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**Series: PICTURING THE PAST | HOW SCIENCE IS MAPPING MEMORY  
SECOND OF THREE PARTS**

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**IT'S A POWER THAT HAUNTS AND INTRIGUES: TOTAL RECALL**

By [AMY ELLIS NUTT](#) AND PHOTOS BY ARISTIDE ECONOMOPOULOS  
STAR-LEDGER STAFF - LA CROSSE, Wisc.

Brad Williams closes his eyes and tastes the memory. Frosted Flakes. Dec. 26, 1962. "We were at my grandparents' farm. It was cold on the tile floor and you could smell the wood-burning stove. Grandma had all the sugary cereals ready."

Something strange is going on inside Williams' brain. The 51-year-old broadcaster remembers nearly every day of his life - what he was doing, world events, what was on TV.

Neuroscientists at the University of California-Irvine are so fascinated by Williams' ability, they have scanned his brain. They also have examined the brain of a 42-year-old California woman, the only other person known to have the same capacity for total recall.

Having identified two individuals with this extraordinary trait - and believing more must be out there - the scientists hope to deepen their knowledge about autobiographical memory, one of the least-understood functions of the human brain.

Understanding how these two people remember almost everything could help Alzheimer's researchers understand why some people remember almost nothing.

Williams' autobiographical memory - which is the capacity to recollect the events of one's own life - is both breathtaking and mystifying. Breathtaking because it encompasses both the mundane and the momentous. Mystifying because everything in science says it just shouldn't be so. A brain isn't built to remember everything.

But Williams' brain, it seems, does.

\* \* \*

*When were American Embassy workers taken hostage in Iran?*

"November 4th, 1979. There was a Roger Mudd interview with Ted Kennedy on TV that night and they were pressing him about Chappaquiddick. He was getting

ready to run for president. 'Jaws' was on another station and we were all watching that."

*When did the musical "Hair" open on Broadway?*

"April 29th, 1968, because that was the day my grandfather died. We were at home. We had gone to the hospital the day before."\* \* \*

No hesitation, no scratching of his head before he answers.

Williams, a small-town Midwesterner, grew up in Prairie du Chien, in the southern part of Wisconsin. Unmarried, he now lives about 60 miles north, in La Crosse. A news anchor for a local radio station, Williams is bright and funny. He enjoys competitive Scrabble and trivia and is active in community theater. But there is a shyness about him that sometimes makes it difficult for him to look you directly in the eye.

He also is matter-of-fact about his gift. "I don't remember realizing it. It was just always there," he said.

James [McGaugh](#), a leading memory researcher at the University of California-Irvine, had to invent a name for this extraordinary recall for life events: hyperthymestic syndrome, from the Greek, meaning "superior memory."

"If there is any one thing that should be studied in order to learn about human nature, it's memory," said [McGaugh](#), a neurobiologist and founding director of Irvine's Center for the Neurobiology of Learning and Memory. "And I rest my case on Alzheimer's. All you have to do is know somebody who is undergoing mental collapse because of Alzheimer's and see how they're robbed of their very persona. Without memory you wouldn't know how to walk or talk or write or get on an airplane. There would be no world."

#### **LBJ AND ROE V. WADE**

Williams' world is populated by dates, places and images, but some days slip by without much happening, and some news events make less of an impact than others. He is not good at sports trivia, or the dates of plane crashes, he said, and when he can't remember something, he fully admits it. (On "Jeopardy!" 17 years ago, he came in second.) But nearly everything about his own life, from the time he was 4, appears to be cataloged somewhere in his brain.

\* \* \*

*When did the Beatles first appear on "The Ed Sullivan Show"?*

"February 9th, 1964. Same night as Cub Scout pack, so we almost missed it. We saw the second part of the show."

*When did LBJ announce he wouldn't run for a second term?*

"March 31st, 1968."

*When did he die?*

"January 22nd, 1973. The same day Roe v. Wade was decided. I was in high school. It was a Monday."

