14.14	19.52	10.02	1.20	0.281	0.03	0.28	0.599	0.01
	L substantia nigra	21.14	12.18	21.86	12.64	0.02	0.877	0.00	22.24	13.33	20.76	11.38	0.18	0.671	0.01	0.19	0.664	0.01
Unexpected omission	R caudate body	19.33	11.80	23.67	12.63	3.11	0.086	0.08	20.33	11.67	22.67	13.02	0.76	0.389	0.02	3.25	0.080	0.08
	L caudate body	17.90	11.53	25.10	12.19	4.91	0.033	0.12	17.90	11.50	25.10	12.21	3.31	0.077	0.09	6.77	0.014	0.16
	R caudate head	20.14	11.72	22.86	12.93	0.11	0.747	0.00	19.48	13.08	23.52	11.35	0.33	0.567	0.01	0.44	0.511	0.01
	L caudate head	20.00	12.90	23.00	11.72	0.08	0.785	0.00	18.29	12.33	24.71	11.62	1.40	0.245	0.04	1.08	0.306	0.03

	R inferior orbitofrontal cortex	19.38	12.35	23.62	12.11	1.94	0.173	0.05	19.81	10.67	23.19	13.74	0.02	0.900	0.00	0.37	0.549	0.01
	L inferior orbitofrontal cortex	20.67	11.06	22.33	13.60	0.72	0.403	0.02	19.76	10.72	23.24	13.68	0.27	0.606	0.01	1.03	0.318	0.03
	R medial orbitofrontal cortex	22.33	10.79	20.67	13.81	1.99	0.168	0.05	17.81	11.77	25.19	11.89	1.77	0.192	0.05	2.50	0.123	0.07
	L medial orbitofrontal cortex	22.19	11.24	20.81	13.46	2.21	0.147	0.06	17.95	10.82	25.05	12.85	2.44	0.127	0.07	2.73	0.107	0.07
	R middle orbitofrontal cortex	23.81	11.62	19.19	12.74	0.07	0.793	0.00	22.14	11.54	20.86	13.21	0.74	0.396	0.02	0.77	0.385	0.02
	L middle orbitofrontal cortex	21.52	10.94	21.48	13.74	0.38	0.541	0.01	21.05	12.46	21.95	12.37	0.02	0.896	0.00	0.00	0.960	0.00
	R dorsal anterior insula	19.38	12.38	23.62	12.07	2.13	0.153	0.06	18.29	12.22	24.71	11.72	0.81	0.375	0.02	2.13	0.153	0.06
	L dorsal anterior insula	20.81	11.87	22.19	12.91	1.49	0.230	0.04	18.43	11.53	24.57	12.48	1.85	0.182	0.05	2.65	0.112	0.07
	R posterior insula	19.33	12.38	23.67	12.06	2.11	0.155	0.06	19.10	12.87	23.90	11.44	1.32	0.258	0.04	2.12	0.155	0.06
	L posterior insula	20.33	12.89	22.67	11.81	3.76	0.061	0.10	18.67	14.00	24.33	9.77	1.97	0.170	0.05	3.85	0.058	0.10
	R ventral anterior insula	19.29	12.07	23.71	12.35	1.54	0.223	0.04	18.48	11.73	24.52	12.32	0.74	0.396	0.02	1.38	0.248	0.04
	L ventral anterior insula	20.76	11.53	22.24	13.21	2.03	0.163	0.06	18.95	11.85	24.05	12.43	2.16	0.150	0.06	2.76	0.105	0.07
	R ventral caudate/nucleus accumbens	20.00	11.46	23.00	13.13	0.89	0.352	0.03	18.48	11.80	24.52	12.25	2.01	0.165	0.05	1.77	0.192	0.05
	L ventral caudate/nucleus accumbens	19.67	12.41	23.33	12.15	0.21	0.652	0.01	17.24	11.45	25.76	11.80	2.85	0.101	0.08	1.74	0.196	0.05
	R substantia nigra	21.81	13.98	21.19	10.63	0.48	0.493	0.01	21.24	12.74	21.76	12.08	0.42	21.76	0.01	0.59	0.449	0.02
	L substantia nigra	21.76	11.89	21.24	12.93	0.02	0.902	0.00	20.38	10.69	22.62	13.84	0.39	22.62	0.01	0.38	0.541	0.01
Unexpected receipt	R caudate body	20.24	11.53	22.76	13.12	1.35	0.254	0.04	19.90	10.99	23.10	13.51	2.04	0.163	0.06	2.09	0.157	0.06
	L caudate body	20.86	11.73	22.14	13.04	1.11	0.299	0.03	18.81	12.41	24.19	11.81	3.08	0.088	0.08	2.04	0.162	0.06
	R caudate head	20.19	12.69	22.81	11.99	0.91	0.347	0.03	19.29	12.54	23.71	11.87	1.46	0.234	0.04	1.47	0.233	0.04
	L caudate head	21.43	12.12	21.57	12.71	0.17	0.683	0.01	18.71	11.43	24.29	12.71	1.97	0.169	0.05	0.40	0.532	0.01
	R inferior orbitofrontal cortex	18.62	12.72	24.38	11.37	0.64	0.429	0.02	19.76	11.47	23.24	13.06	0.57	0.456	0.02	1.01	0.321	0.03
	L inferior orbitofrontal cortex	19.95	11.69	23.05	12.92	0.25	0.620	0.01	22.05	10.59	20.95	13.99	0.01	0.917	0.00	0.19	0.664	0.01
	R medial orbitofrontal cortex	21.48	12.24	21.52	12.60	1.13	0.296	0.03	20.24	11.61	22.76	13.05	0.62	0.436	0.02	1.02	0.319	0.03
	L medial orbitofrontal cortex	21.52	11.78	21.48	13.03	1.53	0.225	0.04	21.43	11.50	21.57	13.27	0.75	0.394	0.02	1.74	0.196	0.05
	R middle orbitofrontal cortex	22.24	12.64	20.76	12.15	0.33	0.570	0.01	20.38	12.04	22.62	12.68	0.17	0.680	0.01	0.00	0.989	0.00
	L middle orbitofrontal cortex	21.29	12.41	21.71	12.42	0.33	0.569	0.01	21.00	12.03	22.00	12.78	0.23	0.632	0.01	0.38	0.542	0.01
	R dorsal anterior insula	18.43	12.29	24.57	11.73	5.90	0.020	0.14	18.86	12.17	24.14	12.07	7.35	0.010	0.17	10.19	0.003	0.23
	L dorsal anterior insula	22.33	11.01	20.67	13.64	1.35	0.253	0.04	19.10	11.36	23.90	12.93	5.67	0.023	0.14	4.48	0.042	0.11
	R posterior insula	17.33	11.66	25.67	11.66	5.17	0.029	0.13	20.81	11.99	22.19	12.79	1.50	0.229	0.04	4.68	0.037	0.12
	L posterior insula	20.43	11.54	22.57	13.16	1.21	0.279	0.03	20.95	12.74	22.05	12.07	0.18	0.674	0.01	0.47	0.496	0.01

