Heritability of working memory in preschoolers

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Working memory is thought to depend on networks of frontal brain structures. We tested the efficiency of working memory performance in a large sample of nearly 6-year old healthy monozygotic and dizygotic twin pairs, using a computerized test battery. The working memory task was a variant of the Sternberg memory search task. As predicted, we found that an increase in memory load lead to an increase in response times and errors. We analyzed variations in absolute performance paramaters (overall speed and accuracy) and relative performance parameters (increase in errors and/or reaction time). The results showed clear genetic effects on speed, accuracy, and memory search rate. This is a promising result, because (a) the memory search rate variable is essentially composed of the difference between two RT-variables, and (b) our subject group was highly variable. This means that memory search rate may qualify as a suitable cognitive endophenotype of developmental syndromes, such as ADHD, which is characterized by frontal deficits.

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