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Why Bilinguals Are Smarter

By YUDHIJIT BHATTACHARJEE

SPEAKING two languages rather than just one has obvious practical benefits in an increasingly globalized world. But in recent years, scientists have begun to show that the advantages of bilingualism are even more fundamental than being able to converse with a wider range of people. Being bilingual, it turns out, makes you smarter. It can have a profound effect on your brain, improving cognitive skills not related to language and even shielding against dementia in old age.

This view of bilingualism is remarkably different from the understanding of bilingualism through much of the 20th century. Researchers, educators and policy makers long considered a second language to be an interference, cognitively speaking, that hindered a child's academic and intellectual development.

They were not wrong about the interference: there is ample evidence that in a bilingual's brain both language systems are active even when he is using only one language, thus creating situations in which one system obstructs the other. But this interference, researchers are finding out, isn't so much a handicap as a blessing in disguise. It forces the brain to resolve internal conflict, giving the mind a workout that strengthens its cognitive muscles.

Bilinguals, for instance, seem to be more adept than monolinguals at solving certain kinds of mental puzzles. In a 2004 study by the psychologists Ellen Bialystok and Michelle Martin-Rhee, bilingual and monolingual preschoolers were asked to sort blue circles and red squares presented on a computer screen into two digital bins — one marked with a blue square and the other marked with a red circle.

In the first task, the children had to sort the shapes by color, placing blue circles in the bin marked with the blue square and red squares in the bin marked with the red circle. Both groups did this with comparable ease. Next, the children were asked to sort by shape, which was more challenging because it required placing the images in a bin marked with a conflicting color. The bilinguals were quicker at performing this task.

The collective evidence from a number of such studies suggests that the bilingual experience improves the brain's so-called executive function — a command system that directs the attention processes that we use for planning, solving problems and performing various other mentally demanding tasks. These processes include ignoring distractions to stay focused, switching attention willfully from one thing to another and holding information in mind — like remembering a sequence of directions while driving.

Why does the tussle between two simultaneously active language systems improve these aspects of cognition? Until recently, researchers thought the bilingual advantage stemmed primarily from an ability for *inhibition* that was honed by the exercise of suppressing one language system: this suppression, it was thought, would help train the bilingual mind to ignore distractions in other contexts. But that explanation increasingly appears to be inadequate, since studies have shown that bilinguals perform better than monolinguals even at tasks that do not require inhibition, like threading a line through an ascending series of numbers scattered randomly on a page.

The key difference between bilinguals and monolinguals may be more basic: a heightened ability to monitor the environment. "Bilinguals have to switch languages quite often — you may talk to your father in one language and to your mother in another language," says Albert Costa, a researcher at the University of Pompeu Fabra in Spain. "It requires keeping track of changes around you in the same way that we monitor our surroundings when driving." In a study comparing German-Italian bilinguals with Italian monolinguals on monitoring tasks, Mr. Costa and his colleagues found that the bilingual subjects not only performed better, but they also did so with less activity in parts of the brain involved in monitoring, indicating that they were more efficient at it.

The bilingual experience appears to influence the brain from infancy to old age (and there is reason to believe that it may also apply to those who learn a second language later in life).

In a 2009 study led by Agnes Kovacs of the International School for Advanced Studies in Trieste, Italy, 7-month-old babies exposed to two languages from birth were compared with peers raised with one language. In an initial set of trials, the infants were presented with an audio cue and then shown a puppet on one side of a screen. Both infant groups learned to look at that side of the screen in anticipation of the puppet. But in a later set of trials, when the puppet began appearing on the opposite side of the screen, the babies exposed to a bilingual environment quickly learned to switch their anticipatory gaze in the new direction while the other babies did not.

Bilingualism's effects also extend into the twilight years. In a recent study of 44 elderly Spanish-English bilinguals, scientists led by the neuropsychologist Tamar Gollan of the University of California, San Diego, found that individuals with a higher degree of bilingualism — measured through a comparative evaluation of proficiency in each language — were more resistant than others to the onset of dementia and other symptoms of Alzheimer's disease: the higher the degree of bilingualism, the later the age of onset.

Nobody ever doubted the power of language. But who would have imagined that the words we hear and the sentences we speak might be leaving such a deep imprint?

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This article has been revised to reflect the following correction:

Correction: March 25, 2012

The Gray Matter column on bilingualism last Sunday misspelled the name of a university in Spain. It is Pompeu Fabra, not Pompea Fabra.

Dual Language Immersion (DLI) Programs in Portland Public Schools
Questions & Answers

Q: ***What is a Dual Language Immersion (DLI) program?***
A: A dual language immersion (DLI) program is a core educational language program that offers academic content in two languages: English and a partner language. PPS has DLI programs in four languages: Spanish, Japanese, Mandarin Chinese and Russian. The goal is for all students to become bilingual and bi-literate while achieving at a high academic level and developing deeper cultural awareness. DLI programs are open to all students.

For more information on PPS DLI models please visit the DLI website: http://www.pps.k12.or.us/departments/immersion

Q: ***Do DLI programs span grades K–12?***
A: Yes. Students may transfer into a DLI program as early as kindergarten (pre-kindergarten in some cases), and have a right to remain in the program through their senior year of high school. Currently, there are district-wide DLI programs for Japanese, Mandarin Chinese and Russian. Spanish DLI programs are located in four regions of the district, and students are encouraged to apply for the program closest to their home. Beginning with 9th grade in 2014, students who have been in a DLI program outside of their home region will be assigned to their regional high school to continue DLI. (See chart below.)