	R ventral anterior insula	20.10	12.30	22.90	12.37	1.95	0.172	0.05	18.95	11.80	24.05	12.48	4.19	0.048	0.11	4.39	0.044	0.11
	L ventral anterior insula	23.19	10.53	19.81	13.84	0.11	0.744	0.00	21.24	11.83	21.76	12.98	1.12	0.297	0.03	0.48	0.492	0.01
	R ventral caudate/nucleus accumbens	19.90	11.87	23.10	12.74	0.74	0.395	0.02	19.05	10.81	23.95	13.38	3.33	0.077	0.09	3.48	0.071	0.09
	L ventral caudate/nucleus accumbens	22.10	11.84	20.90	12.95	0.35	0.556	0.01	19.00	11.48	24.00	12.79	1.83	0.184	0.05	0.20	0.659	0.01
	R substantia nigra	21.57	12.11	21.43	12.73	0.28	0.600	0.01	22.19	12.07	20.81	12.72	0.00	0.969	0.00	0.02	0.876	0.00
	L substantia nigra	18.86	12.36	24.14	11.88	1.58	0.218	0.04	19.95	13.11	23.05	11.47	0.19	0.665	0.01	1.04	0.315	0.03
Prediction Error	R caudate body	19.00	12.79	24.00	11.48	6.89	0.013	0.16	19.05	13.24	23.95	10.98	3.59	0.066	0.09	6.54	0.015	0.16
	L caudate body	19.24	12.48	23.76	11.92	5.32	0.027	0.13	19.24	12.12	23.76	12.28	3.68	0.063	0.10	7.78	0.009	0.18
	R caudate head	18.24	12.70	24.76	11.17	5.94	0.020	0.15	19.10	13.59	23.90	10.56	0.85	0.363	0.02	4.54	0.040	0.11
	L caudate head	19.86	12.32	23.14	12.29	0.15	0.704	0.00	18.90	12.44	24.10	11.82	3.04	0.090	0.08	3.15	0.084	0.08
	R inferior orbitofrontal cortex	18.90	12.67	24.10	11.57	3.30	0.078	0.09	20.67	11.40	22.33	13.31	0.44	0.513	0.01	1.96	0.171	0.05
	L inferior orbitofrontal cortex	22.29	11.48	20.71	13.25	0.01	0.916	0.00	21.29	12.27	21.71	12.56	0.04	0.836	0.00	0.01	0.938	0.00
	R medial orbitofrontal cortex	20.43	11.62	22.57	13.08	3.39	0.074	0.09	23.29	13.27	19.71	11.21	0.26	0.614	0.01	0.59	0.447	0.02
	L medial orbitofrontal cortex	19.81	11.92	23.19	12.67	3.70	0.062	0.10	23.33	12.62	19.67	11.93	0.01	0.940	0.00	1.12	0.297	0.03
	R middle orbitofrontal cortex	22.43	12.06	20.57	12.69	0.11	0.743	0.00	23.00	11.75	20.00	12.88	1.64	0.209	0.05	1.35	0.253	0.04
	L middle orbitofrontal cortex	20.90	11.28	22.10	13.43	0.04	0.852	0.00	21.33	11.64	21.67	13.15	0.58	0.453	0.02	0.46	0.501	0.01
	R dorsal anterior insula	19.33	12.10	23.67	12.34	8.41	0.006	0.19	19.57	11.51	23.43	12.97	3.16	0.084	0.08	7.85	0.008	0.18
	L dorsal anterior insula	20.29	12.53	22.71	12.18	1.78	0.191	0.05	20.43	12.71	22.57	12.02	0.91	0.346	0.03	2.75	0.106	0.07
	R posterior insula	19.00	12.89	24.00	11.37	5.36	0.027	0.13	19.19	13.66	23.81	10.52	2.52	0.121	0.07	4.44	0.042	0.11
	L posterior insula	20.19	12.43	22.81	12.27	9.02	0.005	0.21	19.38	13.66	23.62	10.61	1.85	0.183	0.05	5.08	0.031	0.13
	R ventral anterior insula	20.38	12.57	22.62	12.16	4.76	0.036	0.12	19.05	11.06	23.95	13.17	2.99	0.093	0.08	5.08	0.031	0.13
	L ventral anterior insula	21.86	11.73	21.14	13.07	1.23	0.275	0.03	20.86	11.85	22.14	12.94	1.05	0.314	0.03	1.73	0.197	0.05
	R ventral caudate/nucleus accumbens	18.10	12.72	24.90	11.06	6.94	0.012	0.17	19.57	13.07	23.43	11.40	1.26	0.270	0.04	6.63	0.014	0.16
	L ventral caudate/nucleus accumbens	19.57	12.34	23.43	12.19	1.60	0.215	0.04	19.76	13.16	23.24	11.36	0.97	0.331	0.03	3.19	0.083	0.08
	R substantia nigra	21.62	11.79	21.38	13.02	0.14	0.708	0.00	21.48	12.75	21.52	12.08	0.08	0.773	0.00	0.34	0.563	0.01
	L substantia nigra	20.76	12.22	22.24	12.57	0.28	0.601	0.01	21.38	13.02	21.62	11.78	0.07	0.800	0.00	0.08	0.778	0.00

[a]ANCOVA=Analysis of covariance; [b]R=right, L=left; [c]SD=Standard deviation; [d]p-values are adjusted for Bonferroni multiple comparisons; the gray shaded rows indicate significant group difference for regions that also showed significant group effect in the mixed ANOVA.

