

Making the 'irrelevant' relevant to understand memory and aging

February 24 2011

Age alters memory. But in what ways, and why? These questions comprise a vast puzzle for neurologists and psychologists. A new study looked at one puzzle piece: how older and younger adults encode and recall distracting, or irrelevant, information. The results, published in *Psychological Science*, a journal of the Association of Psychological Science, can help scientists better understand memory and aging.

"Our world contains so much information; we don't always know which is relevant and which is irrelevant," said Nigel Gopie, who cowrote the study with Fergus I.M. Craik and Lynn Hasher, all from the University of Toronto's Rotman Research Institute. Most psychological scientists have focused on the relevant: on learning what we intend to learn. But the background noise also gets into our heads and influences our behavior—differently at different ages.

The study recruited about 125 subjects, in two groups, average ages 19 and 69. It tested two kinds of memory: "implicit" memory, which influences behavior without awareness, such as purchasing the snacks we've seen "product-placed" in a film; and "explicit" memory, the kind we enlist to reconstruct a shopping list left at home.

At the start, participants pressed buttons in response to the colors of words and random letter strings on a screen. What mattered was the color; the words themselves were irrelevant. Then they were instructed to complete word fragments. In one test, the earlier task wasn't mentioned; this accessed implicit memory. In the other, the subjects

were told to use words from the color task to complete the fragments, employing explicit memory.

The older people showed better implicit than explicit memory and better implicit memory than the younger. In the younger participants the pattern was reversed: better explicit than implicit memory and better explicit memory than their elders.

"We believe younger people remember in deep, elaborative ways: conceptually"—spontaneously creating semantic or imaginary associations among words and ideas, said Gopie. To find the study's words, "they had to search." They used explicit memory.

"Older people encode things 'perceptually,' in a more sensory way," he continued. They also don't filter out irrelevant stimuli. All of the information ends up "all over the place," and is more accessible in the implicit mode. When trying to remember explicitly—say, a person's name—elders are often stumped.

This shallower processing may be related to a decline in mental "resources" as we age. To test this, the researchers "made the younger people more like the older people" by taking away some of their resources. While performing the color task, participants had to listen to numbers and say the second of any two consecutive odd numbers aloud. While their attention was divided, the younger people performed as their elders did: better on implicit than explicit [memory](#).

The study suggests potential uses from age-specific marketing to assisting older learners. But it offers immediate lessons, too. "We're learning all the time, whether we know it or not," says Gopie. But we have only so much brain to process the information. When distracted, younger [adults](#) behaved just like older adults.

Provided by Association for Psychological Science

Citation: Making the 'irrelevant' relevant to understand memory and aging (2011, February 24)
retrieved 18 April 2024 from

<https://medicalxpress.com/news/2011-02-irrelevant-relevant-memory-aging.html>

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