Article

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My Two Minds

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Learning Outcomes

After reading this article, you will be able to:

- Discuss the origins of human linguistic diversity.
- Discuss the advantages of being bilingual.

When I was just a newborn baby, my mother gazed down at me in her hospital bed and did something that was to permanently change the way my brain developed. Something that would make me better at learning, multitasking and solving problems. Eventually, it might even protect my brain against the ravages of old age. Her trick? She started speaking to me in French.

At the time, my mother had no idea that her actions would give me a cognitive boost. She is French and my father English, so they simply felt it made sense to raise me and my brothers as bilingual. Yet as I've grown up, a mass of research has emerged to suggest that speaking two languages may have profoundly affected the way I think.

Cognitive enhancement is just the start. According to some studies, my memories, values, even my personality, may change depending on which language I happen to be speaking. It is almost as if the bilingual brain houses two separate minds. All of which highlights the fundamental role of language in human thought. "Bilingualism is quite an extraordinary microscope into the human brain," says neuroscientist Laura Ann Petitto of Gallaudet University in Washington DC.

The view of bilingualism has not always been this rosy. For many parents like mine, the decision to raise children speaking two languages was controversial. Since at least the 19th century, educators warned that it would confuse the child, making them [sic] unable to learn either language properly. At best, they thought the child would become a jack-of-all-trades and master of none. At worst, they suspected it might hinder other aspects of development, resulting in a lower IQ.

These days, such fears seem unjustified. True, bilingual people tend to have slightly smaller vocabularies in each language than their monolingual peers, and they are sometimes slower to reach for the right word when naming objects. But a key study in the 1960s by Elizabeth Peal and Wallace Lambert at McGill University in Montreal, Canada, found that the ability to speak two languages does not stunt overall development. On the contrary, when controlling for other factors which might also affect performance, such as socioeconomic status and education, they found that bilinguals outperformed monolinguals in 15 verbal and non-verbal tests (*Psychological Monographs,* vol 76, no 27, p. 1).

Unfortunately, their findings were largely overlooked. Although a trickle of research into the benefits of bilingualism followed their study, most researchers and educators continued to cling to the old ideas. It is only within the last few years that bilingualism has received the attention it deserves. "For 30 years I've been sitting in my little dark room doing my thing and suddenly in the last five years it's like the doors have swung open," says Ellen Bialystok, a psychologist at York University in Toronto, Canada.

In part, the renewed interest comes from recent technological developments in neuroscience, such as functional near-infrared spectroscopy (fNIRS)—a form of brain imaging that acts as a silent and portable monitor, peering inside the brains of babies as they sit on their parents' laps. For the first time, researchers can watch young babies' brains in their initial encounters with language.

Using this technique, Petitto and her colleagues discovered a profound difference between babies brought up speaking either one or two languages. According to popular theory, babies are born "citizens of the world," capable of discriminating between the sounds of any language. By the time they are a year old, however, they are thought to have lost this ability, homing in exclusively on the sounds of their mother tongue. That seemed to be the case with monolinguals, but Petitto's study found that bilingual children still showed increased neural activity in response to completely unfamiliar languages at the end of their first year (*Brain and Language,* vol 121, p. 130).

She reckons the bilingual experience "wedges open" the window for learning language. Importantly, the children still reached the same linguistic milestones, such as their first word, at roughly the same time as monolingual babies, supporting the idea that bilingualism can invigorate rather than hinder a child's development. This seems to help people like me acquire new languages throughout our lives. "It's almost like the monolingual brain is on a diet, but the bilingual brain shows us the full, plump borders of the language tissue that are available," says Petitto.

Indeed, the closer the researchers looked, the more benefits they discovered, some of which span a broad range of skills.

Bialystok first stumbled upon one of these advantages while asking children to spot whether various sentences were grammatically correct. Both monolinguals and bilinguals could see the mistake in phrases such as "apples growed on trees," but differences arose when they considered nonsensical sentences such as "apples grow on noses." The monolinguals, flummoxed by the silliness of the phrase, incorrectly reported an error, whereas the bilinguals gave the right answer (*Developmental Psychology,* vol 24, p. 560).