Table S2: Parameter estimates across scans and task conditions excluding 1 anorexia nervosa-binge subtype patient

		Scan 1							Scan 2							Mixed ANCOVA Group Effect		
		Healthy Controls (n=21)		Anorexia Nervosa (n=20)		ANCOVA[a]			Healthy Controls (n=21)		Anorexia Nervosa (n=20)		ANCOVA					
Condition	**Region of Interest[b]**	**Mean**	**SD[c]**	**Mean**	**SD**	***F* (1,34)**	***p*[d]**	**η_p^2**	**Mean**	**SD**	**Mean**	**SD**	***F* (1,34)**	***p***	**η_p^2**	***F* (1,34)**	***p***	**η_p^2**
Expectation	R caudate body	18.43	12.34	23.70	11.27	1.50	0.229	0.04	20.00	12.49	22.05	11.65	0.39	0.537	0.01	1.12	0.297	0.03
	L caudate body	17.76	12.04	24.40	11.22	2.92	0.097	0.08	19.43	12.55	22.65	11.43	0.03	0.859	0.00	0.75	0.393	0.02
	R caudate head	17.86	11.59	24.30	11.76	2.56	0.119	0.07	19.67	13.86	22.40	9.79	0.04	0.846	0.00	0.95	0.337	0.03
	L caudate head	20.24	12.75	21.80	11.39	0.70	0.408	0.02	20.43	12.58	21.60	11.61	0.59	0.449	0.02	0.01	0.937	0.00
	R inferior orbitofrontal cortex	20.43	11.88	21.60	12.36	0.13	0.718	0.00	19.81	10.88	22.25	13.20	0.09	0.761	0.00	0.16	0.693	0.01
	L inferior orbitofrontal cortex	20.81	11.59	21.20	12.68	0.20	0.657	0.01	20.81	11.41	21.20	12.84	0.00	0.983	0.00	0.07	0.799	0.00
	R medial orbitofrontal cortex	21.71	10.96	20.25	13.21	0.00	0.986	0.00	21.19	11.14	20.80	13.09	0.48	0.492	0.01	0.73	0.400	0.02
	L medial orbitofrontal cortex	22.81	10.81	19.10	13.10	0.11	0.742	0.00	20.05	10.24	22.00	13.77	1.56	0.220	0.04	1.28	0.266	0.04
	R middle orbitofrontal cortex	19.43	12.06	22.65	11.97	1.92	0.175	0.05	21.29	12.36	20.70	11.88	0.09	0.766	0.00	0.60	0.444	0.02
	L middle orbitofrontal cortex	19.71	11.47	22.35	12.64	0.25	0.617	0.01	21.10	11.05	20.90	13.17	0.02	0.879	0.00	0.03	0.872	0.00
	R dorsal anterior insula	19.38	12.16	22.70	11.85	2.59	0.117	0.07	20.29	12.50	21.75	11.68	0.11	0.739	0.00	1.25	0.272	0.04
	L dorsal anterior insula	19.52	12.46	22.55	11.56	0.70	0.410	0.02	21.43	11.69	20.55	12.57	0.13	0.726	0.00	0.05	0.825	0.00
	R posterior insula	17.67	11.91	24.50	11.30	3.69	0.063	0.10	18.29	12.75	23.85	10.69	2.28	0.140	0.06	5.91	0.020	0.15
	L posterior insula	19.24	12.50	22.85	11.43	3.64	0.065	0.10	19.00	12.99	23.10	10.74	1.15	0.292	0.03	2.72	0.108	0.07
	R ventral anterior insula	20.57	12.24	21.45	12.00	0.60	0.445	0.02	20.24	12.13	21.80	12.08	0.01	0.924	0.00	0.20	0.661	0.01
	L ventral anterior insula	19.48	12.77	22.60	11.19	1.29	0.265	0.04	20.76	12.23	21.25	12.02	0.00	0.987	0.00	0.30	0.588	0.01
	R ventral caudate/nucleus accumbens	19.52	12.39	22.55	11.64	0.34	0.563	0.01	21.19	14.00	20.80	9.78	0.45	0.509	0.01	0.07	0.787	0.00
	L ventral caudate/nucleus accumbens	19.19	12.48	22.90	11.43	0.51	0.480	0.02	20.62	12.25	21.40	11.99	1.86	0.181	0.05	0.53	0.473	0.02
	R substantia nigra	20.76	13.72	21.25	10.19	0.34	0.563	0.01	22.62	13.91	19.30	9.61	1.29	0.264	0.04	0.33	0.568	0.01
	L substantia nigra	20.38	11.87	21.65	12.36	0.04	0.853	0.00	21.43	13.05	20.55	11.06	0.19	0.663	0.01	39.72	0.206	0.65
Unexpected omission	R caudate body	18.67	11.43	23.45	12.34	3.18	0.084	0.09	19.52	11.40	22.55	12.66	0.74	0.396	0.02	3.18	0.084	0.09
	L caudate body	17.05	11.33	25.15	11.47	5.08	0.031	0.13	16.95	11.43	25.25	11.29	3.30	0.078	0.09	6.91	0.013	0.17
	R caudate head	19.86	11.36	22.20	12.78	0.12	0.727	0.00	18.86	12.69	23.25	11.05	0.30	0.590	0.01	0.43	0.514	0.01
	L caudate head	19.81	12.64	22.25	11.43	0.07	0.790	0.00	17.38	12.19	24.80	10.77	1.33	0.257	0.04	1.00	0.325	0.03

