Food recognition in 100-year-olds explains how semantic memory works

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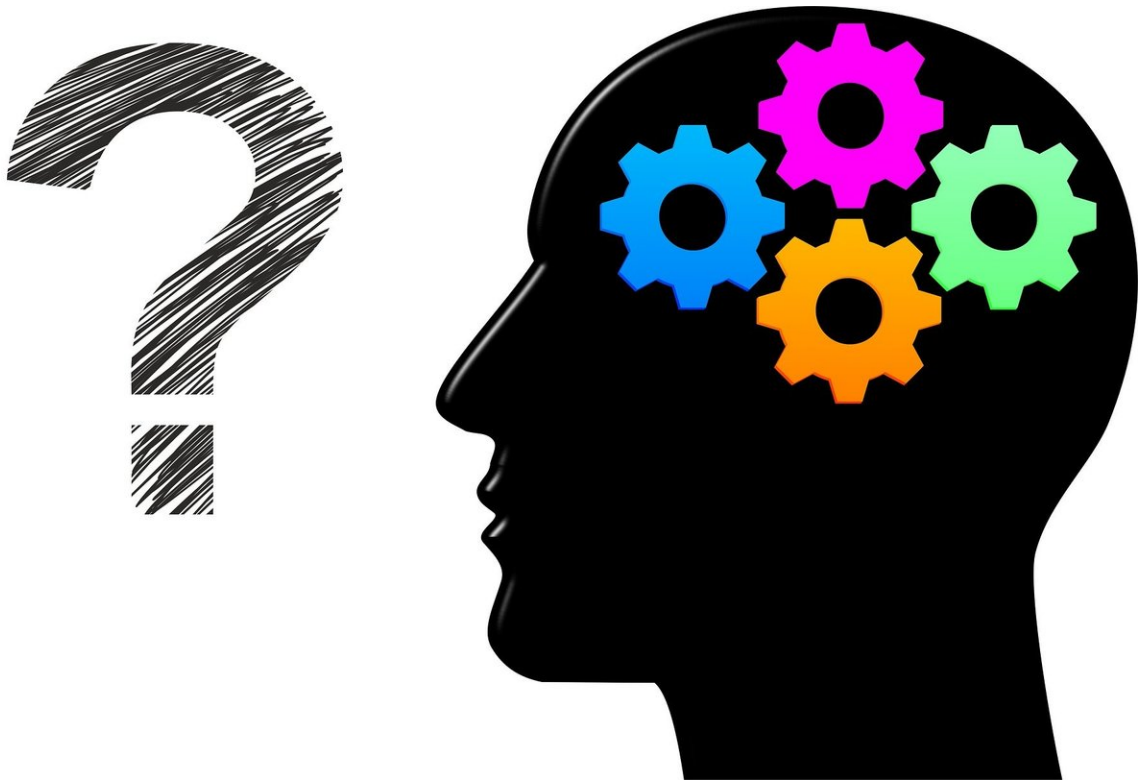

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A study by SISSA shows that, contrary to younger individuals, centenarians recognise natural foods more accurately than processed foods because they have eaten them with greater frequency over their lifetime. This result clarifies the mechanisms at the root of our semantic

memory, which do not appear to depend on the characteristics of food alone, but also on experience and eating habits over a lifetime.

Repeated lifelong experience models the semantic memory, which constitutes knowledge related to objects and events. This also relates to eating habits, which people recall with the greatest accuracy. This has been proven by a study enrolling people of various ages and a group of centenarians, led by a research team of SISSA-Scuola Internazionale Superiore di Studi Avanzati, coordinated by Raffaella I. Rumiati, in collaboration with the CAT project (Centenari a Trieste- Centenarians in Trieste). In this research, just published in *Scientific Reports*, the scientists compared the recognition of natural foods (such as tomatoes, apples or aubergines) and processed foods (such as hamburgers or pizza) of three groups of elderly individuals of different ages with their eating habits.

The key result is that the group of the oldest people, aged between 100 and 108 years, recognised and named natural foods with greater accuracy. This constitutes the same type of food that had been the basis of their diets for their entire lives, compared with processed foods, which they were less exposed to for reasons of age. The groups of younger elderly people showed opposite results, in line with their eating habits. These results shed new light on the understanding of how our semantic memory works. The research shows how this type of memory develops also in virtue of the experience accumulated throughout life. Furthermore, according to the results, semantic memory would seem to remain stable until very late in life, declining only in the last decade of life.

"Semantic memory allows us to acquire and save information on facts, episodes and abstract knowledge. The way in which the knowledge is organised allows us not only to give meaning and a name to what we have already encountered in life, but also to understand environmental

stimuli more easily," explains Miriam Vignardo, first author of the research. "It differentiates itself from episodic memory that collects specific events and the context in which they occurred. Few studies have up to now investigated the role of experience in organising semantic memory. This is what we tried to do with this study."

"For this study, we focused on food for its biological relevance and for the fact that its consumption has changed over time. What was eaten by those born in 1910 is certainly different to what someone born in the following decades ate," explains Vignando. "This allowed us to compare distinct groups by period of birth and different eating experiences."

The scientists enrolled three age groups of participants: the first aged between 54 and 74, the second between 75 and 91, and the third between 100 and 108. Each of them took psycholinguistic tests, including different foods as stimuli. The centenarians, as well as a subset of 37 among the younger elderly adults, were also asked to describe the eating habits of a lifetime.

"According to their answers, the diets of centenarians always included a larger amount of natural foods. This is reflected in their ability to name with greater accuracy the latter, compared with the processed foods, which they had less contact with during their lifetime." The other two groups showed the opposite behaviour, i.e. faring much better with processed foods, which have been more frequent in their diet: "This means that the cultural context, habits and experiences pursued for many years can affect our semantic memory, even attenuating the biologically determined food characteristics, like the level of processing, perhaps in virtue of a higher caloric intake," explains Miriam Vignando.

The decline of semantic memory

Unlike episodic memory, which tends to decline with aging, the function

of semantic memory was considered not to be compromised until a very old age. The study by SISSA has confirmed and extended this data investigating this ability in a sample of centenarians: "In our study, we observed that from 90 years of age on, there is also a rather evident and pronounced decline in this function. Understanding how semantic memory changes as people get older, is particularly important because a sign of its decline could be used as a possible early indicator of the onset of neurodegenerative diseases."

More information: Miriam Vignando et al, How experience modulates semantic memory for food: evidence from elderly adults and centenarians, *Scientific Reports* (2018). DOI: 10.1038/s41598-018-24776-3

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