

Ellen Bialystok: Bilingual brains are more healthy

Looking at Alzheimer's patients, Canadian neuroscientist Ellen Bialystok finds that people who speak two languages cope significantly better with the disease.

Ellen Bialystok is a cognitive neuroscientist whose research has shown that speaking two or more languages on a regular basis from a young age can have a positive effect on the brain. Not only does it enhance cognitive abilities, being bilingual can also delay symptoms of Alzheimer's disease. Bialystok, 62, is a distinguished research professor of psychology at York University in Toronto, Canada. Last year, she was awarded a \$100,000 [Killam](#) prize for her contributions to the social sciences.

What was the first indication in your research that bilingualism had neurological benefits?

It came from children's ability to understand the structure of [language](#) as well as the meaning. This is called metalinguistic knowledge, and it's the key to using language for learning, for literacy, for thinking, for logic. To assess how far along they are in metalinguistic development, we would ask children between the ages of five and nine to judge whether or not a sentence is grammatically correct, however nonsensical it may be. The example I use is: "Apples grow on noses." It's very hard for kids to say that's OK grammatically: they want to tell you that apples don't grow on noses. We found that bilingual children were better able to do this.

Why?

It relates to the essential problem of bilingualism. When a bilingual person is speaking in one language, research shows that the other language is active in his or her mind. That creates a problem: how do you select from the language you need without this other active language getting in the way? In my view, you incorporate a cognitive system called the executive control system, whose job it is to resolve competition and focus attention. If you're bilingual, you are using this system all the time, and that enhances and fortifies it. And that's why bilingual children can say that "Apples grow on noses" is said the right way: they are accustomed to resolving the conflict between form and meaning.

Metalinguistic superiority aside, what other advantages are there?

The cognitive enhancement across the life span of a bilingual person is quite dramatic. It turns out that something as ordinary as speaking a couple of languages reconfigures the brain network in a way that positively affects certain things that brains do.

Can you give an example?

We did a study at the [Baycrest](#) geriatric centre in Toronto in which we identified 200 clear cases of Alzheimer's disease and looked at the patients' backgrounds to see if they were mono- or bilingual. Then we looked at how old they were when the family noticed something was wrong and when they were formally diagnosed. In both cases the bilinguals were significantly older, by about four years. We repeated that study using another 200 patients and got identical results.

What conclusion did you arrive at?

It was possible that bilingualism protected the brain and they didn't get Alzheimer's disease as soon, but I never thought that. We did a second study with 20 monolinguals and 20 bilinguals, all about 75 years old. They had all been diagnosed with Alzheimer's, and they were at exactly the same cognitive level, so you would expect them to have the same level of damage in the medial-temporal cortex. But when we looked at their brains, we found that the bilinguals had significantly more damage than the monolinguals. They had more advanced Alzheimer's but they were functioning at the same level. That's the advantage: they could cope with the disease better.

Do you have to be bilingual from a young age to experience cognitive and health-related benefits?

It's very hard to know. My view is that late-life language learning is probably beneficial, not because of bilingualism but because learning a language is a stimulating mental activity and a good way to exercise your brain.

Are the benefits cumulative? If you speak three or more languages fluently, will you be three or more times better off?

There are hints of evidence supporting the idea that three languages are better than two. But here's the problem. The vast majority of bilinguals did not choose to become bilingual because they had a talent for languages: they became bilingual because life required them to. Trilingualism is usually more of a choice, a luxury option associated with intelligence, language talent and education. The benefits are more difficult to measure.

In Britain, we are notoriously bad at learning foreign languages because we have English to rely on. Does this mean that nations that do not speak a globally recognized language have healthier brains?

That's the logical prediction but the reality is much more complicated. When we do our research we go to great pains to make sure that the people in the two groups are the same on everything else we can think of measuring. When you move across nations, you have national differences in wealth, education, social circumstances, health, etc, that contribute to healthy [ageing](#), for example, so finding a difference between two nations is very difficult.

Should curriculum setters take notice?

Language should be a central part of the curriculum but not because bilingualism postpones the onset of dementia: any intellectually engaged activity requiring intense involvement will keep your brain healthy. Learning other languages is important because it helps you understand other people, other cultures, other ways of thinking. Even if it didn't change your brain, there are just so many benefits.