

# People with rare type of memory loss still sensitive to others, study shows

**People with a devastating brain injury that has wiped out many of their personal memories may still be able to understand other people's feelings and intentions, according to a joint study by the Rotman Research Institute at the Baycrest Centre for Aging and the Brain, and York University's Department of Psychology, Faculty of Health.**

The study, published in the Nov. 23, 2007 issue of *Science*, reports that severe loss of autobiographical episodic memory does not necessarily compromise the ability to figure out the mental states of other people, including their feelings and intentions.

For people with this distressing cognitive condition and for those caring for them, there is a "hope" message in the findings, says lead investigator Dr. Shayna Rosenbaum, a cognitive neuropsychologist at Baycrest's Rotman Research Institute and assistant professor of psychology at York University.

Even though there might be some social consequences of losing your autobiographical memory, it doesn't mean all is lost, Dr. Rosenbaum says. "The person can still be in tune with others' feelings and intentions which can help sustain social relationships, especially with loved ones. It's encouraging to know that this ability may be more resilient and preserved in us than was first thought."

Understanding the feelings and intentions of others is the basis of our socialization and what makes us human. It's known as "Theory of Mind" and associated with the prefrontal cortex. In scientific circles, an idea has floated around for a long time that in order to imagine and make sense of other people's thoughts, we must rely on our own personal autobiographical recollections (episodic memory). But some scientists have been skeptical of this assumption and wondered if Theory of Mind abilities can exist without episodic memory.

Dr. Rosenbaum and senior scientists at the Rotman – including the world-renowned memory pioneer Dr. Endel Tulving, frontal lobes expert Dr. Donald Stuss, and Dr. Brian Levine whose expertise is autobiographical memory – had an extraordinary opportunity to test this long-held assumption by conducting the first systematic examination of this theory in two individuals with limited auto-noetic awareness, a rare cognitive condition.

The individuals, known as K.C. and M.L., sustained severe head injuries several years earlier in motorcycle and cycling accidents that erased most of their autobiographical episodic memory. They could no longer remember personal episodes of their past and how they felt. Dr. Tulving had studied K.C. many years ago and noted that K.C. was also unable to imagine himself at a future point in time. He came up with the phrase "auto-noetic awareness" to describe this human ability to mentally time travel.

In this latest study, K.C., M.L. and 14 healthy controls were put through a series of tests widely known to be sensitive to Theory of Mind and perspective taking (ie. the clear appreciation of empathy, deception, sarcasm and false beliefs in others). Some of the tests involved looking at the eye regions of faces to determine if the person was deceitful or playful, and viewing emotional scenarios and listening to narratives to determine the other's mental state.

Investigators found that K.C. and M.L. performed as well as healthy subjects on all measures even though they had severely impaired auto-noetic awareness.

"We found that if you're trying to put yourself mentally in someone else's shoes, you don't need to put

yourself in your own shoes first,” says Dr. Rosenbaum.

This preserved ability to infer other people’s feelings and intentions may be related to semantic memory (knowledge of general facts about the world and people) that was left intact after the injury, Dr. Rosenbaum suggests. She adds that more studies are needed to look at what parts of the brain are involved in this compensation.

“Our findings suggest that episodic memory is not necessary to have normal insight into other people’s minds,” reinforces Dr. Tulving, a cognitive psychologist who is internationally recognized for his landmark research to distinguish different types of human memory. “We still do not know whether episodic memory might be necessary for the development of such an insight in the first place! This is yet another open problem.”

Source: Baycrest Centre for Geriatric Care

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