

Psychologist creates tool for measuring memory

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Psychologist Jamie Edgin built a homemade memory test for children that has now been transformed into an Android touchscreen assessment. Credit: Jamie Edgin

Psychologist Jamie Edgin studies human memory at the University of Arizona, where her research often involves working with very young children and children with intellectual disabilities.



A few years ago, Edgin grew frustrated with the lack of standardized memory tests designed for those populations, so she gathered an armload of her kids' toys and a kitchen tray from home and went to work building her own tabletop version of an interactive game that tests memory in a style similar to the card game "Concentration."

She began using the tool in her research, and one day last year decided to lug the cumbersome prototype to the offices of Tech Launch Arizona, the UA division dedicated to helping campus researchers move their innovations to market.

After demonstrating her concept, Edgin was awarded a \$71,000 asset development grant from TLA that enabled her to work with Tucsonbased Galatea Studios, a firm that does app and game design and development. The company helped her translate her concept into an Android touchscreen-based battery of tests, which Edgin uses in her research today.

Edgin, an assistant professor of psychology and associate head of the Cognition and Neural Systems graduate program at the UA, is now working in partnership with two other universities to continue to develop and test the effectiveness of the tool with support from a newly awarded five-year, \$2.9 million grant from the National Institute of Child Health and Human Development. She also has received development funding from the LuMind Research Down Syndrome Foundation.

Edgin is working on the UA-led project with collaborators at Drexel University and the MIND Institute at the University of California, Davis. If found to be effective, the assessment could change how researchers worldwide measure memory in typically developing <u>children</u> ages 3 to 6 and children up to age 18 who have <u>intellectual disabilities</u> such as Down syndrome or Fragile X syndrome, a genetic condition that causes intellectual disability and symptoms similar to autism.



"Right now, the way things stand, there are very few assessments that are designed for younger children," said Edgin, who directs the Memory Development and Disorders Lab in the UA Department of Psychology and also is a faculty member in the UA's Sonoran UCEDD, or University Center for Excellence in Developmental Disabilities.

"Most available tests are designed for children older than 5, and the items are very difficult," she said. "Since there's no single test that you can draw on as an outcome measure, researchers have to pick and choose from existing test batteries, and it ends up being pretty inefficient to do that."

The same testing limitations exist for children with intellectual disabilities, who can't always complete assessments designed for typically developing children, Edgin said.

"Young children and children with cognitive impairment can't always respond verbally, but there's something about having an immersive computer environment that really engages them," Edgin said. "For example, we had some kids with autism who we tested with the touchscreen device who weren't able to respond during a tabletop version of the test, but they were able to complete the Android version."

Edgin's work is especially important as a growing number clinical trials are now underway to test pharmaceutical interventions to treat cognitive deficits in individuals with Down syndrome and Fragile X syndrome.

Because those pharmaceuticals often target the function of the brain's hippocampus and associated memory systems, having a reliable way to measure memory is critical, Edgin said.

"There are many different behavioral and pharmacological treatments evolving for intellectual disabilities, so that's why there is an emphasis on



trying to to develop outcome measures that can be used in these populations," Edgin said.

The touchscreen test also could help researchers better assess and understand how memory develops in typical children from ages 3 to 6—a period in which memory evolves significantly.

"Our test covers a lot of different domains of memory, like visual recognition, being able to associate pieces of information, being able to remember over a delay, and working memory," Edgin said.

During the first six months of the grant, Edgin will be collecting feedback on the test from a panel of worldwide scientific experts in medicine, pharmacy, memory and intellectual disabilities. In-person testing with children will then take place at the UA, UC Davis and Drexel University—all of which have expertise in intellectual disabilities.

"The idea is to bring together all of this expertise to design one battery that could be used effectively in a short testing session," Edgin said. "The study will be a validation of the test, but it will also help us understand a lot about memory in typical children, as well as children with intellectual disabilities."

Provided by University of Arizona

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