

ABSTRACT

Objective. We examined how working memory circuits are affected by face emotion processing in pediatric bipolar disorder (PBD) and attention-deficit hyperactivity disorder (ADHD). **Methods.** Twenty-three patients with bipolar disorder, 14 patients with ADHD and 19 healthy controls (HC) (mean age = 13.36 ± 2.55) underwent an affective 2-back fMRI task with blocks of happy, angry and neutral faces. **Results.** For angry vs neutral faces PBD patients, relative to ADHD patients, exhibited increased activation in subgenual anterior cingulate cortex (ACC) and orbitofrontal cortex, and reduced activation in dorsolateral prefrontal cortex (DLPFC) and premotor cortex. Also, relative to HC the PBD group showed no increased activation and reduced activation at the junction of DLPFC and ventrolateral prefrontal cortex (VLPFC). Relative to HC the ADHD patients exhibited greater activation in DLPFC and reduced activation in ventral and medial PFC, pregenual ACC, striatum and temporo-parietal regions. For happy vs neutral faces, relative to ADHD the PBD group exhibited greater activation in bilateral caudate, and increased activation relative to HC in DLPFC, striatal and parietal regions, and no reduced activation. The ADHD group, compared to HC, showed no reduced activation and increased activation in regions that were underactive for the angry vs neutral face condition. **Conclusions.** Relative to the ADHD group the PBD group exhibited greater deployment of the emotion processing circuitry and reduced deployment of working memory circuitry. Commonalities across PBD and ADHD patients, relative to HC, entailed cortico-subcortical activity that is reduced under negative emotional challenge, and increased under positive emotional challenge.