

Basic elementary skill

# Unconscious memory system allows brain to prepare

By LORRAINE BROWN

University of Toronto psychology professor Dr. Endel Tulving says the human brain may have a separate, primitive type of memory that allows us to quickly recognize and understand objects or words we've seen before.

This unconscious memory system is called "priming", referring to the brain's ability to prepare or "prime" itself so that it can process with a minimum of effort information it has already taken in before.

Knowledge of how the system works may be helpful in assessing and treating certain perceptual disorders - for example, reading dif-

ficulties in children - and some amnesia patients.

Priming has been a subject of intensive research since 1970, when British researchers reported that people with amnesia could recognize lists of words they had seen a few moments before, providing they were given some visual cues in the form of a few letters from the words. (Normally, amnesiacs have no recall of recent events). Even though these people could not remember that they had been shown the word, they showed a perfectly normal ability to identify it when given a visual cue.

This ability remained even in peo-

ple who suffered 'organic' amnesia - a permanent amnesia caused by brain damage - as well as people with 'functional' amnesia - caused by psychological/emotional trauma, and usually temporary.

On the basis of the work with amnesia victims, researchers began devising simple tests to measure priming in people with normal memories. For example, testees were shown a list of words, then asked to recall them, as well as other words that had not been on the list, some time later. The subjects were given a few letters from each word as clues.

The researchers found the subjects were far more likely to recognize the words that had been on the earlier list. This simple test was a demonstration of priming.

"The whole point of priming is that it comes about by virtue of a person's having seen a word or shape once before," said Dr. Tulving. "It is entirely independent of the person's ability to remember the word. It's as if the two types of memory come from two parts of the brain working independently."

Priming is present in the very young and the very old. Unlike other forms of memory, it is unaffected by the use of alcohol or other drugs. A basic, elementary skill, it develops, both in species and in individuals, either before or simultaneously, with higher forms of learning, which would be impossible without it, Tulving says.

The identification of words is an important example of priming in children who are learning to read. A better understanding of priming

could lead to new ways to treat reading disorders.

"The reading process is very complex, with priming being only one facet of it," says Tulving. "But now we know that there are different types of memory, a child who is having trouble learning to read could be given priming tests to determine more exactly where the learning disorder exists."

He adds that a former colleague of his in Arizona is now using priming as the key in a new system for teaching basic life skills to organic amnesia victims. (Who don't retain what they've been taught by any conventional method).

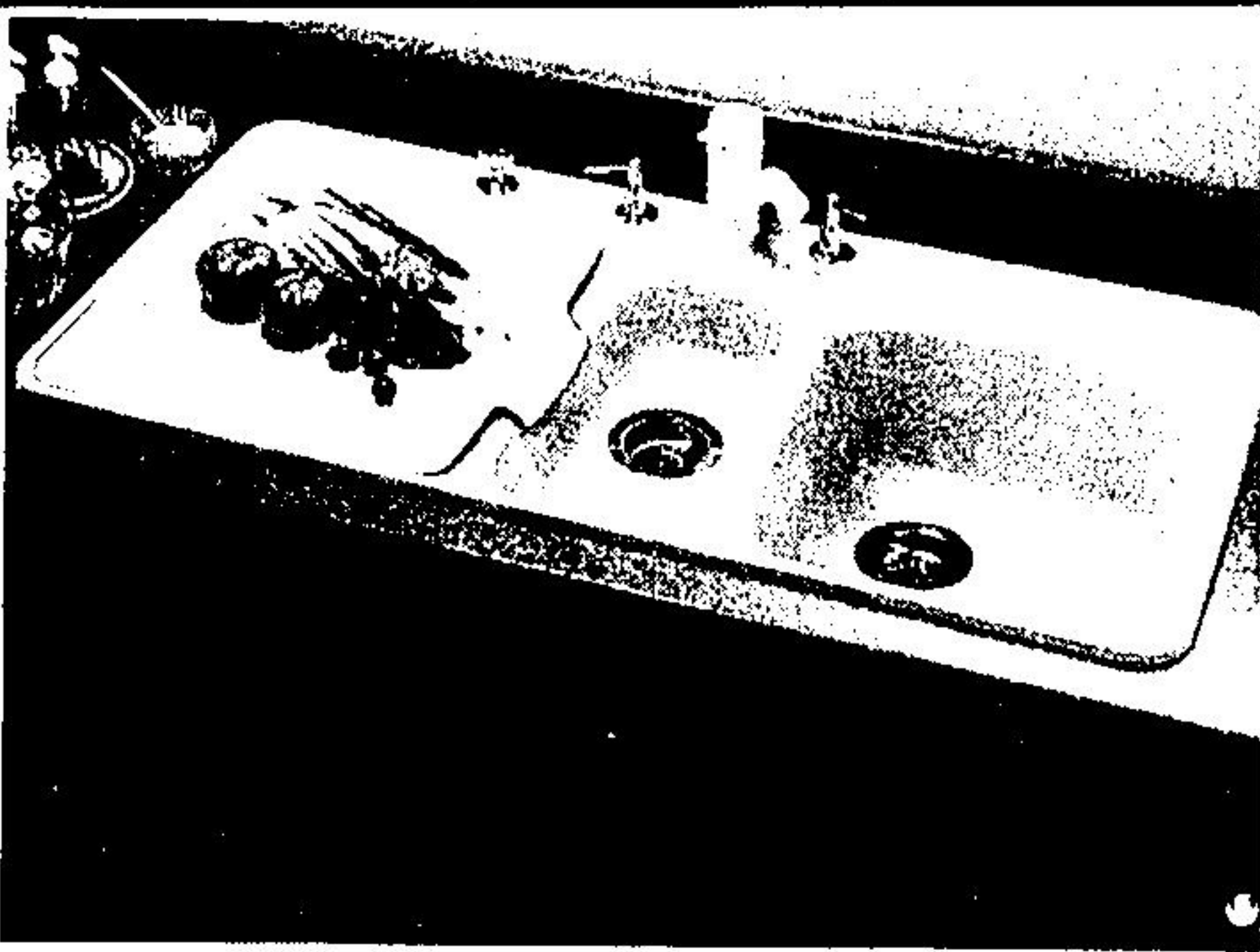
Priming is also called the Perception Recognition System, because it is so closely tied to the sense of vision. Tulving thinks that the priming mechanism may be located in the brain's occipital lobes - the portions responsible for processing visual information from the optic nerve. But similar priming effects also almost certainly occur in the other senses, such as hearing and smell, he adds.

