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## Blanks for the Memories

*What's Your Earliest Childhood Recollection? Scientists Delve Into Brain Circuitry for Answers*



By MELINDA BECK

A rowdy cousin ... an Eeyore T-shirt ... a dog-shaped balloon.

Why we remember some scenes from early childhood and forget others has long intrigued scientists—as well as parents striving to create happy memories for their kids. One of the biggest mysteries: why most people can't seem to recall anything before age 3 or 4.

Now, researchers in Canada have demonstrated that some young children can remember events from even before age 2—but those memories are fragile, with many vanishing by about age 10, according to a study in the journal *Child Development* this month.

### How Memories are Stored and Retrieved



Researchers asked 140 children, aged between 4 and 13, to describe their three earliest memories, and repeated the exercise two years later with the same children. On average, the 50 youngest children, aged 4 to 6 during the first interview, recalled events from when they were barely 2 years old, as verified by their parents. When they were interviewed two years later, only five of those 50 children mentioned the same earliest memory. By contrast, 22 of the 61 children who were 10 to 13 at the first interview were able to mention the same earliest memory when they were interviewed again two years later.

"By 10, those memories are crystallized. Those are the memories we keep," says psychologist Carole Peterson at Memorial University of Newfoundland, the lead investigator. "It's the memories from earliest childhood that we lose."

The inability of adults to remember the earliest years of childhood—also known as infantile amnesia—has been the subject of speculation for more than a century.

Modern researchers think that storing and retrieving memories require language skills that don't develop until age 3 or 4. Others believe that while children can recall fragments of scenes from early life, they can't create autobiographical memories—the episodes that make up one's life story—until they have a firm concept of "self," which may take a few more years.

Researchers are finding intriguing cultural differences, too. In a study published in *Child Development* in 2009, Dr. Peterson and colleagues asked 225 Canadian children and 113 Chinese children, aged 8, 11

and 14, to write down as many early memories as they could in four minutes. The Canadian children were able to recall twice as many memories from their early childhoods, going back six months earlier, than Chinese children. What's more, the Canadian children's memories were much more likely to be about their own experiences, whereas the Chinese children focused on family or group activities.

The difference isn't in memory skills, experts believe, but in how experiences are encoded in children's brains, which is greatly affected by the attention adults pay to them. In this case, researchers concluded, the Western parents were more likely to savor and tell stories about moments when a child said something funny or did something unusual, underscoring their individuality, while Asian cultures value collective experiences.

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### Unforgettable?

Canadian researchers asked a group of children for their earliest memories and repeated the process two years later. The older children were more likely to mention the same early memories, while the youngest had largely forgotten theirs. (Researchers' prompts are shown in parentheses.)

#### 4-year-Old

**Initial interview:** When I was little, I was leaving my mom in the room and I was crawling. And then I came back in and my dad lifted me up by my legs and I made a sound. (Where did that happen?) At a different house...I was really little, I was about 2½.

**Two years later:** Not recalled.

#### 8-Year Old

**Initial interview:** When I was in Vancouver, I was at the doctor and he was giving me some needles and I got licorice. (What happened?) Mom bribed me. He was checking and he had to give me a needle in that leg and that leg. And that leg hurt the most, I even remember what leg hurt the most. Mom bribed me with the licorice. (What else do you remember?) The color licorice. It was red. And green. (How old were you?) I think I was three. When I stepped in the office it was sorta scary because that was the first time I had a needle for a very long time. I didn't know how it felt.

**Two years later:** (Do you remember when you were little visiting the doctor in Vancouver and having to get a needle and your mom bribed you with licorice?) Yes I do remember that. I remember the doctor used one of those tappy on the knee things and I was scared to do it. Then she gave me a needle in this leg. I remember it was this one. Then I wouldn't get it done because I was afraid it would hurt and they would take too much blood out and then my mom said, "Well, I'll buy you some red and green licorice to get you to do it" and then that's how that one happened.

interesting.' "

Neuroscientists believe that there are different kinds of memories, stored in many different neural circuits. "We can't go to a particular spot in the brain to see where our third birthday party is stored," says Dr. Hudson.

