Objective
Alterations of the default mode network (DMN) have been described in patients with neuropsychiatric disorders, including attention deficit hyperactivity disorder (ADHD), and the neurotransmitter serotonin (5-HT) is known to modulate DMN activity. This study aimed to explore the role of 5-HT on the DMN and its functional connectivity (FC) in young patients with ADHD.

Methods
Young male patients with ADHD (n = 12) and healthy controls (n = 10) (both aged 12–17 years) were subjected to acute tryptophan depletion (ATD) and subsequently diminished brain 5-HT synthesis. Three hours after challenge intake (ATD or a balanced control condition, BAL), resting state fMRI scans were obtained.

Results
In patients, ATD led to attenuated FC of the right superior premotor cortex (BA 6) with the DMN, comparable to the extent found in controls after BAL administration. ATD lowered FC of the left somatosensory cortex (BA 3) with the DMN, independently of the factor group, but with stronger effects in controls.

Conclusions
Data reveal a serotonergic modulation of FC between BA 6 and 3, known to be relevant for motor planning and sensory perception, and the DMN, thereby possibly pointing toward ATD acting beneficially on neural planning of motor activity in patients with ADHD.