

The Bilingual Advantage

A cognitive neuroscientist, Ellen Bialystok has spent almost 40 years learning about how bilingualism sharpens the mind. Her good news: Among other benefits, the regular use of two languages appears to delay the onset of Alzheimer's disease symptoms. Dr. Bialystok, 62, a distinguished research professor of psychology at York University in Toronto, was awarded a \$100,000 Killam Prize last year for her contributions to social science. We spoke for two hours in a Washington hotel room in February and again, more recently, by telephone. An edited version of the two conversations follows.

Q. How did you begin studying bilingualism?

A. You know, I didn't start trying to find out whether bilingualism was bad or good. I did my doctorate in psychology: on how children acquire language. When I finished graduate school, in 1976, there was a job shortage in Canada for Ph.D.'s. The only position I found was with a research project studying second language acquisition in school children. It wasn't my area. But it was close enough.

As a psychologist, I brought neuroscience questions to the study, like "How does the acquisition of a second language change thought?" It was these types of questions that naturally led to the bilingualism research. The way research works is, it takes you down a road. You then follow that road.

Q. So what exactly did you find on this unexpected road?

A. As we did our research, you could see there was a big difference in the way monolingual and bilingual children processed language. We found that if you gave 5- and 6-year-olds language problems to solve, monolingual and bilingual children knew, pretty much, the same amount of language.

But on one question, there was a difference. We asked all the children if a certain illogical sentence was grammatically correct: "Apples grow on noses." The monolingual children couldn't answer. They'd say, "That's silly" and they'd stall. But the bilingual children would say, in their own words, "It's silly, but it's grammatically correct." The bilinguals, we found, manifested a cognitive system with the ability to attend to important information and ignore the less important.

Q. How does this work — do you understand it?

A. Yes. There's a system in your brain, the executive control system. It's a general manager. Its job is to keep you focused on what is relevant, while ignoring distractions. It's what makes it possible for you to hold two different things in your mind at one time and switch between them.

If you have two languages and you use them regularly, the way the brain's networks work is that every time you speak, both languages pop up and the executive control system has to sort through everything and attend to what's relevant in the moment. Therefore the bilinguals use that system more, and it's that regular use that makes that system more efficient.

Q. One of your most startling recent findings is that bilingualism helps forestall the symptoms of Alzheimer's disease. How did you come to learn this?

A. We did two kinds of studies. In the first, published in 2004, we found that normally aging bilinguals had better cognitive functioning than normally aging monolinguals. Bilingual older adults performed better than monolingual older adults on executive control tasks. That was very impressive because it didn't have to be that way. It could have turned out that everybody just lost function equally as they got older.

That evidence made us look at people who didn't have normal cognitive function. In our next studies, we looked at the medical records of 400 Alzheimer's patients. On average, the bilinguals showed Alzheimer's symptoms five or six years later than those who spoke only one language. This didn't mean that the bilinguals didn't have Alzheimer's. It meant that as the disease took root in their brains, they were able to continue functioning at a higher level. They could cope with the disease for longer.

Q. So high school French is useful for something other than ordering a special meal in a restaurant?

A. Sorry, no. You have to use both languages all the time. You won't get the bilingual benefit from occasional use.

Q. One would think bilingualism might help with multitasking — does it?

A. Yes, multitasking is one of the things the executive control system handles. We wondered, "Are bilinguals better at multitasking?" So we put monolinguals and bilinguals into a driving simulator. Through headphones, we gave them extra tasks to do — as if they were driving and talking on cellphones. We then measured how

much worse their driving got. Now, everybody's driving got worse. But the bilinguals, their driving didn't drop as much. Because adding on another task while trying to concentrate on a driving problem, that's what bilingualism gives you — though I wouldn't advise doing this.

Q. Has the development of new neuroimaging technologies changed your work?

A. Tremendously. It used to be that we could only see what parts of the brain lit up when our subjects performed different tasks. Now, with the new technologies, we can see how all the brain structures work in accord with each other.

In terms of monolinguals and bilinguals, the big thing that we have found is that the connections are different. So we have monolinguals solving a problem, and they use X systems, but when bilinguals solve the same problem, they use others. One of the things we've seen is that on certain kinds of even nonverbal tests, bilingual people are faster. Why? Well, when we look in their brains through neuroimaging, it appears like they're using a different kind of a network that might include language centers to solve a completely nonverbal problem. Their whole brain appears to rewire because of bilingualism.

Q. Bilingualism used to be considered a negative thing — at least in the United States. Is it still?

A. Until about the 1960s, the conventional wisdom was that bilingualism was a disadvantage. Some of this was xenophobia. Thanks to science, we now know that the opposite is true.

Q. Many immigrants choose not to teach their children their native language. Is this a good thing?

A. I'm asked about this all the time. People e-mail me and say, "I'm getting married to someone from another culture, what should we do with the children?" I always say, "You're sitting on a potential gift."

There are two major reasons people should pass their heritage language onto children. First, it connects children to their ancestors. The second is my research: Bilingualism is good for you. It makes brains stronger. It is brain exercise.

Q. Are you bilingual?

A. Well, I have fully bilingual grandchildren because my daughter married a Frenchman. When my daughter announced her engagement to her French boyfriend, we were a little surprised. It's always astonishing when your child announces she's getting married. She said, "But Mom, it'll be fine, our children will be bilingual!"