	R inferior orbitofrontal cortex	19.14	12.02	22.95	11.92	1.90	0.177	0.05	19.52	10.30	22.55	13.62	0.01	0.906	0.00	0.38	0.544	0.01
	L inferior orbitofrontal cortex	20.05	10.65	22.00	13.44	0.74	0.397	0.02	19.57	10.41	22.50	13.54	0.27	0.605	0.01	0.95	0.336	0.03
	R medial orbitofrontal cortex	21.81	10.35	20.15	13.71	2.01	0.166	0.06	17.57	11.42	24.60	11.76	1.63	0.211	0.05	2.36	0.134	0.07
	L medial orbitofrontal cortex	21.62	10.81	20.35	13.35	2.42	0.129	0.07	17.86	10.66	24.30	12.65	2.45	0.127	0.07	2.72	0.109	0.07
	R middle orbitofrontal cortex	22.90	11.45	19.00	12.49	0.06	0.813	0.00	21.52	11.13	20.45	13.08	0.78	0.383	0.02	0.82	0.372	0.02
	L middle orbitofrontal cortex	21.14	10.53	20.85	13.62	0.40	0.532	0.01	20.33	12.11	21.70	12.11	0.03	0.857	0.00	0.01	0.918	0.00
	R dorsal anterior insula	19.19	12.09	22.90	11.86	2.08	0.159	0.06	17.95	11.82	24.20	11.57	0.72	0.402	0.02	2.09	0.157	0.06
	L dorsal anterior insula	20.38	11.41	21.65	12.81	1.39	0.247	0.04	18.29	11.30	23.85	12.29	1.92	0.175	0.05	2.65	0.113	0.07
	R posterior insula	18.95	11.95	23.15	11.93	2.26	0.142	0.06	18.62	12.41	23.50	11.28	1.28	0.265	0.04	2.14	0.153	0.06
	L posterior insula	19.90	12.44	22.15	11.68	3.63	0.065	0.10	18.14	13.56	24.00	9.49	1.77	0.193	0.05	3.56	0.068	0.10
	R ventral anterior insula	19.10	11.77	23.00	12.17	1.48	0.233	0.04	18.24	11.39	23.90	12.18	0.76	0.389	0.02	1.42	0.241	0.04
	L ventral anterior insula	20.48	11.13	21.55	13.08	1.93	0.174	0.05	18.62	11.43	23.50	12.32	2.12	0.155	0.06	2.70	0.110	0.07
	R ventral caudate/nucleus accumbens	19.38	11.04	22.70	12.96	1.00	0.325	0.03	18.05	11.36	24.10	12.10	1.92	0.175	0.05	1.71	0.200	0.05
	L ventral caudate/nucleus accumbens	19.38	12.04	22.70	11.99	0.25	0.624	0.01	16.43	11.21	25.80	11.07	2.76	0.106	0.08	1.70	0.202	0.05
	R substantia nigra	21.43	13.55	20.55	10.41	0.53	0.472	0.02	20.33	12.59	21.70	11.59	0.37	0.547	0.01	0.60	0.445	0.02
	L substantia nigra	21.48	11.53	20.50	12.72	0.01	0.930	0.00	19.71	10.30	22.35	13.67	0.38	0.545	0.01	0.36	0.553	0.01
Unexpected receipt	R caudate body	19.24	11.53	22.85	12.45	1.45	0.236	0.04	18.90	10.99	23.20	12.85	1.98	0.168	0.06	2.03	0.164	0.06
	L caudate body	19.86	11.73	22.20	12.42	1.24	0.273	0.04	17.81	12.41	24.35	10.82	3.03	0.091	0.08	1.97	0.170	0.06
	R caudate head	19.19	12.69	22.90	11.18	0.96	0.335	0.03	18.38	12.41	23.75	11.16	1.37	0.250	0.04	1.38	0.248	0.04
	L caudate head	20.57	11.89	21.45	12.36	0.19	0.663	0.01	17.71	11.43	24.45	11.84	1.91	0.177	0.05	0.33	0.568	0.01
	R inferior orbitofrontal cortex	18.10	12.28	24.05	11.15	0.60	0.444	0.02	19.10	11.10	23.00	12.81	0.55	0.465	0.02	0.92	0.344	0.03
	L inferior orbitofrontal cortex	19.19	11.38	22.90	12.58	0.28	0.602	0.01	21.43	10.19	20.55	13.87	0.01	0.940	0.00	0.19	0.662	0.01
	R medial orbitofrontal cortex	20.52	12.16	21.50	12.08	1.25	0.271	0.04	19.86	11.20	22.20	12.92	0.62	0.438	0.02	0.97	0.332	0.03
	L medial orbitofrontal cortex	20.62	11.62	21.40	12.64	1.69	0.202	0.05	21.19	11.21	20.80	13.02	0.77	0.386	0.02	1.65	0.207	0.05
	R middle orbitofrontal cortex	21.38	12.42	20.60	11.81	0.34	0.563	0.01	19.76	11.64	22.30	12.49	0.17	0.686	0.01	0.00	0.953	0.00
	L middle orbitofrontal cortex	20.48	12.16	21.55	12.08	0.33	0.569	0.01	20.81	11.75	21.20	12.52	0.20	0.661	0.01	0.36	0.554	0.01
	R dorsal anterior insula	17.81	11.90	24.35	11.40	5.85	0.021	0.15	18.24	11.77	23.90	11.79	7.00	0.012	0.17	9.69	0.004	0.22
	L dorsal anterior insula	21.67	10.61	20.30	13.51	1.37	0.250	0.04	18.43	11.01	23.70	12.63	5.46	0.026	0.14	4.36	0.044	0.11
	R posterior insula	16.62	11.33	25.60	11.11	5.41	0.026	0.14	20.14	11.62	21.90	12.59	1.44	0.239	0.04	4.47	0.042	0.12
	L posterior insula	19.43	11.54	22.65	12.51	1.35	0.253	0.04	20.10	12.53	21.95	11.62	0.14	0.707	0.00	0.43	0.518	0.01