Q: ***Where are the programs located?***
A: PPS District-Wide and Regional DLI Programs

Language	Region*	Elementary School	Middle School	High School
Spanish	West	Ainsworth (T)	West Sylvan	Lincoln
Spanish	Southeast	Atkinson	Mt. Tabor	Franklin
Spanish	North	Beach	Beach	Roosevelt
Spanish	Southeast	Bridger	Bridger	Franklin
Spanish	North	Cesar Chavez	Cesar Chavez	Roosevelt
Russian	District-wide	Kelly	Lane	Franklin
Spanish	Southeast	Lent	Lent	Franklin
Japanese	District-wide	Richmond (T)	Mt. Tabor	Grant
Spanish	Northeast	Rigler	Beaumont	Madison
Spanish	Northeast	Scott	Scott	Madison
Mandarin	District-wide	Woodstock (T)	Hosford	Cleveland

* Regions serve the following high school clusters: Southeast – Cleveland and Franklin; Northeast – Madison, Grant and eastern portion of Jefferson; North – Roosevelt and northern portion of Jefferson; West – Lincoln and Wilson.
(T) Kindergarten tuition or scholarship is required for the second half of the day.

Q: ***How do I apply for my student to participate in a*** DLI ***program?***
A: Families must submit a School Choice Application during the annual transfer cycle. Applications may be submitted online at www.schoolchoice.pps.k12.or.us or delivered to the Enrollment and Transfer Center, 501 N. Dixon St., first floor, room 140.

Most DLI programs require parents or guardians to attend a mandatory informational meeting and sign a statement of understanding. Students applying for "late entry" (after kindergarten) must contact the school for language assessment information. Learn more about mandatory informational meetings and late entry requirements at www.schoolchoice.pps.k12.or.us, or contact the schools or the Enrollment and Transfer Center.

Q: ***What is the timeline for the School Choice student transfer process?***
A: School Choice/Transfer Cycle Information for 2013-14

Important Dates	Start Date/Time	End Date/Time
High School Transfer Application Cycle	February 1, 2013 8:00 a.m.	February 22, 2013 5:00 p.m.
Elementary/Middle School Transfer Application Cycle	February 8, 2013 8:00 a.m.	March 15, 2013 5:00 p.m.

Q: ***I can't make it to the mandatory informational session. What do I do?***

A: Contact the school prior to the School Choice application deadline.

Q: ***Can a student enroll in a*** DLI ***program if a sibling is already enrolled in that program?***
A: Co-enrolled preference is given to students who have siblings enrolled in the same DLI program.

Q: ***My third-grade student is attending the neighborhood non-*** DLI ***program. I want my child entering kindergarten at the same school to participate in its*** DLI ***program. Will this child receive sibling preference?***
A: No. Sibling preference only applies to children with a sibling enrolled in the same DLI program, even if the program shares space with a neighborhood school.

Q: ***Do I need to apply in the lottery for transfer if my student will be moving from elementary to middle or middle to high school?***
A: No. DLI students are automatically promoted to the next level of their designated DLI program. However, a lottery application is required if a student is interested in switching into a different program. Beginning in 2014, students who wish to attend a high school program that is outside their region will need approval through the lottery, as well.

Q: How are lottery slots determined for DLI ***programs?***
A: Space for lottery transfers is determined every year based on the number of students needed to maintain a robust program and the amount of classrooms available in a school to serve that program.

Q***: What if my student decides not to continue in an immersion program?***
A: There are two ways that students can request a program change: 1. Students who wish to change programs for the next school year must apply in the annual lottery. On-time lottery applicants are guaranteed a space at their neighborhood school, however, approval to any other school or program is based on a student's lottery number and space availability. 2. Students who are experiencing an urgent hardship may request a program change for the same school year by filing a petition in the Enrollment & Transfer Center.

Q: ***How does a student enter a*** DLI ***program after kindergarten?***
A: Students requesting entrance to a DLI program after kindergarten are referred to as "late entry." Late entry is possible at any grade if space is available in the requested program and IF the student meets minimum oral and written language proficiency requirements. To determine whether your student meets minimum language proficiency requirements please contact the school directly for assessment, at least two weeks prior to the School Choice application deadline.

Q: ***Does living in the school's neighborhood increase my child's chances of gaining entrance into the program?***
A: Most DLI programs offer neighborhood families a priority in the lottery process. Most — but not all — programs also have space available for students who live outside the neighborhood. The Richmond Japanese School is a district-wide program that does not have a neighborhood attendance area, so there is no preference for students who live near that school.

Q: ***Can a "nonresident" student who lives outside Portland Public Schools boundaries in another school district, city, state or country apply for a*** DLI ***program during the School Choice transfer cycle, for the following school year?***
A: Yes. Students who are not PPS residents can apply to a DLI program or any school in the district. District families are considered first in the lottery, so nonresident students have less of a chance of being accepted. If selected, nonresident students are conditionally approved until the resident district approves an interdistrict transfer or tuition is paid. Interdistrict agreements must be renewed annually by PPS and the resident district.

Q: ***I do not currently reside in the Portland Public Schools boundaries but plan to move within the district boundaries before the first day of school. Will my student be considered a "resident" in the School Choice lottery process?***
A: Under certain circumstances, a student may be considered "resident" in the School Choice process, but can only be "conditionally" approved if selected in the lottery. Please contact the Enrollment & Transfer Center for more information.