Poster Abstract

The Role of Emotion and Choice in Learning (ReaCh): math, reading and visuospatial awareness

The REaCh task is a newly funded NIH Learning Disabilities Research Hub (LDRH) study, led by Dr. Terry Jernigan and Dr. Erik Newman. The primary aims of this study are to characterize children’s individual tendencies to approach or avoid specific types of academic stimuli, its relations to academic achievements, and to examine how cognitive emotional and motivational factors relate to brain development. The new paradigm we are developing assesses children’s level of functioning using six interactive games in math, quantity estimation (the dots task), reading, phonology, music and visuospatial awareness (the star task). Each task consists of different levels of difficulty, appropriate for children of age five or above. The stair casing method is used to determine participant’s threshold in each task.

I have played a major role in the development of the dots task, the reading task and the star task. Using Python programming language in PsychoPy stimulus presentation software, I created stimuli generation algorithms, developed methods and algorithms to determine stimuli’s difficulty bins, and developed the software of the three tasks. The dots task is a modification of an existing paradigm called panamath, which assesses one’s quantity estimation ability. The reading task is a novel reading paradigm. To construct the difficulty bins of this task, I developed a new method that best measure grapheme and orthographic similarities of words, by combining existing methods called metaphone and cmudist. The star task is a novel visuospatial location task that aims to assess participant’s ability to quickly remember and recall an object’s spatial location. Our tasks and its difficulty levels are specifically designed to adaptively and accurately assess participant’s performance threshold. This poster will further discuss the experimental design of these three tasks, as well as the methods and algorithms I have developed to generate its stimuli and difficulty bins. I will also demonstrate the task using a touch screen monitor or tablet during the poster presentation session.

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