Bialystok suspected that rather than reflecting expertise in grammar, their performance demonstrated improvement in what is called the brain's "executive system," a broad suite of mental skills that centre on the ability to block out irrelevant information and concentrate on a task at hand. In this case, they were better able to focus on the grammar while ignoring the meaning of words. Sure enough, bilingual kids in subsequent studies aced a range of problems that directly tested the trait. Another executive skill involves the ability to switch between different tasks without becoming confused, and bilinguals are better at these kinds of challenges too. When categorising objects, for instance, they can jump from considering the shape to the colour without making errors (*Bilingualism: Language and Cognition,* vol 13, p. 253).

A Second Viewpoint

These traits are critical to almost everything we do, from reading and mathematics to driving. Improvements therefore result in greater mental flexibility, which may explain why the bilingual people performed so well in Peal and Lambert's tests, says Bialystok.

Its virtues may even extend to our social skills. Paula Rubio-Fernández and Sam Glucksberg, both psychologists at Princeton University, have found that bilinguals are better at putting themselves in other people's shoes to understand their side of a situation. This is because they can more easily block out what they already know and focus on the other viewpoint (*Journal of Experimental Psychology: Learning, Memory and Cognition,* vol 38, p. 211).

So what is it about speaking two languages that makes the bilingual brain so flexible and focused? An answer comes from the work of Viorica Marian at Northwestern University in Evanston, Illinois, and colleagues, who used eye-tracking devices to follow the gaze of volunteers engaged in various activities. In one set-up, Marian placed an array of objects in front of Russian-English bilinguals and asked them to "pick up the marker," for example.

The twist is that the names of some of the objects in the two languages sound the same but have different meanings. The Russian word for stamp sounds like "marker," for instance, which in English can mean *pen.* Although the volunteers never misunderstood the question, the eye-tracker showed that they would quickly glance at the alternative object before choosing the correct one (*Bilingualism: Language and Cognition,* vol 6, p. 97).

This almost-imperceptible gesture gives away an important detail about the workings of the bilingual brain, revealing that the two languages are constantly competing for attention in the back of our minds. As a result, whenever we bilinguals speak, write, or listen to the radio, our brain is busy choosing the right word while inhibiting the same term from the other language. It is a considerable test of executive control—just the kind of cognitive workout, in fact, that is common in many commercial "brain-training" programs, which often require you to ignore distracting information while tackling a task.

It did not take long for scientists to wonder whether these mental gymnastics might help the brain resist the ravages of ageing. After all, there is plenty of evidence to suggest that other forms of brain exercise can create "cognitive reserve," a kind of mental padding that cushions the mind against age-related decline. To find out, Bialystok and her colleagues collected data from 184 people diagnosed with dementia, half of whom were bilingual. The results, published in 2007, were startling—symptoms started to appear in the bilingual people four years later than in their monolingual peers (*Neuropsychologia,* vol 45, p. 459). Three years later, they repeated the study with a further 200 people showing signs of Alzheimer's disease. Again, there was around a five-year delay in the onset of symptoms in bilingual patients (*Neurology,* vol 75, p. 1726). The results held true even after factors such as occupation and education were taken into account. "I was as surprised as anyone that we found such large effects," Bialystok says.

Besides giving us bilinguals a brain boost, speaking a second language may have a profound effect on behaviour.

Neuroscientists and psychologists are coming to accept that language is deeply entwined with thought and reasoning, leading some to wonder whether bilingual people act differently depending on which language they are speaking. That would certainly tally with my experience. People often tell me that I seem different when I speak English compared with when I speak French.

Such effects are hard to characterise, of course, since it is not easy to pull apart the different strands of yourself. Susan Ervin-Tripp, now at the University of California, Berkeley, found an objective way to study the question in the 1960s, when she asked Japanese-English bilinguals to complete a set of unfinished sentences in two separate sessions—first in one language, then the other. She found that her volunteers consistently used very different endings depending on the language. For example, given the sentence "Real friends should" a person using Japanese replied "help each other out," yet in English opted for "be very frank." Overall, the responses seemed to reflect how monolinguals of either language tended to complete the task. The findings led Ervin-Tripp to suggest that bilinguals use two mental channels, one for each language, like two different minds.