Priming probably evolved before higher forms of memory. There is evidence that it occurs in other mammals, and also in lower vertebrate animals such as birds, reptiles and fish.

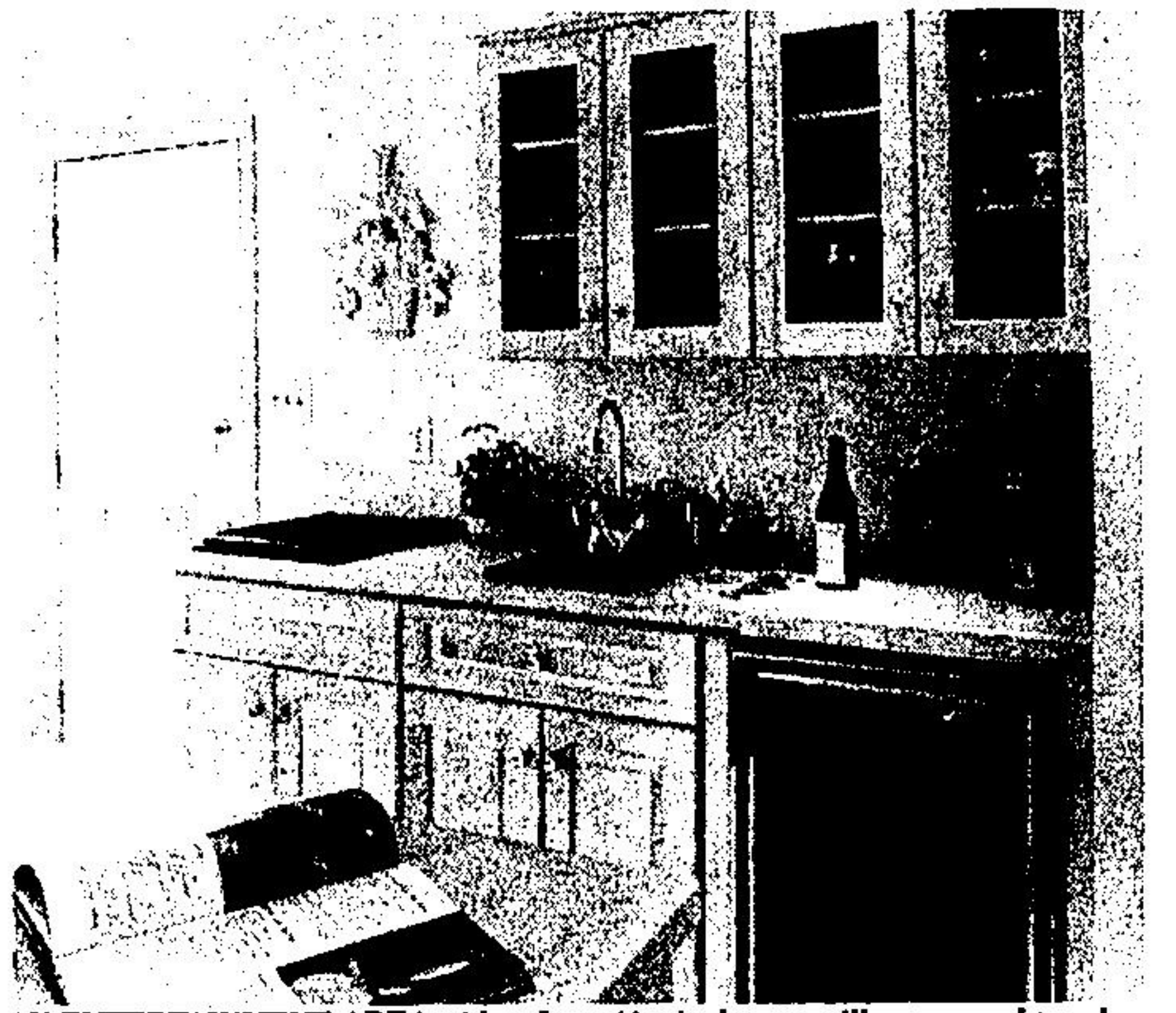
Priming may have developed out of animals' need to be able to react to dangerous situations without having the entire picture in their brain. For example, an antelope that has been 'primed' because it has run away from a tiger in the past will react much more quickly the next time it sees stripes moving in the grass. For it to see the whole tiger is not necessary.

Dr. Tulving's research is funded by the Natural Sciences and Engineering Research Council (NSERC).

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