

Living life in the third person

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Credit: Rice University

Imagine living a healthy, normal life without the ability to re-experience

in your mind personal events from your past. You have learned details about past episodes from your life and can recite these to family and friends, but you can't mentally travel back in time to imagine yourself in any of them.

Cognitive scientists from Baycrest Health Sciences' Rotman Research Institute in Toronto had a rare opportunity to examine three middle-aged adults (two from the U.S., the other from the U.K.) who essentially live their lives in the "third person" because of a condition known as lifelong severely deficient autobiographical memory (SDAM).

The intriguing findings are posted online in the journal *Neuropsychologia*, ahead of the print edition.

"Many of us can relate to the idea that people have different abilities when remembering events. What is unique about these individuals is that they have no personal recollection," said Dr. Brian Levine, senior scientist at Baycrest's Rotman Research Institute, and senior author on the paper.

"Even though they can learn and recall information normally and hold down professional careers, they cannot re-experience the past with a vivid sense of personal reliving. It's as if their past was experienced in the third person."

There is no history of amnesia, brain injury, birth complications, seizures, stroke, neurological disease, or psychological disorder to explain their memory syndrome. They are highly educated and functioning normally in their occupational and social roles. While scientists are unsure how rare the condition is, the Canadian study represents the first opportunity to examine the memory syndrome in healthy individuals in a lab setting with brain imaging and reliable and valid memory testing protocols.

The Rotman research team discovered reduced vividness, visualization and recollection of both personal events and laboratory-presented material in the three adults compared to age-and-education matched control subjects. Using different methods of brain imaging (structural and functional magnetic resonance imaging (MRI) and electroencephalography (EEG), the team found evidence of brain differences in the SDAM cases compared to control subjects. The researchers also examined the size of the hippocampus, a brain region known to play a critical role in recollecting events, and found a subtle volume reduction in the right hippocampus in the SDAM cases.

When presented with events from their own life, the SDAM cases had reduced activation in midline brain regions that play a prominent role in autobiographical memory processes, such as mental time travel. When their memory for pictures was tested, the EEG signals associated with conscious recollection in healthy adults were greatly reduced in the SDAM cases, even though their recognition of the pictures was normal. This suggested that the SDAM cases can learn, but without a normal recollective experience.

"The SDAM cases had very little access to autobiographical details from their remote past, including visualization of those experiences and their emotional state," said Dr. Daniela Palombo, the study's lead author and currently a post-doctoral researcher at VA Boston Healthcare System and Boston University School of Medicine.

"We also found significant activation reductions in core regions known to play a role in autobiographical memory, which may provide some of the explanation for their inability to mentally project the self through time and their reduced visualization abilities, compared to the matched controls."

Yet the findings also suggested how it is that the SDAM cases can still

function normally in day-to-day life. They rely on intact non-recollective memory, such as rehearsed factual knowledge about themselves or others.

"There is a lot that we can accomplish with these skills, which are also part of normal memory function," said Dr. Levine. The SDAM syndrome may involve a lifetime of compensation using these abilities.

Dr. Palombo cautioned that further studies are required to tease out other possible neurological factors and health issues that may play a role in SDAM.

"We are very grateful that these three individuals came forward and allowed us to test them so we could document their syndrome and try to understand the brain mechanisms behind it," added Dr. Levine.

SDAM is the extreme opposite of another syndrome known as highly superior autobiographical memory (HSAM), which refers to individuals with the uncanny ability to recall a vast amount of episodic [autobiographical memory](#) details.

Provided by Baycrest Centre for Geriatric Care

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