	R ventral anterior insula	19.48	11.90	22.60	12.15	1.91	0.177	0.05	18.19	11.50	23.95	12.04	4.12	0.050	0.11	4.26	0.047	0.11
	L ventral anterior insula	22.24	10.44	19.70	13.56	0.14	0.707	0.00	20.33	11.68	21.70	12.55	1.04	0.315	0.03	0.47	0.499	0.01
	R ventral caudate/nucleus accumbens	18.90	11.87	23.20	11.99	0.80	0.377	0.02	18.19	10.59	23.95	12.89	3.32	0.077	0.09	3.55	0.068	0.09
	L ventral caudate/nucleus accumbens	21.10	11.84	20.90	12.43	0.35	0.560	0.01	18.19	11.22	23.95	12.32	1.77	0.192	0.05	0.16	0.688	0.01
	R substantia nigra	20.57	12.11	21.45	12.14	0.31	0.581	0.01	21.19	12.07	20.80	12.19	0.01	0.944	0.00	0.02	0.897	0.00
	L substantia nigra	18.05	12.10	24.10	11.32	1.69	0.203	0.05	19.05	12.98	23.05	10.78	0.18	0.674	0.01	1.00	0.325	0.03
Prediction Error	R caudate body	18.00	12.79	24.15	10.46	7.34	0.010	0.18	18.62	12.79	23.50	10.82	3.52	0.674	0.09	6.30	0.017	0.16
	L caudate body	18.24	12.48	23.90	10.99	5.81	0.022	0.15	18.52	11.77	23.60	11.94	3.61	0.069	0.10	7.78	0.009	0.19
	R caudate head	17.29	12.64	24.90	10.14	6.20	0.018	0.15	18.76	13.17	23.35	10.40	0.91	0.066	0.03	4.49	0.041	0.12
	L caudate head	18.90	12.25	23.20	11.59	0.15	0.703	0.00	18.76	12.20	23.35	11.58	3.03	0.346	0.08	2.95	0.095	0.08
	R inferior orbitofrontal cortex	18.52	12.25	23.60	11.41	3.38	0.075	0.09	20.48	11.11	21.55	13.10	0.44	0.091	0.01	1.94	0.173	0.05
	L inferior orbitofrontal cortex	21.38	11.32	20.60	12.92	0.01	0.941	0.00	21.00	11.92	21.00	12.35	0.07	0.510	0.00	0.01	0.928	0.00
	R medial orbitofrontal cortex	19.43	11.62	22.65	12.42	3.30	0.078	0.09	22.86	12.84	19.05	10.99	0.21	0.801	0.01	0.64	0.430	0.02
	L medial orbitofrontal cortex	18.86	11.84	23.25	12.00	3.95	0.055	0.10	22.81	12.18	19.10	11.76	0.02	0.646	0.00	1.18	0.286	0.03
	R middle orbitofrontal cortex	21.52	11.91	20.45	12.34	0.09	0.765	0.00	22.71	11.41	19.20	12.58	1.52	0.904	0.04	1.25	0.271	0.04
	L middle orbitofrontal cortex	20.33	10.86	21.70	13.30	0.03	0.866	0.00	21.19	11.40	20.80	12.85	0.58	0.226	0.02	0.48	0.492	0.01
	R dorsal anterior insula	18.95	11.66	23.15	12.22	8.19	0.007	0.19	19.43	11.25	22.65	12.78	3.19	0.451	0.09	7.68	0.009	0.18
	L dorsal anterior insula	19.62	12.13	22.45	11.96	1.77	0.192	0.05	20.24	12.41	21.80	11.77	1.00	0.083	0.03	2.72	0.108	0.07
	R posterior insula	18.33	12.52	23.80	11.00	5.49	0.025	0.14	18.86	13.23	23.25	10.37	2.54	0.324	0.07	4.31	0.045	0.11
	L posterior insula	19.57	12.02	22.50	12.06	9.34	0.004	0.22	19.00	13.21	23.10	10.45	1.90	0.121	0.05	5.09	0.031	0.13
	R ventral anterior insula	20.00	12.16	22.05	12.01	4.68	0.038	0.12	18.90	10.82	23.20	13.00	2.94	0.177	0.08	4.93	0.033	0.13
	L ventral anterior insula	20.90	11.65	21.10	12.62	1.34	0.254	0.04	20.43	11.41	21.60	12.82	0.99	0.096	0.03	1.67	0.206	0.05
	R ventral caudate/nucleus accumbens	17.24	12.54	24.95	10.23	7.45	0.010	0.18	18.90	12.67	23.20	11.10	1.20	0.280	0.03	6.39	0.016	0.16
	L ventral caudate/nucleus accumbens	18.71	12.13	23.40	11.64	1.66	0.207	0.05	19.29	12.70	22.80	11.21	0.98	0.330	0.03	3.07	0.089	0.08
	R substantia nigra	20.62	11.79	21.40	12.47	0.15	0.700	0.00	20.62	12.54	21.40	11.67	0.07	0.787	0.00	0.32	0.576	0.01
	L substantia nigra	19.81	12.14	22.25	11.99	0.31	0.584	0.01	21.05	12.62	20.95	11.59	0.07	0.787	0.00	0.07	0.788	0.00

[a]ANCOVA=Analysis of covariance; [b]R=right, L=left; [c]SD=Standard deviation; [d]p-values are adjusted for Bonferroni multiple comparisons; the gray shaded rows indicate significant group difference for regions that also showed significant group effect in the mixed ANOVA.

Table S3: Parameter estimates across scans and task conditions excluding 5 AN[a] patients on antipsychotics

		Scan 1							Scan 2							Mixed ANCOVA Group Effect		
		Healthy Controls (n=21)		Anorexia Nervosa (n=16)		ANCOVA[a]			Healthy Controls (n=21)		Anorexia Nervosa (n=16)		ANCOVA					
Condition	**Region of Interest[b]**	**Mean**	**SD[c]**	**Mean**	**SD**	***F* (1,31)**	***p*[d]**	**η_p^2**	**Mean**	**SD**	**Mean**	**SD**	***F* (1,31)**	***p***	**η_p^2**	***F* (1,31)**	***p***	**η_p^2**
Expectation	R caudate body	16.95	11.20	21.69	10.02	1.40	0.246	0.04	18.90	10.98	19.13	10.97	0.43	0.519	0.01	1.60	0.215	0.05
	L caudate body	16.71	11.22	22.00	9.82	2.05	0.162	0.06	18.43	11.33	19.75	10.45	0.03	0.868	0.00	1.02	0.321	0.03
	R caudate head	16.29	10.36	22.56	10.68	1.85	0.184	0.06	18.48	12.33	19.69	8.81	0.04	0.847	0.00	1.36	0.252	0.04
	L caudate head	18.57	11.50	19.56	10.20	0.50	0.484	0.02	19.52	11.25	18.31	10.56	0.57	0.456	0.02	0.01	0.944	0.00
	R inferior orbitofrontal cortex	19.05	10.74	18.94	11.28	0.05	0.833	0.00	18.86	9.94	19.19	12.23	0.28	0.603	0.01	0.47	0.500	0.02
	L inferior orbitofrontal cortex	18.81	10.74	19.25	11.29	0.11	0.741	0.00	19.38	10.01	18.50	12.13	0.01	0.922	0.00	0.27	0.605	0.01
	R medial orbitofrontal cortex	19.52	9.86	18.31	12.27	0.08	0.779	0.00	19.48	9.71	18.38	12.44	0.66	0.422	0.02	0.92	0.345	0.03
	L medial orbitofrontal cortex	20.38	9.61	17.19	12.32	0.33	0.568	0.01	18.24	9.31	20.00	12.80	2.43	0.129	0.07	2.18	0.150	0.07
	R middle orbitofrontal cortex	18.00	10.69	20.31	11.21	1.54	0.224	0.05	20.24	11.23	17.38	10.39	0.02	0.887	0.00	0.89	0.352	0.03
	L middle orbitofrontal cortex	18.14	10.22	20.13	11.81	0.13	0.720	0.00	19.38	9.95	18.50	12.19	0.01	0.906	0.00	0.18	0.671	0.01
	R dorsal anterior insula	17.90	10.82	20.44	11.01	2.94	0.097	0.09	19.10	11.33	18.88	10.49	0.31	0.580	0.01	1.81	0.188	0.06
	L dorsal anterior insula	18.24	11.30	20.00	10.44	0.64	0.430	0.02	20.00	10.71	17.69	11.19	0.04	0.848	0.00	0.23	0.639	0.01
	R posterior insula	16.52	10.64	22.25	10.51	4.05	0.053	0.12	17.48	11.49	21.00	9.88	2.37	0.134	0.07	6.39	0.017	0.17
	L posterior insula	17.52	11.44	20.94	9.98	4.27	0.047	0.12	17.43	11.49	21.06	9.86	1.25	0.273	0.04	3.70	0.064	0.11
	R ventral anterior insula	19.43	11.07	18.44	10.83	0.71	0.405	0.02	19.38	10.90	18.50	11.06	0.00	0.997	0.00	0.28	0.598	0.01
	L ventral anterior insula	18.05	11.69	20.25	9.79	1.22	0.278	0.04	19.48	11.10	18.38	10.78	0.03	0.870	0.00	0.64	0.430	0.02
	R ventral caudate/nucleus accumbens	18.05	11.09	20.25	10.69	0.13	0.718	0.00	19.67	12.57	18.13	8.31	0.33	0.571	0.01	0.02	0.888	0.00
	L ventral caudate/nucleus accumbens	17.86	11.45	20.50	10.11	0.29	0.592	0.01	19.14	11.47	18.81	10.28	1.43	0.240	0.04	0.27	0.610	0.01
	R substantia nigra	18.90	12.44	19.13	8.65	0.31	0.581	0.01	20.48	12.79	17.06	7.50	0.82	0.372	0.03	0.09	0.766	0.00
	L substantia nigra	18.33	11.21	19.88	10.59	0.06	0.809	0.00	19.52	11.93	18.31	9.52	0.00	0.962	0.00	0.00	0.980	0.00
Unexpected omission	R caudate body	17.29	10.71	21.25	10.90	4.30	0.047	0.12	18.24	10.11	20.00	11.96	1.00	0.324	0.03	4.40	0.044	0.12
	L caudate body	15.90	10.26	23.06	10.48	5.41	0.027	0.15	16.14	10.57	22.75	10.29	4.37	0.045	0.12	9.09	0.005	0.23
	R caudate head	18.62	10.57	19.50	11.48	0.37	0.547	0.01	17.62	11.18	20.81	10.41	0.35	0.557	0.01	0.73	0.400	0.02
	L caudate head	18.81	11.57	19.25	10.12	0.15	0.706	0.01	16.43	10.93	22.38	10.02	1.92	0.176	0.06	1.95	0.172	0.06

