

# Actively speaking two languages protects against cognitive impairment

September 21 2020, by Cristina Sáez

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Languages are used to convey thoughts, identity, knowledge, and the way people see and understand the world. Mastering more than one language provides a gateway to other cultures, and according to a team of

researchers led by scientists from the Universitat Oberta de Catalunya (UOC) and Pompeu Fabra University (UPF), actively using them also brings neurological benefits and protects people from cognitive impairment associated with aging.

In a paper published in *Neuropsychologia*, the researchers conclude that speaking two languages on a regular basis—and having done so all one's life—enhances [cognitive reserve](#) and delays the appearance of symptoms associated with [cognitive decline](#) and dementia.

"The prevalence of dementia in countries where more than one language is spoken is 50% lower than in those regions where the population uses only one language to communicate," said researcher Marco Calabria, professor at the UOC Faculty of Health Sciences and member of the University's Cognitive NeuroLab research group and the Speech Production and Bilingualism research group, at the UPF.

Previous work had already found that the lifelong use of two or more languages could be a key factor in increasing cognitive reserve and delaying the onset of dementia, as well as offering advantages for memory and [executive functions](#).

"We wanted to discover the mechanism through which [bilingualism](#) contributes to cognitive reserve in cases of mild [cognitive impairment](#) and Alzheimer's, and whether there were differences in terms of the benefit gained from different degrees of bilingualism, and not only between monolingual and bilingual people," said Calabria, who led the study.

Therefore, unlike in previous studies, the researchers established a bilingualism gradient: from people who speak only one language but are passively exposed to another, to individuals who have excellent proficiency in both and use them indiscriminately on a day-to-day basis.

To create this gradient, several variables were taken into account, including the age of acquisition of the second language, the use made of each language, and switching between languages in the same context.

The researchers focused on the population of Barcelona, where the use of Catalan and Spanish is highly variable, with some predominantly Catalan-speaking neighborhoods and others where Spanish is the main language. "We wanted to take advantage of this variability, and instead of comparing monolingual and bilingual people, we looked at whether in Barcelona—where everyone is more or less bilingual—there was a certain degree of bilingualism that had neuroprotective benefits," explained Calabria.

## **Bilingualism and Alzheimer's**

They recruited 63 healthy individuals, 135 patients with mild cognitive impairment such as memory loss, and 68 people with Alzheimer's—the most prevalent type of dementia—in four hospitals in Barcelona and the metropolitan area. They used a questionnaire to establish proficiency in Catalan and Spanish and ascertain each person's degree of bilingualism. They then correlated this degree with the age of neurological diagnosis and the onset of symptoms.

To better understand the origin of cognitive advantage, they asked participants to perform various cognition tasks, focusing primarily on the executive control system, as previous studies have suggested that this is the source of the benefit. In total, the participants performed five tasks in two sessions, such as memory tests and cognitive control.

"We saw that the people with a higher degree of bilingualism received a diagnosis of mild cognitive impairment later than those who were passive bilinguals," said Calabria, who surely considers speaking two languages and regularly switching from one to the other to be lifelong

training for the brain. According to this researcher, such linguistic gymnastics is related to other cognitive functions, such as executive control, which kicks in when we perform several actions at once, for example when we drive, to help us filter out relevant information.

The brain's executive control system is related to the system used to control two languages: It has to switch between them, making the brain focus on one and then the other, to avoid one language intruding into the other when we speak.

Calabria says, "In the context of neurodegenerative diseases, this system could offset symptoms. So when something is not functioning well due to the disease, thanks to the fact that it is bilingual, the brain has efficient alternative systems for resolving the problem. We have seen that the more you use both languages and the better your [language](#) skills, the more neuroprotective advantage you have. In fact, active bilingualism is an important predictor of delay in the onset of symptoms of mild cognitive impairment—a preclinical phase of Alzheimer's disease—because it contributes to cognitive reserve."

Now, researchers want to see whether bilingualism is also beneficial for other diseases, such as Parkinson's and Huntington's disease.

**More information:** Marco Calabria et al, Active bilingualism delays the onset of mild cognitive impairment, *Neuropsychologia* (2020). [DOI: 10.1016/j.neuropsychologia.2020.107528](https://doi.org/10.1016/j.neuropsychologia.2020.107528)

Provided by Universitat Oberta de Catalunya

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