

Brain-injured patients can relearn emotions

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The visitor in Barry Willer's office at the University at Buffalo was frustrated and deeply depressed. The man's wife had sustained a relatively mild traumatic brain injury, and he was doing all he could to support her. But despite his best efforts, the man's wife described him to friends as being "indifferent." He was at his wits end.

Willer, UB professor of psychiatry and a specialist in traumatic brain injury (TBI), listened to this scenario with great interest. He was pilot testing a computer-based diagnostic and treatment program he and a graduate student had developed for brain-injured adults to help them regain their emotional lives.

Willer had the man's wife take the test, which requires participants to view photos of faces expressing a variety of emotions and then name each emotion.

Persons with no brain injury easily can distinguish frightened from annoyed, or disappointed from gleeful. But when a sad, or angry, or surprised face appeared on the screen, the man's wife saw only "indifferent."

It was eye-opening for the man and his wife and a rewarding moment for Willer. "His wife didn't know she wasn't recognizing his emotions," Willer recounts, "and he had no idea what was going on."

Interpreting and expressing emotion are defining characteristics of being human. The psychiatric rehabilitation community confirmed in recent



years that as many as 50 percent of TBI patients had lost this ability. In the past, people with TBI who reacted inappropriately, such as joking at a funeral, or didn't react at all, were considered to have behavior problems. This capacity to understand and respond to emotions now is known as affect recognition.

Based on his promising pilot-study results, Willer has received a \$600,000 grant from the National Institute on Disability and Rehabilitation Research (NIDDR) to carry out a three-year controlled trial of his affect recognition training program. It is the first structured intervention designed to treat this disability among those with brain injury.

Recruitment currently is underway at the Carolinas Healthcare System in Charlotte, N.C., Brock University in St. Catherines, Ont., and Massey University in Wellington, New Zealand. Willer and his co-primary investigator, Machiko Tomita, Ph.D., clinical associate professor of rehabilitation sciences, are overseeing the three sites.

Willer's interest in affect recognition was inspired by the PBS series "The Secret Life of the Brain." One of the episodes showed a man watching a horrific scene from a "slasher" movie that would make most viewers cringe. But this man simply was puzzled, recounts Willer, because he couldn't produce the fear emotion and therefore did not understand what was happening. "I was watching that and I thought, 'My gosh! I see that all the time in brain injury."

That television program on the brain set the wheels of Willer's research group in motion. No one had yet developed a program to treat affect recognition. Working with graduate students Barbra Zupan and Dawn Neumann, Willer took two interventions shown to be successful in helping autistic children recognize emotions, modified them to be appropriate for adults with brain injury and tested them in the pilot



study.

These interventions, which now are being tested in the three-year trial, are titled "facial affect recognition" (FAR), and "stories of emotional inference" (SEI). Tim Bleiler, an instructional designer in the UB medical school, has put both interventions into a single piece of software ready for the multi-site trial. The new investigation will randomize 108 participants with TBI into one of these two groups or to a control training group (CTG).

Participations in the FAR group, as the facial-affect-recognition name implies, will focus on specific elements of the face. "The research suggests that the majority of the information we gather about somebody else's emotional state is based on their facial expression," said Willer. "We gather a little from the voice, we gather a little from body language, but the majority comes from the face."

FAR participants will view faces on a computer screen equipped with cues that direct them to concentrate on specific elements of each face... "Look at the eyes. What are the eyes doing? What is the mouth doing?" ...and asks them to name the emotion.

"To know what the other person is feeling," noted Willer, "You have to know what you're feeling. Individuals who don't know how to recognize anger won't recognize it in themselves, and in fact can't produce it. If you hold a mirror in front of them and say, 'Show me an angry face,' it's really interesting to watch them moving their face around and trying to come up with an angry face, and they can't."

The SEI intervention uses examples to teach what a person is likely to be feeling in various situations. Participants randomized to this group are asked to read stories on the computer that describe events, along with character's beliefs, wants and behaviors. From this information,



participants are asked to infer the emotions imbedded in the story. Willer uses the admittedly simplistic "joking-at-the-funeral" example, to describe how a story intervention works. "These stories might say: "You're going to a funeral and you're meeting the person whose husband died. What is that person likely to be feeling?"

The control group will receive computer-based educational instruction in areas such as banking or applying for a job, and will learn how to use Word and Excel programs and how to search the Internet.

All participants will receive treatments three times a week for three weeks. They will be tested immediately at the end of the treatment, and at three and six months post-treatment. Willer and colleagues will evaluate participants' recognition of emotion from faces and written text, changes in empathy and emotional behavior and any changes in the quality of their personal relationships.

Perhaps the most important observation from Willer's research is the plasticity of the neural structures involved with affect recognition. "What was so exciting about our preliminary study," says Willer, " is that someone may lose the ability to recognize emotions, but even 10 years later, they can relearn the skill if given the right assistance."

Willer also learned, in researching and developing this project, that emotional expressions appear to be universal. "It's completely crosscultural," he says. "No matter what culture you enter, it's the same expressions, the same interpretation. The only exception is in some Muslim areas where women's faces are covered. In these settings, much more expression is communicated in the eyes, because only the eyes are visible."

Then there is "happy," which is the only emotion that TBI does not erase, says Willer. "Happy has so much redundant circuitry, so much



additional wiring in the brain, that persons with brain injury always recognize happy. I don't know how that happened, but we all can be glad it did."

Source: University at Buffalo

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