	R inferior orbitofrontal cortex	18.14	10.94	20.13	10.92	1.81	0.188	0.06	18.19	9.78	20.06	12.32	0.02	0.896	0.00	0.73	0.398	0.02
	L inferior orbitofrontal cortex	18.71	9.87	19.38	12.29	1.11	0.300	0.04	17.86	9.68	20.50	12.33	0.78	0.384	0.03	2.01	0.167	0.06
	R medial orbitofrontal cortex	20.24	9.23	17.38	12.75	2.11	0.156	0.06	16.14	10.66	22.75	10.16	3.12	0.087	0.09	4.91	0.034	0.14
	L medial orbitofrontal cortex	19.76	9.89	18.00	12.20	2.22	0.146	0.07	16.52	10.16	22.25	11.12	3.94	0.056	0.11	5.63	0.024	0.15
	R middle orbitofrontal cortex	21.00	10.89	16.38	10.49	0.03	0.855	0.00	19.90	10.27	17.81	11.74	0.44	0.511	0.01	0.28	0.604	0.01
	L middle orbitofrontal cortex	19.62	9.92	18.19	12.20	0.30	0.588	0.01	18.43	10.93	19.75	10.99	0.03	0.874	0.00	0.15	0.697	0.01
	R dorsal anterior insula	17.90	11.00	20.44	10.77	2.15	0.152	0.07	16.90	10.98	21.75	10.31	1.28	0.267	0.04	3.14	0.086	0.09
	L dorsal anterior insula	18.81	10.57	19.25	11.49	2.07	0.161	0.06	17.14	11.01	21.44	10.41	3.45	0.073	0.10	4.78	0.037	0.13
	R posterior insula	17.14	11.37	21.44	9.88	2.48	0.126	0.07	17.71	11.38	20.69	10.16	1.62	0.212	0.05	3.41	0.075	0.10
	L posterior insula	17.71	11.35	20.69	10.20	4.12	0.051	0.12	16.90	12.44	21.75	7.79	2.49	0.125	0.07	4.92	0.034	0.14
	R ventral anterior insula	18.00	10.60	20.31	11.32	1.24	0.273	0.04	17.29	10.38	21.25	11.32	1.17	0.288	0.04	1.73	0.198	0.05
	L ventral anterior insula	18.86	10.33	19.19	11.78	2.43	0.129	0.07	17.33	10.38	21.19	11.33	3.07	0.090	0.09	4.39	0.045	0.12
	R ventral caudate/nucleus accumbens	17.71	10.06	20.69	11.88	0.81	0.376	0.03	16.81	10.64	21.88	10.71	2.87	0.101	0.09	3.58	0.068	0.10
	L ventral caudate/nucleus accumbens	17.76	11.23	20.63	10.40	0.12	0.731	0.00	15.33	10.72	23.81	9.20	4.00	0.054	0.11	3.46	0.072	0.10
	R substantia nigra	19.33	12.06	18.56	9.32	0.64	0.432	0.02	18.19	11.64	20.06	9.92	0.98	0.330	0.03	1.67	0.206	0.05
	L substantia nigra	20.10	10.52	17.56	11.40	0.08	0.784	0.00	18.24	9.69	20.00	12.41	1.12	0.297	0.04	1.26	0.271	0.04
Unexpected receipt	R caudate body	17.05	10.59	21.56	10.92	1.55	0.223	0.05	18.14	9.85	20.13	12.22	1.81	0.189	0.06	2.30	0.140	0.07
	L caudate body	17.62	10.86	20.81	10.85	1.23	0.275	0.04	16.81	11.22	21.88	9.89	3.38	0.075	0.10	2.55	0.121	0.08
	R caudate head	17.62	11.20	20.81	10.37	0.90	0.350	0.03	17.48	11.07	21.00	10.51	1.17	0.288	0.04	1.38	0.249	0.04
	L caudate head	18.52	10.88	19.63	11.07	0.13	0.724	0.00	16.71	10.33	22.00	11.05	2.36	0.135	0.07	0.63	0.433	0.02
	R inferior orbitofrontal cortex	17.10	11.11	21.50	10.24	0.27	0.606	0.01	17.95	10.22	20.38	11.77	0.94	0.341	0.03	1.39	0.248	0.04
	L inferior orbitofrontal cortex	17.81	10.25	20.56	11.68	0.26	0.616	0.01	19.86	9.33	17.88	12.76	0.04	0.848	0.00	0.68	0.415	0.02
	R medial orbitofrontal cortex	18.81	11.61	19.25	10.07	1.46	0.237	0.05	19.10	10.26	18.88	11.87	0.68	0.417	0.02	1.65	0.208	0.05
	L medial orbitofrontal cortex	18.86	11.09	19.19	10.83	1.55	0.223	0.05	19.48	9.89	18.38	12.25	1.20	0.282	0.04	3.05	0.090	0.09
	R middle orbitofrontal cortex	20.00	11.35	17.69	10.31	0.46	0.502	0.02	18.76	10.36	19.31	11.74	0.23	0.633	0.01	0.03	0.870	0.00
	L middle orbitofrontal cortex	18.76	11.09	19.31	10.81	0.56	0.459	0.02	19.71	11.01	18.06	10.86	0.07	0.798	0.00	0.12	0.736	0.00
	R dorsal anterior insula	16.19	10.99	22.69	9.72	7.64	0.010	0.20	17.19	10.57	21.38	11.03	8.37	0.007	0.21	13.93	0.001	0.31
	L dorsal anterior insula	19.62	9.58	18.19	12.56	1.93	0.175	0.06	17.19	10.42	21.38	11.22	8.23	0.007	0.21	7.28	0.011	0.19
	R posterior insula	15.33	10.15	23.81	10.01	5.83	0.022	0.16	18.29	10.92	19.94	10.98	2.50	0.124	0.08	6.56	0.015	0.18
	L posterior insula	17.38	11.28	21.13	10.14	1.54	0.224	0.05	18.33	11.78	19.88	9.74	0.53	0.471	0.02	1.31	0.260	0.04

