Universität Basel

Research Project

Detection of Rare Variants of Working Memory by Using Phenotypic Extremes

Third-party funded project

Project title Detection of Rare Variants of Working Memory by Using Phenotypic Extremes
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Background: i) Working memory, which represents a limited capacity neural network capable of actively maintaining task-relevant information during the execution of a cognitive task, is a key cognitive trait well amenable to behavioral genetic studies: working memory is heritable, can be assessed in a valid and reliable manner, and has well-defined neural correlates. Working memory deficits are a key component of psychiatric disorders such as schizophrenia, bipolar disorder, and attention-deficit hyperactivity disorder (ADHD). Although human genetic studies have identified several common variants related to working memory, a major portion of the heritability, partly based on rare variants, remains unexplained, a phenomenon commonly termed “missing heritability”. ii) Recent advances in DNA sequencing technology are transforming human and medical genetics by enabling whole-exome and whole-genome sequencing at high coverage, thereby allowing the identification of rare variants. Aim: To identify rare variants associated with working memory performance. Methods: We will perform high-coverage exome sequencing in phenotypic extremes, i.e. groups of healthy young individuals with particularly high or low working memory performance. Independent samples will be used for replication of the top findings. Expected value: By identifying rare variants related to working memory performance, this study will generate novel findings regarding the “missing heritability” of working memory and will help to improve understanding –and hopefully treatment- of working memory-related psychopathological conditions, such as schizophrenia and attention deficit syndromes.

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