**\* \* \***

Memory has been the focus of research for more than a century, but autobiographical memory, sometimes called episodic memory, has been the subject of serious study for barely three decades. The primary reason is that it has been difficult to examine. Personal memories are subjective and involve multiple systems, including cognitive, sensory and emotional processes.

The rare opportunity to study autobiographical memory in action presented itself to [McGaugh](#) in June 2000, when he was contacted by a 34-year-old woman who claimed her memory was so powerful, it was interfering with her life.

[McGaugh](#) began by testing the woman, who has requested she be identified only by her first name, Jill. He picked out random events and dates from a massive book about the history of the millennium.

Jill knew them all.

A news story about her appeared in the spring of 2006 and caught the attention of a California man, Eric Williams. He contacted the university and said he believed his brother had the same ability.

#### **LOCATION, LOCATION**

For Brad Williams and Jill, remembering is not a singular act but a complex process across time and space, between the public and the personal, involving all the senses - particularly the sense of place.

The relationship between memory and location is being studied by a number of scientists around the world. Some believe the sense of space is key to encoding memories in the brain.

Glancing back across the landscape of his life, Williams is able to focus rapidly on a date and often sees an image of himself: He is at school, on vacation, in a play. Sometimes the date will remind him of a news event, and then he remembers where he was and what he was doing. If no image immediately comes to mind, he performs a rapid calendar calculation, figuring out the day of the week - maybe it's a Saturday, or the day before a holiday - on which he eventually hooks a memory.

**\* \* \***

*When did Murphy Brown (the title character on a TV show from the 1980s) have her baby?*

"May 18th, 1992. The next day my mom and I flew to London. The first night we walked past Buckingham Palace. We took a boat ride on the Thames and went to the world premiere of 'Wayne's World.'"

*When did the singer Mama Cass die?*

"July 29th, 1974. I was at Yellowstone. I was sitting in the back of the car and we were driving through the park with my parents and the radio was on."

*When was Robert Kennedy buried?*

"June 8th, 1968. It was a Saturday. Andy Williams sang 'The Battle Hymn of the Republic' at the funeral. They buried him at night at Arlington. Also, our cousin Mike brought his records over to the house and we listened to a 45 of 'Mrs. Robinson.'"

\* \* \*

In August, after undergoing an MRI scan and a series of formal tests, Williams sat down with [McGaugh](#) and Larry Cahill, the scientist who had just overseen the scan. They wanted to ask him about how he retrieves his memories.

"If you take a random date," Williams said, "I can usually tell you what town I was living in, whether I was in school, what job I was working at, and then I can cross-reference to something else."

[McGaugh](#) then asked, "So if I say the year is 1987, the month is July and the day is the 15th?"

"Well, I was working at the radio station at La Crosse and I had already been working on a play, backstage, on a production of 'Peter Pan.' But that particular date doesn't bring anything specific to mind."

"You didn't give the day of the week," said [McGaugh](#).

"It was a Wednesday."

"So how did you know it was a Wednesday?"

"The Fourth of July was on a Saturday that year."

"How did you know the Fourth of July was on a Saturday?"

"Because it was two days after 'Peter Pan' closed, which was on a Thursday."

Neither [McGaugh](#) nor Cahill is sure yet where in the several stages of memory - encoding, consolidation, retrieval - Williams and Jill diverge from the normal population. Perhaps, like fishermen who have found a well-stocked, secret pool upriver from everyone else, Williams and Jill retrieve their memories from a place in the brain as yet unknown to scientists.

Three weeks ago, the Irvine psychologists got their first tantalizing clues.

After comparing Jill's brain scan against a databank of thousands of "average" human brains, imaging experts at Harvard Medical School identified at least a couple of dozen areas in Jill's brain that were substantially larger. Some of those areas, said Cahill, differed by as much as three or four standard deviations from the norm.

"That's like the difference in size between Shaquille O'Neal and the rest of us," he said.

Cahill was unwilling to specify those areas of the brain until further analysis was completed and the results were discussed with Jill, but he said the hippocampus proper was not one of them. Instead, there were "some regions in the general area of the hippocampus that people associate with memory that appeared somewhat larger."

Over the next several months, the Harvard scientists will compare Williams' brain scan with the same databank.