	R ventral anterior insula	17.43	11.14	21.06	10.38	2.02	0.165	0.06	17.19	10.38	21.38	11.27	4.86	0.035	0.14	6.53	0.016	0.17
	L ventral anterior insula	20.24	9.86	17.38	12.11	0.27	0.608	0.01	18.81	10.84	19.25	11.16	1.94	0.174	0.06	1.33	0.259	0.04
	R ventral caudate/nucleus accumbens	17.90	10.65	20.44	11.22	0.93	0.344	0.03	17.43	9.58	21.06	12.28	3.24	0.082	0.10	3.82	0.060	0.11
	L ventral caudate/nucleus accumbens	19.24	10.90	18.69	11.07	0.23	0.637	0.01	17.19	10.30	21.38	11.37	1.87	0.182	0.06	0.31	0.582	0.01
	R substantia nigra	18.24	11.35	20.00	10.37	0.21	0.652	0.01	18.90	11.49	19.13	10.25	0.07	0.794	0.00	0.27	0.610	0.01
	L substantia nigra	16.00	11.15	22.94	9.29	2.08	0.160	0.06	17.52	11.55	20.94	9.81	0.33	0.567	0.01	1.87	0.182	0.06
Prediction Error	R caudate body	16.38	11.61	22.44	8.91	7.02	0.013	0.19	17.24	11.47	21.31	9.79	4.43	0.044	0.13	8.53	0.006	0.22
	L caudate body	16.67	11.59	22.06	9.18	6.37	0.017	0.17	17.52	10.72	20.94	11.00	4.11	0.051	0.12	11.62	0.002	0.27
	R caudate head	16.14	11.38	22.75	9.07	6.20	0.018	0.17	17.14	12.03	21.44	8.77	1.41	0.244	0.04	5.28	0.029	0.15
	L caudate head	17.95	11.48	20.38	10.09	0.28	0.604	0.01	17.14	11.21	21.44	10.13	4.65	0.039	0.13	4.01	0.054	0.12
	R inferior orbitofrontal cortex	17.62	11.15	20.81	10.45	2.76	0.107	0.08	18.95	10.46	19.06	11.63	0.97	0.331	0.03	2.80	0.104	0.08
	L inferior orbitofrontal cortex	20.14	10.14	17.50	11.83	0.01	0.921	0.00	19.00	10.82	19.00	11.19	0.37	0.548	0.01	0.28	0.599	0.01
	R medial orbitofrontal cortex	17.19	10.12	21.38	11.58	3.19	0.084	0.09	20.95	11.58	16.44	9.49	0.06	0.811	0.00	0.84	0.368	0.03
	L medial orbitofrontal cortex	17.19	10.82	21.38	10.70	3.77	0.061	0.11	20.48	11.13	17.06	10.43	0.20	0.660	0.01	2.35	0.136	0.07
	R middle orbitofrontal cortex	19.86	10.94	17.88	10.92	0.12	0.732	0.00	21.19	10.14	16.13	11.34	1.01	0.322	0.03	0.63	0.434	0.02
	L middle orbitofrontal cortex	19.33	10.08	18.56	12.06	0.09	0.770	0.00	19.33	10.70	18.56	11.32	0.21	0.651	0.01	0.13	0.724	0.00
	R dorsal anterior insula	17.76	11.00	20.63	10.73	7.74	0.009	0.20	18.10	10.50	20.19	11.47	5.06	0.032	0.14	15.24	0.000	0.33
	L dorsal anterior insula	18.43	11.19	19.75	10.64	2.09	0.158	0.06	18.90	11.46	19.13	10.30	1.91	0.176	0.06	5.52	0.025	0.15
	R posterior insula	17.24	11.75	21.31	9.34	5.48	0.026	0.15	17.43	12.12	21.06	8.79	3.96	0.055	0.11	6.83	0.014	0.18
	L posterior insula	17.95	11.20	20.38	10.51	11.85	0.002	0.28	17.43	12.20	21.06	8.65	2.74	0.108	0.08	8.24	0.007	0.21
	R ventral anterior insula	18.62	10.97	19.50	10.97	4.46	0.043	0.13	17.62	10.09	20.81	11.80	3.99	0.055	0.11	8.01	0.008	0.21
	L ventral anterior insula	19.10	11.02	18.88	10.92	1.48	0.234	0.05	19.10	10.89	18.88	11.09	1.91	0.177	0.06	4.76	0.037	0.13
	R ventral caudate/nucleus accumbens	15.81	11.61	23.19	8.27	8.66	0.006	0.22	17.43	11.75	21.06	9.44	1.41	0.244	0.04	7.52	0.010	0.20
	L ventral caudate/nucleus accumbens	17.71	11.29	20.69	10.29	2.30	0.140	0.07	17.48	12.06	21.00	8.94	1.25	0.272	0.04	3.69	0.064	0.11
	R substantia nigra	17.76	10.79	20.63	11.00	0.20	0.656	0.01	18.90	11.45	19.13	10.31	0.34	0.567	0.01	0.73	0.400	0.02
	L substantia nigra	17.48	10.96	21.00	10.66	0.14	0.711	0.00	19.38	11.36	18.50	10.42	0.30	0.588	0.01	0.35	0.557	0.01

[a]ANCOVA=Analysis of covariance; [b]R=right, L=left; [c]SD=Standard deviation; [d]p-values are adjusted for Bonferroni multiple comparisons; the gray shaded rows indicate significant group difference for regions that also showed significant group effect in the mixed ANOVA.

