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FRONTOPOLAR CORTICAL INEFFICIENCY UNDERPINS BOTH “HOT” AND “COLD”
COGNITIVE DYSFUNCTION IN BIPOLAR DISORDER

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Introduction: Emotional dysregulation in Bipolar Disorder (BD) is thought to be linked with prefrontal cortex (PFC) dysfunction associated with cognitive control coupled with increased or aberrant activation within regions associated with emotional processing.

Objectives: To determine the common and distinct patterns of functional brain abnormalities during affective and emotionally neutral cognitive processing in BD.

Aims: Current models of BD emphasise the relationship between mood dysregulation and fronto-limbic dysfunction during affective or “hot” processing. However, they do not account for deficits in emotionally neutral or “cold” tasks of memory and executive function which are also present in BD. Therefore the purpose of this study was to examine the neural correlates of affective decision making and working memory in BD.

Methods: Participants were 36 euthymic BD patients and 37 healthy controls matched for age, gender and IQ. fMRI was conducted during the Iowa Gambling Task (IGT) and the n-back working memory task as respective exemplars of “hot” and “cold” processing.

Results: There were no group differences in performance on either task. BD patients demonstrated a pattern of inefficient engagement within the ventral frontopolar PFC in both the IGT and n-back. These abnormalities showed task-related segregation along the medial-lateral dimension for “hot” and “cold” processing respectively. Patients also showed greater activation in the anterior cingulate cortex during the IGT and in the insula during the n-back. These regions are thought to respond to markers of autonomic arousal.

Conclusions: These data demonstrate ventral frontopolar PFC inefficiency as a shared abnormality underpinning both “hot” and “cold” processing deficits in BD.