"If we can go 2-for-2 in any brain regions," said Cahill, "then instantly they become a major candidate for helping us understand memory not only in these special people but in all of us."

There are no instances in medical literature, outside of Jill, describing a person with a superior autobiographical memory. ([McGaugh's](#) team published her case last year, referring to her as "A.J.")

Some autistic savants reveal a capacity for enormous feats of memory. One of the most famous is Kim Peek, the 56-year-old Utah man on whom the Dustin Hoffman character in "Rain Man" was based. Peek can recall about 12,000 books word for word.

Neither Williams nor Jill "practices" recalling their memories, and in Jill's case her ability for rote memorization, when tested, was merely average. Their autobiographical memories, however, are spontaneous, almost automatic, and summoned without effort.

For Williams, memories are like friends. They engage him, entertain him, keep him company.

\* \* \*

*When was the Titanic found?*

"September 2nd, Labor Day, 1985."

*When did Mount St. Helens erupt?*

"It was May 18th, 1980. A Sunday."

*When did the Supreme Court rule Nixon must turn over his tape recordings?*

"July 24th, 1974. Wednesday."

**'TIP OF MY BRAIN'**

As with Williams, memories dominate Jill's life, but for Jill they appear randomly in the theater of her mind, uninvited and uninterrupted. She will see a date, or hear it spoken, and suddenly the images spill into view.

"Everything is at the tip of my brain," she said in an interview in Los Angeles last year. "So like today is July 2nd. I could tell you what I was doing on this date 10 years ago, 20 years ago, 30 years ago. Thirty years ago I was at Big Bear Lake. My family had just picked me up from camp and we stayed there for the weekend. I was collecting Mad magazines - and that was the weekend of the raid on Entebbe."

Many of her memories are soothing, especially those of living in South Orange for several years, before moving when she was 8.

"I know you can't go home again," she said. "So I go home in my head. I go home to it because I can. And that's what gives me comfort."

Other memories, however - like the 2005 death of her husband from a stroke, after just 2 years of marriage - are excruciating.

"It's all there: every sad thing, every bad choice I ever made, every fork in the road," she said. "Your memory is supposed to protect you, and my memory hasn't done that."

In the seven years that the Irvine group has been studying Jill, they have been able to confirm many of the details of her personal memory because of voluminous diaries she kept during childhood and early adulthood, and which were in storage for several years.

Many of Williams' memories have been validated by his mother and two brothers, and they even provided the researchers with verification, including ticket stubs, old newspaper articles and personal documents.

One of the most puzzling aspects of these two cases, said [McGaugh](#), is that both Jill - whose earliest memories are from the age of 2 - and Williams recall their most ordinary days as clearly as days of significance.

"One of the initial driving hypotheses was that there was an exaggerated form of emotional memory formation, so that emotionally significant events are made more strong," said [McGaugh](#). "But their experience does not fit this."

Williams, for example, can recollect trivial details from a day when nothing extraordinary happened to him.

\* \* \*

*What happened on June 15th, 1982?*

"That would be a Friday, a very cold month. I was living in Illinois. Not much going on."

*How about March 31st, 1986?*

"I moved from Nebraska back to Wisconsin. It was windy and warm. The leaves were blowing down the street."

*December 21st, 1984?*

"I was with my older brother. We were driving across Iowa. We alternated saying words, stringing them together, to see if we could remember them later.

"Fish, book, cheese, duck."

He rattles off the words - 23 years later.

### **THE STUFF OF MEMORY**

[McGaugh](#) and Cahill have noted several similarities between Williams and Jill, including an obsessive component to their personalities.

"It's a really, really interesting lead," said Cahill. "People who have obsessive-compulsive disorder, there's something going on in the amygdala," which also is a memory-processing structure in the brain. "Maybe the obsessive drive is used toward memory storage."

Williams' apartment in La Crosse is flooded with paper - notes, bills, even old scorecards from miniature golf.

They crowd the couch, the dining room table, the kitchen counter. Videocassettes are stacked on the floor by an old Zenith TV, next to Scrabble games and a Yogi Bear bobblehead.