Table S4. Expectation and Sensitivity to Reward/Punishment Correlations in the anorexia nervosa group

SPSRQ scale[a]	Region of Interest[b]	*r*	R^2	*p*
Sensitivity to punishment (scan 1)	L dorsal anterior insula	0.437	0.191	0.048
	L substantia nigra	0.547	0.299	0.010
Sensitivity to reward (scan 1)	R caudate head	0.489	0.239	0.025
Sensitivity to reward (scan 2)	R inferior orbitofrontal cortex	0.468	0.219	0.032
	L inferior orbitofrontal cortex	0.498	0.248	0.021
	R dorsal anterior insula	0.526	0.277	0.014
	L dorsal anterior insula	0.600	0.360	0.004
	R ventral anterior insula	0.388	0.151	0.082
	L ventral anterior insula	0.497	0.247	0.022
	R ventral caudate/nucleus accumbens	0.555	0.308	0.009
	L ventral caudate/nucleus accumbens	0.424	0.180	0.055

[a]SPSRQ=Sensitivity to punishment/sensitivity to reward questionnaire.
[b]L=left, R=right

Further studies to identify the effect of high versus low PE brain response and in relation to BMI

We separated high versus low right caudate PE response in order to test whether the biological measure would be predictive of weight change during treatment. BMI at scan one was indeed predictive of BMI at scan two for the whole group (r=.681, p<0.001, and it was significantly predictive of BMI at scan two for the high PE response group (r=.827, p<0.001). but not for the low PE response group (r=.522, p<0.1). Furthermore, BMI at scan one was not different between high (16.4±1.1) and low (16.5±1.0) PE response groups (p<0.9), and high and low PE response groups could not have been differentiated by BMI at treatment beginning. Days between scans were similar between high (42±15 days) and low (42±16 days) PE response groups (p<0.9), however, BMI at discharge tended to be lower in the high PE (18.3±1.2) versus low PE response group (19.1±0.8) and overall BMI change was lower in the high PE (1.97±.0.8) versus low PE (2.53±0.9). Although the differences in discharge BMI and BMI change were not significant (p<0.17, p<0.13, respectively), the medium to large effect sizes (η_p^2 = 0.10, η_p^2 =0.12, respectively) support a group difference in a larger sample. Therefore, the PE value was the

only measure to predict rate of BMI change in treatment and could be an indicator of health of brain function more specific than BMI.

Temporal difference learning algorithm and rationale for temporal difference model learning rate selection

The predicted value ($\hat{V}$) at any time (*t)* within a trial is calculated as a linear product of weights (w_i) and the presence of a conditioned visual stimulus (CS) at time *t,* coded in a stimulus representation vector $x_i(t)$ where each stimulus x_i is represented separately at each moment in time:

$$V(t) = \sum_i W_i x_i(t)$$

Predicted stimulus value at time *t* is updated by comparing the predicted value at time *t*+1 to that actually observed at time *t,* leading to the prediction error $\delta(t)$:

$$\delta(t) = r(t) + \gamma\hat{V}(t+1) - \hat{V}(t)$$

where *r(t)* is the reward at time *t.* The parameter γ is a discount factor, which determines the extent to which rewards arriving sooner are more important than rewards that arrive later during the task, with γ=0.99. The weights wi relate to how likely a particular unconditioned reward stimulus (US) follows the associated CS and are updated on each trial according to the correlation between prediction error and the stimulus representation:

$$\Delta w_i = \alpha \sum_t x_i(t)\delta(t)$$

where α is a learning rate. Between slow and fast learning rates, (0.2, 0.7) a slow α=0.2 was the best fit for study groups. Initial reward values were 1 for Win and 0 for No Win. Trial-to-trial prediction error was regressed with brain activation across all trials within each subject.

Subjects were asked when presented with a geometric shape (CS) to press a button indicating their prediction of which monetary stimuli (US) they would receive next. Due to a technical error, the reaction times for these button responses were only recorded for 14/21 healthy controls,

17/21 anorexia nervosa at scan 1, and 15/21 healthy controls, 18/21AN at scan 2. However, learning rates in the 0.2 ranges have been commonly used in temporal difference model studies (1-6) and are “thought to fall within the naturalistic range of striatal dopamine neurons (7, 8)” (cited in (6)). Nonetheless, we used the method demonstrated by Bray & O’Doherty (2007) and Metereau & Dreher (2013) to compare learning rates (9, 10). Reaction times were normalized with log transformation and then regressed with the prediction value estimated by the temporal difference algorithm using learning rates of either 0.2 (slow) or 0.7 (fast). The slow 0.2 learning rate gave the best fit to the subjects’ behavior for both groups at scan 1 and for anorexia nervosa at scan 2, (where goodness of fit is indicated by sum of squares due to error (SSE) value closer to zero, R-square value closer to one, adjusted R-square (Adj R-sq) value closer to one, and root mean squared error (RMSE) value closer to zero. Although there was a minimally better fit for the 0.7 rate in healthy controls at scan 2, the significance of the minimal difference (~3%) is unclear and we therefore used the 0.2 rate for all comparisons. Furthermore, no significant difference in mean reaction times was found between groups at either scan, or for either group between scans. Additionally, 0.2 for was most consistent with our previous studies and with previous literature (1, 4).

		α=0.2					**α=0.7**				
	n	*r*	SSE	R-square	Adj R-sq	RMSE	*r*	SSE	R-square	Adj R-sq	RMSE
Anorexia nervosa Scan 1	14	-0.25	560.2	0.024	0.024	0.406	-0.19	561.8	0.021	0.021	0.407
Anorexia nervosa Scan 2	17	-0.27	683.0	0.027	0.027	0.4357	-0.22	683.9	0.026	0.025	0.4360
Healthy controls Scan 1	15	-0.30	506.4	0.030	0.029	0.426	-0.21	510.7	0.022	0.021	0.427
Healthy controls Scan 2	18	-0.38	514.9	0.063	0.062	0.4144	-0.32	514.2	0.064	0.064	0.4141

	Scan 1				Scan 2				Scan1-2 (Paired t-test)			
	Healthy controls	**Anorexia nervosa**	**Ind. t-test**		**Healthy controls**	**Anorexia nervosa**	**Ind. t-test**		**Healthy controls**		**Anorexia nervosa**	
	Mean (SD)	Mean (SD)	t	*p*	Mean (SD)	Mean (SD)	t	*p*	t	*p*	t	*p*
Reaction time (ms)	821.0 (149.6)	799.2 (191.4)	0.35	0.731	785.4 (178.6)	756.2 (216.9)	0.42	0.680	0.58	0.573	1.1	0.309

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