Her theory would seem to find support in a number of recent studies. David Luna from Baruch College in New York City and colleagues, for example, recently asked bilingual English-Spanish volunteers to watch TV adverts featuring women—first in one language and then six months later in the other—and then rate the personalities of the characters involved. When the volunteers viewed the ads in Spanish, they tended to rate the women as independent and extrovert, but when they saw

the advert in English they described the same characters as hopeless and dependent (*Journal of Consumer Research,* vol 35, p. 279). Another study found that Greek-English bilinguals reported very different emotional reactions to the same story depending on the language—finding themselves "indifferent" to the character in one version, but feeling "concerned" for his progress in the other, for example (*Journal of Multilingual and Multicultural Development,* vol 25, p. 124).

One explanation is that each language brings to mind the values of the culture we experienced while learning it, says Nairán Ramírez-Esparza, a psychologist at the University of Washington in Seattle. She recently asked bilingual Mexicans to rate their personality in English and Spanish questionnaires. Modesty is valued more highly in Mexico than it is in the US, where assertiveness gains respect, and the language of the questions seemed to trigger these differences. When questioned in Spanish, each volunteer was more humble than when the survey was presented in English.

Some of the behavioural switches may be intimately linked to the role of language as a kind of scaffold that supports and structures our memories. Many studies have found that we are more likely to remember an object if we know its name, which may explain why we have so few memories of early childhood. There is even some evidence that the grammar of a language can shape your memory. Lera Boroditsky at Stanford University in California recently found that Spanish speakers are worse at remembering who caused an accident than English speakers, perhaps because they tend to use impersonal phrases like "Se rompió el florero" ("the vase broke itself") that do not state the person behind the event (*Psychonomic Bulletin Review,* vol 18, p. 150).

The result seems to be that a bilingual person's recollections will change depending on the language they are [sic] speaking. In a clever but simple experiment, Marian and Margarita Kaushanskaya, then at Northwestern University, asked Mandarin-English bilinguals a general knowledge question, first in one language then the other. For instance, they were asked to "name a statue of someone standing with a raised arm while looking into the distance." They found people were more likely to recall the Statue of Liberty when asked in English, and a statue of Mao when asked in Mandarin (*Psychonomic Bulletin & Review,* p. 14, vol 925). The same seems to occur when bilinguals recall personal, autobiographical memories. "So childhood memories will come up faster and more often when you are reinstating that language," Marian says.

Despite the recent progress, the researchers may just be seeing the tip of the iceberg when it comes to the impact of bilingualism, and many questions remain. Chief among them will be the question of whether any monolingual person could cash in on the benefits. If so, what better incentive to bolster language education in schools, which is flagging in both the UK and US.

Much has been made of the difficulties of learning a new language later in life, but the evidence so far suggests the effort should pay off. "You can learn another language at any age, you can learn it fluently, and you can see benefits to your cognitive system," says Marian. Bialystok agrees that late language-learners gain an advantage, even if the performance boost is usually less pronounced than in bilingual speakers. "Learn a language at any age, not to become bilingual, but just to remain mentally stimulated," she says. "That's the source of cognitive reserve."

As it is, I'm grateful that particular challenge is behind me. My mother could never have guessed the extent to which her words would change my brain and the way I see my world, but I'm certain it was worth the effort. And for all that I just have to say: Merci!

Critical Thinking

1. What was the view of educators regarding bilingualism from the 19th century until recently?
2. What has recent evidence shown regarding bilinguals?
3. How has new technology sparked renewed interest in this subject?
4. What has been the popular theory regarding babies learning language? How do bilingual babies compare with monolingual babies with respect to acquiring new languages? With respect to spotting grammatical correctness in sentences?
5. What skill differences have been showing up in further tests?
6. In what ways do these skills extend beyond the linguistic?
7. What do such studies reveal about "executive control" in bilinguals?
8. What appears to be the relationship between "gymnastic abilities" and resistance to the ravages of aging?
9. What is the evidence that bilinguals are affected by the language they speak in terms of their values, how they perceive others, and what they remember?
10. Why should people be encouraged to learn a language at any age?

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Internet References

Exploratorium Magazine: "The Evolution of Languages"
www.exploratorium.edu/exploring/language

Linguistic Inquiry and Word Count
www.liwc.net