"Sometimes I don't want to throw things out," Williams said. "Sometimes I get sentimental. There's stuff - it might mean something."

The basement of his mother's house is filled with the un-discarded.

Rocks collected by Williams' late father spill from old Folgers coffee containers, a pyramid of 7-Up cans climbs one wall, rusted childhood bicycles rest against another.

For years Jill has recorded messages off her voice mail and onto audiocassettes, and she saves every list she has ever made.

When her parents moved from the L.A. home she grew up in, she scraped away the paint near her bedroom door where over the years she had written down memorable events and dates.

She then stored the paint chips in a small box.

For both Williams and Jill, memories and mementos are more than reminders - they are anchors to the past, archaeological artifacts of a world that refuses to stand still.

"There's probably something going on in my mind," Williams said, "that makes me want to remember things."

Growing up, Jill periodically snapped photographs of her bedroom.

"I've known since early childhood about change," she said. "You can never repeat a minute ago, and that's a hard concept for me to deal with."

During his own childhood, Williams moved three times within the confines of Prairie du Chien. As he conducts a tour of the town, he points out the geography of change. The prison that was once a Catholic boys school and then a Lutheran school. Eddie's Irish Pub, which used to be a grocery store. The apartment building that replaced Beaumont Hospital, where he was born.

There is an inescapable feeling of distance between Williams and the world, as if his superior memory for the events of his life somehow made it more difficult for him to live it.

He deflects questions about still being single, but it obviously pains him.

"I try not to get too upset about it," Williams said. "I think I do fine."

Standing in the waning light atop Pikes Peak, a few miles outside Prairie du Chien, he looks down on the Mississippi River snaking through a valley that was carved out by glaciers more than a million years ago.

The relentless ice sheet missed this bluff, which is why it is sometimes called "the Driftless Land."

From this height, time appears unmoved.

"My dad liked to take movies up here," said Williams.

He leans into the coming twilight - alone, as always, with his memories.

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Tomorrow: A team of psychologists and engineers invents the first memory-retrieval aid for amnesiacs and Alzheimer's patients.

**PHOTO CAPTION:** 1. Brad Williams, right, concentrates to retrieve a memory under the questioning of University of California-Irvine neurobiologist James [McGaugh](#). 2. Wisconsin resident Brad Williams summons a personal memory while being tested in Irvine, Calif. 3. "It was just always there," the 51-year-old Williams says of his uncanny gift. As a 2-year-old, above, he spells out the names of family members. Below, his June 1, 1990, appearance on "Jeopardy!" 4. Back in Prairie du Chien, Wis., Williams sifts through some mementos of his teenage years, including a piece of the castle from a



production of ''Hamlet'' 33 years ago. 5. From Granddad Bluff on the eastern edge of La Crosse, Brad Williams gazes upon the rest of the Wisconsin town where he lives on a late afternoon in August. 6. Brad Williams and brothers Greg, left, and Eric reminisce with their mom, Virginia, at a family reunion in Smithville, Mo., in June. Brad has the advantage over his brothers: He remembers nearly everything since he was 4. **CREDIT:** PHOTOS BY ARISTIDE ECONOMOPOULOS/STAR-LEDGER STAFF

**GRAPHIC CAPTION:** LIST:

**A glossary**

- **Amygdala:** Almond-shaped structure in the middle of the brain responsible for emotions and closely linked to memory.
- **Autobiographical memory:** Memory for the personal events and facts of a life.
- **Hippocampus:** The central memory system, located in the medial temporal lobe. Memories are encoded here before being shipped out for storage to other locations in the neocortex.
- **Hyperthymestic syndrome:** From the Greek, meaning superior memory. Scientists at the University of California-Irvine coined the term after extensive tests of a woman revealed her autobiographical memory was extraordinarily well-developed.
- **Standard deviation:** In considering individual points of data, a statistical measure of how widely dispersed the points are from their mean or average. The greater the standard deviation, the greater the "distance" or difference of the data point from the mean.

**Multimedia:** <http://tvjersey.com/videos/448/>