Sleep-Dependent Consolidation of Rewarded Behavior Is Diminished in Children with Attention Deficit Hyperactivity Disorder and a Comorbid Disorder of Social Behavior

Christian D. Wiesner, Ina Molzow, Alexander Prehn-Kristensen and Lioba Baving

Front. Psychol., 08 February 2017
DOI: https://doi.org/10.3389/fpsyg.2017.00167

Children suffering from attention-deficit hyperactivity disorder (ADHD) often also display impaired learning and memory. Previous research has documented aberrant reward processing in ADHD as well as impaired sleep-dependent consolidation of declarative memory. We investigated whether sleep also fosters the consolidation of behaviour learned by probabilistic reward and whether ADHD patients with a comorbid disorder of social behaviour show deficits in this memory domain, too. A group of 17 ADHD patients with comorbid disorders of social behaviour aged 8–12 years and healthy controls matched for age, IQ, and handedness took part in the experiment. During the encoding task, children worked on a probabilistic learning task acquiring behavioural preferences for stimuli rewarded most often. After a 12-hr retention interval of either sleep at night or wakefulness during the day, a reversal task was presented where the contingencies were reversed. Consolidation of rewarded behaviour is indicated by greater resistance to reversal learning. We found that healthy children consolidate rewarded behaviour better during a night of sleep than during a day awake and that the sleep-dependent consolidation of rewarded behaviour by trend correlates with non-REM sleep but not with REM sleep. In contrast, children with ADHD and comorbid disorders of social behaviour do not show sleep-dependent consolidation of rewarded behaviour. Moreover, their consolidation of rewarded behaviour does not correlate with sleep. The results indicate that dysfunctional sleep in children suffering from ADHD and disorders of social behaviour might be a crucial factor in the consolidation of behaviour learned by reward.