



**Ruprecht-Karls-Universität Heidelberg**  
**Medizinische Fakultät Mannheim**  
**Dissertations-Kurzfassung**

**Sensitivity to reward in adolescents with attention-deficit/hyperactivity disorder**

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In this thesis, we examined the issue of reward anticipation in adolescents with attention-deficit/hyperactivity disorder (ADHD). In the first study, 15 adolescents between 13 and 15 years of age with a diagnosis of ADHD (all off medication), 15 healthy controls and 12 subjects with subclinical depressive symptoms participated. We investigated sensitivity to anticipated reward using functional magnetic resonance imaging during a Monetary Incentive Delay task. Furthermore, we applied personality scales pertaining to reward and collected behavioral data on risk-taking using the Cambridge Gambling task from the Cambridge Neuropsychological Testing Automated Battery. We found that regions in the ventral and dorsal striatum, as well as the anterior cingulate cortex, frontal superior gyrus and medial orbitofrontal cortex were less active during anticipation of small reward in ADHD patients. Subjects with subclinical depression showed almost no reaction to the task. ADHD adolescents as well as subclinically depressed adolescents showed higher impulsivity scores than controls. In the Gambling Task, controls risked significantly more points than both ADHD adolescents and subclinically depressed adolescents. ADHD adolescents risked significantly more points than subclinically depressed subjects. The second study used the same MID task to study reward anticipation in 14 physically and mentally healthy adolescent boys aged 13-15 years with high hyperactivity scores on the strengths and difficulties questionnaire and 14 matched controls. We also employed a Stop Signal Task to obtain reliable measures of impulsivity and collected behavioral data on risk-taking using the Cambridge Gambling task from the Cambridge Neuropsychological Testing Automated Battery as well as personality scales linked to reward behavior and impulsivity. We found that adolescents with high hyperactivity showed a stronger activation in the striatum than controls when they expected a large reward. Controls however showed stronger striatal activation when they anticipated small rewards in comparison to adolescents with subsyndromal ADHD. Activation in the ventral striatum during anticipation of reward was more pronounced in adolescents with subclinical ADHD than in healthy controls. Controls, however, showed stronger activation in the dorsal striatum, independent of reward magnitude. These findings suggest that adolescents with subclinical ADHD appear to be oversensitive to large, but hyposensitive to small rewards.