NEWS

Facebook, brain games may reveal DNA deletion's effects

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Swipe in the direction of the middle bird

Game time: Brain games such as “Lost in Migration” may help uncover symptoms in adults with

too many or too few copies of the 15q11.2 chromosomal region.

It’s no secret that autism studies have a recruitment problem. Traveling to and from clinics for tests and scans is no small feat for families of children with the disorder. For researchers studying subtypes of autism tied to rare deletions or duplications of DNA, the pool of potential study participants is even smaller[1].

This is why geneticist **Brett Abrahams** has moved his research online. He’s using Facebook and the ‘brain-training’ tool **Lumosity** to study the sometimes-subtle effects that large mutations can have on cognition. In three years, he has enlisted 310 volunteers from the U.S., Canada, Australia, Spain and the Netherlands.

"Things are growing very quickly," says Abrahams, assistant professor of genetics at Albert Einstein College of Medicine in New York City. “Eight new members were added in the last 24 hours.”

This strategy could be used to recruit and collect data from people all over the world, says **Georgine Burke**, director of research at Connecticut Children’s Medical Center, who is not involved in the study.

Duplications of the 15q11.2 chromosomal region may be linked to increased autism risk[2]. Deletions of the same region are tied to a rise in the risk of schizophrenia and **epilepsy**[3]. But not everyone with too few or too many copies of 15q11.2 develops a disorder. For instance, many parents carry the same genetic glitch as their affected children but have few cognitive problems[4].

Abrahams wanted to find out whether seemingly unaffected parents might have subtle symptoms that have gone undetected. Discovering more about the effects of deletions or duplications of DNA, dubbed **copy number variants** (CNVs), could help researchers find genes and environmental factors that interact with them and worsen symptoms in some children.

But finding enough people with these chromosome errors would likely be challenging. In 2012, Abrahams stumbled across a Facebook support group for families affected by CNVs on chromosome 15. Then he realized he needed a way to measure these individuals’ mental performance remotely.

Memory test:

Abrahams had previously used an online ‘brain-training’ program called Lumosity, which uses ‘games’ to build and assess mental capacities such as intelligence, memory, mental flexibility,

language and basic problem solving. "I have this really, really terrible memory," he says, recalling his decision to try the program in 2013. "It drives my wife crazy."

More than 35 million other people have used it, so there is plenty of evidence supporting its use. "It dawned on me that it could really be a valuable way to study these families," Abrahams says.

From the Facebook group, he recruited 53 parents and adult relatives of children with 15q11.2 deletions. These individuals played games on Lumosity three times a week for 10 weeks. A test of visual attention, for example, requires determining which direction a central bird is facing without being distracted by other birds.

The researchers found that people with the 15q11.2 deletion have typical intelligence but score far below average on measures of language and math ability. The math and verbal scores came as a surprise, Abrahams says, as many of these individuals balance families and jobs that would seem to require such skills.

Abrahams and his team have also recruited 15 families with children who have 15q11.2 duplications — a number they hope to double in the coming months. They aim to eventually work with hundreds of families with CNVs in 15q11.2.

Compared with traditional studies, "this online approach is much more scalable," Abrahams says.

Facebook-based recruitment might be biased, however, as those who join are more likely to have severely affected children, says **Stephen Bent**, associate professor of medicine at the University of California, San Francisco.

Ultimately, Abrahams says he would like to assess children with CNVs in this region using a version of the Lumosity program for children 2 years and older that the company launched in December.

"If we can identify problem areas and then develop a training program that gives rise to big improvements over time, we could one day deliver an intervention online that families could use in their homes at their convenience," he says. "That could be really powerful."

References:

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