Some memories are generic—what your house, your street or your school looked like. Those get called up as background, like the sets of a movie. Others are semantic, for facts and other information. Still others are episodic, for events that took place.

Indeed, experts say that if parents want their children to remember particular events from their early lives, they should discuss them in as much detail as possible and help children see their significance. Talking over events with an adult "gives a meaning to memories that children may not have before," says psychologist Judith Hudson of Rutgers University who has studied how mother-child interactions influence memories. Ask a child, "Remember when we went to the zoo? What did you see?" she suggests. "Suddenly, it's something to talk about and share."

Psychologist Robyn Fivush at Emory University, another early-memory expert, has shown that children whose mothers reminisce elaborately with them, eliciting their views and relating them to new experiences, at ages 3, 4 and 5, tend to have earlier first memories as well as better coping skills and higher self-esteem than those whose mothers don't. "We create a sense of who we are through these memories," says Dr. Fivush.

Traumatic events, such as the 9/11 terrorist attacks, also tend to become seared in children's memories. In a study titled "I Was Very, Very Crying," published in *Applied Cognitive Psychology* last year, Dr. Peterson and colleagues interviewed 145 children aged 2 to 13 who were treated in a hospital emergency room for injuries. Children who recalled crying a lot at the time were more likely to remember specific details two years later.

Yet most early childhood memories are far more mundane, which baffles experts and parents alike. Dr. Peterson says that when she asked parents of children in her studies to verify that the events they recall were real, "Many of them say, 'He remembered that? How

Scientists think the brain's prefrontal cortex processes experiences, using sensory input from the eyes, ears, nose and mouth, sorts them into categories, and tags the various memory fragments with specific associations (smells of home, friends from camp, bugs, a pet, for example).

When a memory cue comes in, the brain searches its circuits for related fragments and assembles them like a jigsaw puzzle. Some fragments bring associated fragments along, which is why one old memory often leads to others. Tastes and smells are particularly evocative, which is how Marcel Proust was famously able to construct a whole discourse on his childhood just by tasting a Madeleine, says Gayatri Devi, a neuropsychiatrist who specializes in memory problems in New York City.

Each time people bring up the same memory, those related fragments and circuits become stronger. "When you are 80 years old, remembering your kindergarten days, it's really the memory of a memory of a memory," says Dr. Devi.

That may help explain why children's earliest memories are so unstable: Their neural traces are weak and shallow, whereas the few memories we revisit as we get older lay down stronger traces.

Still, because the brain is constantly reassembling the fragments, they are vulnerable to distortion.

"It's possible to have a very detailed and vivid memory and be wrong about the details," says Dr. Hudson. As the distorted memory is repeatedly recalled, it can be very difficult to tell if the memory is or isn't real.

In one famous case, the Swiss psychologist Jean Piaget had vivid memories of being kidnapped at age 2 in Paris, complete with the kidnappers scratching his nurse's face. Years later, the nurse confessed to fabricating the story—but Piaget had heard his family discuss it so often that his mind created a false memory.



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Some therapists claim to be able to "recover" repressed memories of childhood traumas, but the field fell into disrepute in the 1980s when some unscrupulous therapists were found to be planting false memories of incest and child abuse.

Is it possible to recall more of your own childhood memories? Some researchers believe that people can access more if they have the right cues. Discussing past times with family members can jog the memories as well as offer different perspectives.

Photographs and letters are also helpful; knowing specific dates like the birth of a sibling or a move to a different house can help place fragmentary memories in

time.

Writing out early memories often brings up others. In fact, psychologists say writing one's life story can help people find meaning in their lives. "You can call it narcissism," says Dr. Hudson. "But we all carry about this collection of experiences, and if you can make sense of it, it can tell you who you were, who you are and who you are going to be in the future."

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