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Facing-off against autism

By Shannon McCallum

What's the first thing you notice upon entering a room? For most of us, it's people or, more specifically, people's faces. Individuals with autism, however, are just as likely to first notice a chair, book or painting. Dr. Jim Tanaka, a UVic cognitive neuroscientist, has developed a computer game that may improve the face processing abilities of children with autism by jumpstarting the area of the brain that recognizes faces.

"Children with autism spectrum disorder (ASD) seem to have deficits in processing faces—not only with recognizing to whom the face belongs, but also with the emotional expression of a face," explains Tanaka, whose research focuses on the perceptual processes involved in expert object recognition. This face processing problem may help to explain why these children seem to have

deficits in their social and emotional abilities.

In order to develop "face expertise" in children with autism, Tanaka has developed the *Let's Face It!* computer program. The research is a collaborative project with the Yale Child Study Centre funded by a \$2-million five-year grant from the U.S. National Institutes of Health.

One of his goals is to confirm whether children with ASD really do have deficits in face processing. "We're trying to understand how the cognitive and neurological processes of children with ASD differ from those of non-ASD children." A second goal is to find out whether using *Let's Face It!* in an intensive intervention program can teach children with ASD to become experts at recognizing faces and whether face training produces changes in brain activity.

Sharpen your knowl**EDGE**

What is autism?

- Autism is a disability that affects the development of the brain in the areas of social interaction and communication.
- It is often called Autism Spectrum Disorder (ASD) because its symptoms and characteristics can appear in a variety of combinations and can range from mild to very severe.
- ASD affects about 2–6 people in 1,000 and is four times more common in boys than in girls. It is estimated that the incidence of ASD is increasing by 10–17 percent per year.

How the brain sees faces

- Evidence suggests that humans are born with a preference for faces over other objects. This preference seems to have its roots in an area of the brain called the fusiform gyrus — the same area used in such expert object recognition activities as birdwatching.
- In normal populations, the fusiform gyrus is activated more by faces than by other objects. In children with ASD, however, the fusiform gyrus shows reduced activity accompanied by more activity in another area usually associated with non-expert object recognition. This suggests that people with ASD may view a face as just another object, not as anything special.

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Tanaka

The program is a series of games that involve distinguishing faces from other everyday objects, attaching labels to facial expressions and interpreting the meaning of facial cues in a social context. Since the program records the speed and accuracy of responses, it is possible to identify the tasks with which a child has specific problems. The games increase in difficulty with each successful completion of a level, enabling the children to sharpen their face processing skills.

But the work doesn't end when the computer is turned off. "We know that children with ASD are pretty good with computers, but it's important for them to have one-on-one interaction with people as well, since that's what they tend to have problems with," says Tanaka.

So, enter "face tutors," who work individually with the children using lesson plans tailored for each child's specific needs. Face tutors help the children build on their face processing skills by engaging them in a group of activities similar to those in the games,

but in a more realistic and demanding social setting.

Assisting in the project are two recent grads of Oberlin College in Ohio, Dave Swanson and Martha Kaiser, who came to Victoria to continue working on the project with Tanaka when he left Oberlin to join UVic's psychology department this year. Such dedication is what Tanaka means when he refers to this project as a "labour of love."

"In my other lifetime, I was a teacher pursuing a master's degree in special education, so I've kind of come full circle. While we're excited about the scientific questions that the research raises, we're equally motivated by the potential benefits that the project might produce for children with autism."

This article was written by Shannon McCallum, a student in the Faculty of Graduate Studies, as a participant in the UVic SPARK program (Students Promoting Awareness of Research Knowledge), supported by the Vice-President Academic and Provost and the Vice-President Research.



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