

Ventral striatal hyporesponsiveness during reward anticipation in Attention-Deficit/Hyperactivity Disorder

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Background: While abnormalities in reward processing have been proposed to underlie Attention-Deficit/Hyperactivity Disorder (ADHD), this link has not been explicitly tested with neural probes. **Methods** This hypothesis was tested by using fMRI to compare neural activity within the striatum in ADHD and healthy controls during a reward anticipation task previously shown to produce reliable increases in ventral striatum activity in healthy adults and healthy adolescents. Eleven adolescents with ADHD (5 off medication; 6 medication-naïve) and 11 healthy controls (ages 12-17) were included. Groups were matched for age, gender, and IQ.

Results: We found reduced ventral striatal activation in adolescents with ADHD during reward anticipation, relative to healthy controls. Moreover, ventral striatal activation was negatively correlated with parent-rated hyperactive/impulsive symptoms across the entire sample.

Conclusions: These findings provide neural evidence that symptoms of ADHD, and impulsivity/hyperactivity in particular, may involve diminished reward anticipation, in addition to commonly observed executive dysfunction.