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Project Summaries

BrainsCAN

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Developing and validating tools to assess higher level cognition in children and adolescents

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Developing and validating tools to assess higher level cognition in children and adolescents

Background

One of the best predictors of life quality, including vocational success, levels of happiness and even life expectancy, is overall cognitive functioning. The better an individual performs on tests that measure different aspects of cognition, the better their quality of life.

Over the last 25 years, Cambridge Brain Sciences Inc. (CBS) has successfully developed a suite of computerized tests of cognition to assess aspects of memory, attention, planning and reasoning in healthy adults and patient populations. These tests have been validated in patients with anatomically specific brain lesions, in neurodegenerative populations, and in pharmacological intervention studies. The neuronal events and mechanisms occurring in the brain for these different aspects of cognition, known as the neural correlates, have also been well studied using functional neuroimaging in healthy adults, and in those with specific diseases. Recently, the tests were adapted to run online without formal supervision, opening the possibility of large-scale studies of cognition in the general population - CBS has already collected data for multiple studies that involve thousands of individuals, up to almost 100,000 for one study. This would be impossible using traditional laboratory-based methods.

The Problem

Children process the world differently from adults; their brains are imbued with a particular set of interests and properties (such as attention or motor control) that filter how they process information. Designing tests that are simpler or 'friendlier' versions of adult tests is not sufficient because critical information about how their performance compares to that of adults will be lost. They need to be redesigned so that they are optimally configured for children while still targeting the same cognitive domains as the adult tests, to allow us to compare and draw conclusions.

Funding Program

BrainsCAN Accelerator Grant:
Stimulus

Awarded: \$96,050

Additional BrainsCAN Support

Human Cognition and
Sensorimotor Core

Western Faculty, Group or Institution

Department of Psychology,
Faculty of Social Science

Keywords

Learning & learning disorders,
memory, neurodevelopment

Related

None

The Project

Collaborating with CBS, we will create a unique platform for understanding, detecting and predicting delays in cognition during the formative period from childhood to adolescence. The aim of this project is to develop and validate a battery of tests specifically for children and adolescents between the ages of 7 and 15 to measure various aspects of higher-level cognitive abilities. These include short-term and episodic memory, planning, reasoning, verbal abilities and executive functioning (those processes necessary to control behaviour, such as controlling attention and inhibition, working memory, reasoning and problem solving).

The tests will be developed through the lens of cognitive development - the specific set of properties imbued by the brains of children and adolescents, including visual, motor and attentional capacities, along with specific interests that shape how they process the world. The cognitive battery will be available online so that children and adolescents from all over the world can complete the tests from home.

This project will open the door to conducting large-scale online studies of cognition from a diverse sample of participants representing the general population.

Western Researchers

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