

Supplementary material for Andreou C. et al. Oscillatory responses to reward processing in borderline personality disorder, The World Journal of Biological Psychiatry, 2015, doi: 10.3109/15622975.2015.1054880.

Oscillatory responses to reward processing in borderline personality disorder

Supplementary material

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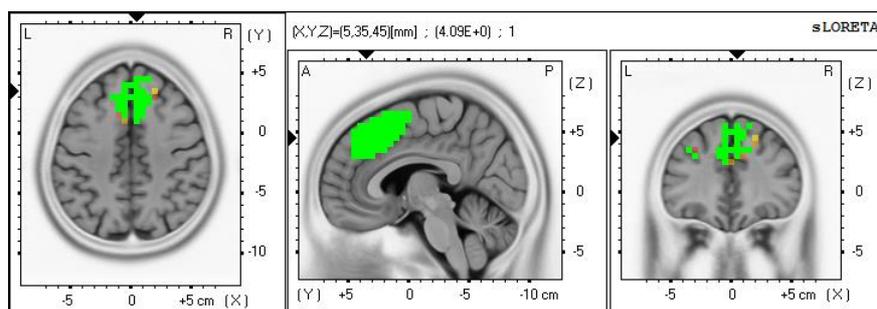
sLORETA whole-brain analyses

Voxel-by-voxel paired t-tests were used to investigate differences in current density power between conditions of maximum (25 points) and maximum loss within each participant group separately. Exceedance proportion tests (Friston et al. 1991) were used to correct for multiple comparisons. The reader is reminded that these analyses only assess effects of feedback valence, and not those of magnitude or magnitude x valence interactions.

Evoked responses

In healthy subjects, current source density power in the theta frequency range was significantly higher following maximum loss compared to maximum gain ($t=3.269$, $p<0.01$) mainly in dorsal medial prefrontal areas (dorsomedial prefrontal cortex and ACC, Brodmann areas (BA) 8, 9, 24, and 32), but also in the left dorsolateral and inferior prefrontal cortex (BA 8, 9, 44, 45) and insula (BA 13); significant differences are displayed in Figure S1. There were no significant differences between gain and loss in the theta frequency range in patients with BPD, nor in high-beta evoked activity in either participant group.

