Bilingualism and the Brain

Why you should call your Mamusha every day!

New research shows individuals who speak two languages experience memory loss later than individuals who speak only one.

BY KRYSTYNA LAGOWSKI

Please don't tell my mother it's actually good for my brain to call her every day.

Since I grew up speaking both English and Polish, I'm what Baycrest psychologist Dr. Ellen Bialystok calls a perfect example of a bilingual person.

And according to a study done by Dr. Bialystok, a distinguished research professor at York University, and her Baycrest colleagues, psychologist Dr. Fergus Craik and neurologist Dr. Morris Freedman, bilingualism may delay the onset of Alzheimer's disease and other dementias by up to four years. ▶

So when I asked Dr. Bialystok if that means I should call my mother every day to flex my bilingual chops, she chuckled but vehemently agreed. She said it wasn't enough to read a Polish book, watch Polish television or listen to a Polish CD. No, I actually have to speak Polish, in a setting where it's natural.

"The key is speaking," says Dr. Bialystok. "When you are a person who has the ability to speak two languages and you do so daily, every time you open your mouth to speak, both languages are available. You need a mechanism to keep focussed.

"Your brain already has a built-in mechanism to control attention – a set of cognitive processors in the front of the brain called the 'executive function.' Every time you speak, it becomes a matter of executive control. And the more you use it, the better it gets," she says.

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In their recent study, Drs. Bialystok, Craik and Freedman examined the diagnostic records of 184 patients who visited Baycrest's Sam and Ida Ross Memory Clinic between 2002 and 2005 for cognitive complaints. The group of patients included 93 who were bilingual, and 91 who were monolingual.

Although they had expected to find some differences between the two groups, they were astonished to find that bilingual patients experienced memory loss or other symptoms of dementia an average of four years later than monolingual patients.

Four years is a dramatic length of time for the disease to be delayed, according to the researchers, with important implications for the family and for the health-care system.

"Bilingual people develop better attention skills because their executive control is used for an ordinary activity like speaking. When we give cognitive tasks to monolinguals and bilinguals that require focussing attention where there is distraction, bilinguals will do it better," says Dr. Bialystok.

So when I go to a Polish restaurant on Roncesvalles, and the waitress says, "Hello, *dzien dobry*," and I ask about the soup of the day in Polish, this is how bilingualism is supposed to work?

"You open your mouth and Polish comes out," says Dr. Bialystok.

Dr. Ellen Bialystok

"The context has primed one of your languages. That's exactly the point. You could have asked her about the soup in English but the context, the fact that you're speaking to this person, has primed your other language. ▶

"When I say you have to control attention and inhibit the other language, you're not doing it consciously. You need to be able to switch and speak in both languages," she says.

But what exactly happens to delay Alzheimer's and other dementias? How does speaking Polish every day to my mother keep my brain healthy?

Dr. Bialystok says she believes it's part of building up a "cognitive reserve" in the brain. "All the stimulating things you do – from speaking two languages, going to a social group, doing crossword puzzles – create a cognitive reserve. For reasons nobody has been able to explain yet, if you stay cognitively active and maintain a mentally stimulating lifestyle, you can continue functioning at a much higher level."

Her colleague, Dr. Craik, a world-renowned authority on age-related changes in memory processes, says, "We don't know for sure how cognitive reserve works. I like to use the analogy that it's like squeezing better performance out of a weaker machine."

Officially, Alzheimer's disease cannot be confirmed without an autopsy. "When you open up the brain of an Alzheimer's patient, the brain is riddled with amyloid plaques and neurofibrillary tangles," he says. "They are assumed to clog up the brain and essentially cause dementia."

Dr. Craik theorizes that poor cognitive performance may be due to decreased connectivity in the brain. "As you get older, the connections among neurons, which are typically in the thousands for a young adult or child, shrivel up. A young and healthy adult neuron has branches going out in all directions. But a neuron from a person in their 70s and 80s is much more shriveled, with relatively few connections," he says. "You multiply that by several million and you get the picture that the brain is less efficient."

> *"[Bilinguals] are able to squeeze better performance out of a weaker machine."*

Dr. Bialystok explains that sometimes an autopsy can reveal a brain that is full of plaques and tangles, a sure sign of Alzheimer's, but when you ask the family if their loved one suffered from dementia they may be surprised. To Dr. Bialystok, that would mean the person was able to use their cognitive reserve to function, even though their brain was actually deteriorating.

Dr. Bialystok offers the example of two seniors – one is a 75-year-old bilingual, the other is a 71-year-old monolingual; both have been diagnosed with Alzheimer's. "If you give each of them cognitive tests and the results are the same for both, the prediction would be that the brain of the bilingual would be in much worse shape than the younger senior even though they are functioning at the same level.

"They're able to squeeze higher performance out of a much more broken machine," she says. "That's the cognitive reserve. However, the size of the reserve you can build is still to be determined."

The next step for Dr. Bialystok and her colleagues will be visiting their patients at home and doing detailed cognitive tests, which were not done in the original study. "We're doing home visits every six months to track their progression, and have already replicated the original effect. Bilinguals are showing onset symptoms significantly later, four to five years later.

"We want to get more data to see what happens with the cognitive progression over the long run," she says.

In the meantime, Dr. Bialystok says it's too soon to recommend brushing up on your high school French or signing up for language classes, since the results of her study only dealt with lifelong bilingualism.

Now, if you'll kindly excuse me…I have to call my mother. ■