Emotional Response Inhibition in Bipolar Disorder: A Functional Magnetic Resonance Imaging Study of Trait- and State-Related Abnormalities

Supplemental Information

Table S1. Clinical and demographic information by group.

Measure	BD (*n* = 30) Mean (SD)	BE (*n* = 14) Mean (SD)	BM (*n* = 30) Mean (SD)	HC (*n* = 30) Mean (SD)	ANOVA
Age (years)	M=35 (11)	M=31 (11)	M=34 (11)	M=32 (10)	ns
Age at first episode (years)	M=14 (6)	M=15 (5)	M=14 (5)		ns
Hamilton Depression Rating Scale score (17 item)	M=20 (4)	M= 7 (4)	M=6 (3)		0.001
Young Mania Rating Scale score	M=3 (3)	M=2 (3)	M=16 (3)		0.001
	Median (Range)	**Median (Range)**	**Median (Range)**		**ANOVA**
Period off medication prior to scan (months)	12 (1-108)	22 (2-384)	30 (1-360)		ns
Number of prior mood episodes (depression)	15 (2-186)	20 (0-100)	15 (2-102)		ns
Number of prior mood episodes (mania)	24 (1-310)	32 (1-122)	75 (3-447)		ns
Time since last manic episode (months)	4 (1-36)	2 (1-384)	3 (1-60)		ns
Time since last depressive episode (months)	6 (1-26)	3 (1-19)	3 (.25-108)		ns
Duration of current episode (weeks)	4 (1.4-32)	4 (2-1536)	1 (1-8)		ns
	***n* (%)**	***n* (%)**	***n* (%)**	***n* (%)**	χ^2
Female	18 (60%)	10 (71%)	19 (63%)	19 (63)	ns
Caucasian	26 (87%)	12 (86%)	28 (93%)	27 (90)	ns
Trauma history	15 (50%)	9 (64%)	15 (50%)		ns
History of suicide attempt	13 (43%)	6 (43%)	15 (50%)		ns
History of psychosis	11 (37%)	4 (27%)	7(23%)		ns
Bipolar I	13 (43%)	10 (71%)	17 (57%)		ns
Bipolar II	17 (57%)	4 (29%)	13 (43%)		ns
Hypomanic:Manic			27:3		
History of alcohol abuse	16 (53%)	5 (36%)	12 (40%)		ns
History of drug abuse	14 (47%)	7 (50%)	15 (50%)		ns

ANOVA, analysis of variance; BD, bipolar depression; BE, bipolar euthymia; BM, bipolar mania; HC, healthy control; M, mean; ns, not significant.

Table S2. Behavioral performance.

	BD	BE	BM	HC	*F*	*p*
Letters						
Accuracy						
Letter Go block	99% (2%)	99% (2%)	99% (3%)	100% (1%)	1.11	0.35
Letter No-Go: Go trials	99% (2%)	100% (0%)	98% (9%)	100% (0%)	1.46	0.23
Letter No-Go: No-Go trials	91% (10%)	89% (12%)	85% (22%)	95% (7%)	2.33	0.08
Reaction Time						
Letter Go block	325.7 (51.6)	298.2 (55.5)	297.2 (52.0)	336.2 (67.9)	3.03	0.03
Letter No-Go: Go trials	402.5 (40.4)	410.9 (41.7)	397.9 (57.2)	401.9 (54.1)	0.22	0.88
Happy Faces						
Accuracy						
Happy Go block	98% (3%)	100% (0%)	98% (5%)	100% (0%)	2.73	0.05
Sad No-Go: Go trials	94% (11%)	99% (3%)	92% (15%)	94% (11%)	1.11	0.35
Happy No-Go: No-Go trials	92% (15%)	95% (9%)	89% (22%)	94% (11%)	0.79	0.50
Reaction Time						
Happy Go block	330.8 (52.5)	299.2 (51.0)	303.6 (58.6)	338.2 (62.5)	2.80	0.04
Sad No-Go: Go trials	481.6 (72.3)	479.8 (57.4)	486.7 (78.5)	474.4 (65.8)	0.15	0.93
Sad Faces						
Accuracy						
Sad Go block	98% (6%)	99% (2%)	99% (3%)	99% (2%)	0.18	0.91
Happy No-Go: Go trials	99% (2%)	98% (5%)	98% (8%)	99% (3%)	0.70	0.55
Sad No-Go: No-Go trials	91% (12%)	88% (11%)	90% (19%)	96% (6%)	1.66	0.18
Reaction Time						
Sad Go block	350.2 (57.4)	324.7 (50.9)	340.4 (63.8)	356.6 (69.7)	0.96	0.42
Happy No-Go: Go trials	459.9 (56.0)	465.8 (52.7)	456.5 (65.4)	452.8 (50.3)	0.19	0.90

BD, bipolar depression; BE, bipolar euthymia; BM, bipolar mania; HC, healthy control.

Mean (standard deviation) accuracy and reaction time for each stimulus type. Performance measures are split into the different blocks in which they occur. Happy faces, for instance, were seen during Happy Go blocks (press button to faces, which were all happy), Sad No-Go blocks (press for happy faces, inhibit to sad faces) and Happy No-Go blocks (press for sad faces, inhibit to happy faces).

Table S3. Bipolar state effects during responses (Go blocks) to happy faces, sad faces or letters.

	Main Effects				Post-Hoc Significant Comparisons*		
Region	**BA**	**MNI Peak**	**Z**	**Cluster**	**BE vs HC**	**BD**	**BM**
Happy Go							
None							
Sad Go							
Ant Cing Cortex	10/24	(-2, 56, 0)	3.38	244		BD > BM	
R Inf Frontal Gyrus	44/45	(50, 36, -6)	3.85	212		BD > BE, BM, HC	
Mid Cing Cortex	31	(-14, -30, 46)	3.05	33	HC > BE	BD > BE	
Post Cing Cortex	23/31	(8, -52, 28)	3.87	606			BM < BD, BE
L Sup Temp Gyrus	39	(-46, -60, 26)	4.09	370			BM < BD, BE
Letter Inhibition							
L Caudate		(-12, 4, 20)	3.20	19	BE > HC		BM < BE

Clusters of significant activity represented, with voxel of peak activation (with peak z-score) in MNI coordinates.

Ant, anterior; BA, Brodmann's area; BD, bipolar depression; BE, bipolar euthymia; BM, bipolar mania; Cing, cingulate; HC, healthy control; Inf, inferior; L, left; Mid, middle; MNI, Montreal Neurological Institute; Post, posterior; R, right; Sup, superior; Temp, temporal.

*Post-hoc comparisons were performed on mean activity within significant main effect clusters, with a Tukey honestly significant difference correction for $p < .05$, in order to clarify the nature of group differences.