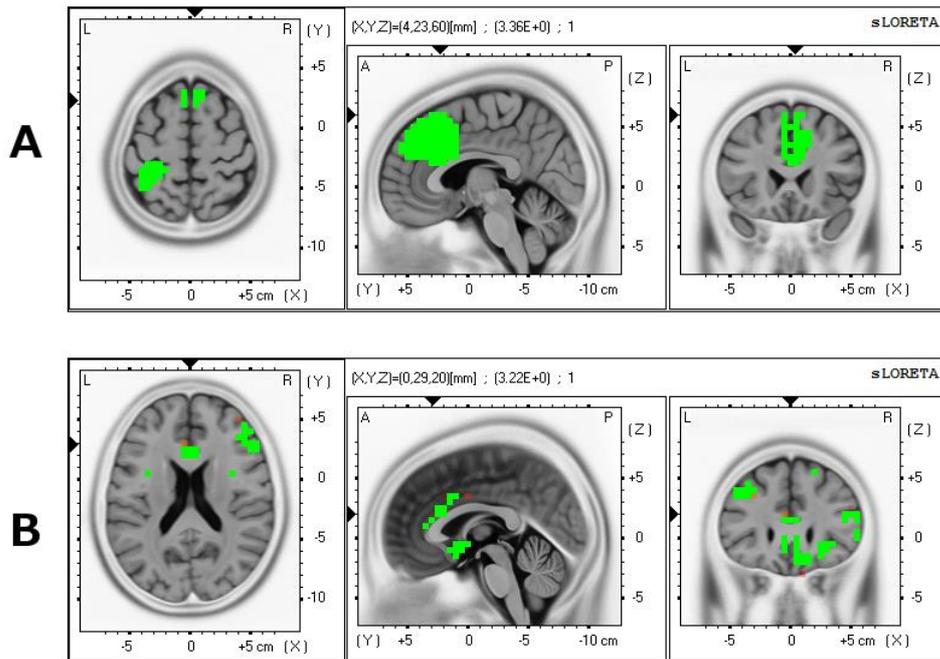
Figure S1



Induced responses

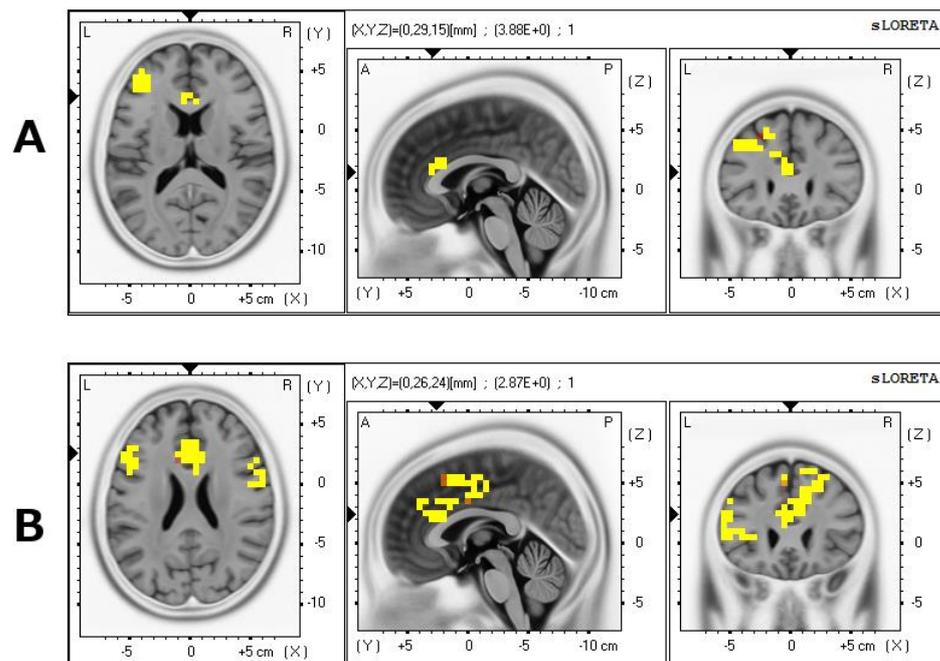
In both participant groups, there were significant differences in theta-band current source density power between the maximum loss and maximum gain conditions (healthy controls: $t=3.055$, $p=0.02$; BPD patients: $t=3.253$, $p<0.01$). In healthy controls, these differences were located in the dorsomedial prefrontal cortex/ACC (BA 8, 9, 24, 32, 33), but also in the left inferior parietal cortex (BA 40) and lateral prefrontal areas (BA 6, 8, 9), which displayed higher activity following loss than gain (Figure S2 A). In contrast, differences between the two conditions in patients were more prominent in the ACC (BA 24, 25), right inferior lateral/ventrolateral and ventral medial frontal areas (BA 9, 10, 11, 45-47), and the right insula (BA 13); the direction of this effect was the same as in controls (higher activity in the maximum loss condition) (Figure S2 B).

Figure S2



Induced responses were also significantly different between conditions in the high-beta band in both groups (healthy controls: $t=3.683$, $p<0.01$; BPD patients: $t=2.553$, $p=0.015$). Current source density power was higher following maximum gain than maximum loss feedback in medial (BA 8, 9, 24, 32, 33) and left lateral prefrontal areas (BA 10, 46, 47) in controls (Figure S3 A), and in medial (BA 8, 9, 24, 32) and bilateral lateral prefrontal and insular areas (BA 8, 9, 13, 44, 45-47) in patients with BPD (Figure S3 B)

Figure S3



Calculation of total medication load

In order to exclude the possibility that differences between patients and controls were due to the effects of medication rather than the illness *per se*, we calculated a measure of total medication load. The dose of antidepressants, mood-stabilizers and antipsychotics was coded as 0=absent, 1=low, or 2=high, based on a protocol previously used in studies in patients with bipolar disorder (e.g. Almeida et al. 2009, Hassel et al. 2008, Vederman et al. 2012) and BPD (Vega et al. 2013) – for dose conversion criteria, see Sackeim (2001) and Davis and Chen (2004). For each patient, total medication dose was calculated as the sum of each individual medication class codes; the resulting score was included as a covariate in linear mixed models conducted on the BPD group separately, in order to assess the effects of medication on all dependent variables.

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