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In an increasingly globalised world, there are many practical benefits to speaking two languages rather than one. Even in the US, which is largely monolingual, more than 20 percent of the population is now thought to speak a second language.

Early research on bilingualism, conducted before the 1960s, however, linked bilingualism with lower IQ scores, cognitive deficiencies and even mental retardation. These studies reported that monolingual children were up to three years ahead of bilingual children in both verbal and non-verbal intelligence. From these studies, there grew a perception among the general public that bilingualism led to a 'language handicap'.

"Speaking with my own students about their childhood experiences, I found that many of them were discouraged from speaking two languages while growing up. This was based on a misperception that doing so would delay development," says Assistant Professor Yang Hwajin, a cognitive and developmental psychologist from the Singapore Management University (SMU) School of Social Sciences.

Since then, these early language studies have been widely discredited, and linguists no longer believe that bilingualism results in cognitive deficiencies. "What we have found in the last three decades is that bilingualism has substantial impact on cognitive function—the way that we think, make decisions, perceive things, solve decisions, and so on," she notes.

In fact, multi-lingualism can confer a very beneficial form of cognitive training, says Professor Yang. "For example, I speak Korean and English. When I speak English, I have to inhibit thoughts about Korean grammar, and focus on English grammar, as the two languages do not share any grammatical structure. Speaking these two languages has trained me to inhibit distractions and focus better."

Professor Yang's research into bilingualism grew naturally from her interest in the factors that influence executive function. The brain's executive function directs the processes that allow us to solve crossword puzzles, deconstruct the latest Game of Thrones episode, or recall what we had

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for dinner last week. Being bilingual has been shown to improve the brain's executive function, and even delay the onset of dementia or Alzheimer's disease.

"I was interested in the factors influencing such executive control, as they can in turn shape our performance in work, school, and other parts of our life. After all, most critical cognitive functions affect our lives in various settings, regardless of age," she says.

Language power

Professor Yang is particularly impressed by the high extent of bilingualism in Singapore, which is a contrast to her homeland of South Korea where most of the population is monolingual. There, speaking two languages is limited mostly to those with high socioeconomic status. "Whenever I speak even to taxi drivers here, they often speak multiple languages—English, Mandarin, and one or more Chinese dialects," she says.

Singapore, as such, has proven a fertile ground for Professor Yang to study the relationship between multi-lingualism and cognition, though she has faced challenges in collecting data.

"I study bilingual children, and sometimes even infants raised in a bilingual context. Since parents are busy people, we visit day care centres and ask for parental consent for the children to be involved in research. But parents and day care teachers are reluctant to do so, as there is still a tendency to disbelieve the potential impact of such research," she notes.

Professor Yang's work with children has already seen results, however. One study saw her examine the impact of being raised in a bilingual versus monolingual household for children of low economic status. "Children of low socioeconomic status generally have lower cognitive function than those with high socioeconomic status. This might be because both parents are out working to earn money, leaving them home alone and without intellectual stimulation," she explains.

Here, bilingualism appears to be a form of intervention to promote executive function. Professor Yang found that low socioeconomic status children who spoke two languages performed much better in behavioural tests than their monolingual counterparts. Interestingly, she uncovered similar observations in another study that involved infants, instead of children, of low socioeconomic status.

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"Since infants cannot verbalise or express themselves, we define bilingual infants via the number of languages they are exposed to. For example, an infant exposed to English 60 percent of the time, and Mandarin 40 percent of the time, would be considered bilingual," she says.

"Surprisingly, we found that even bilingual infants from low socioeconomic status demonstrated greater cognitive development than monolingual infants of the same status. This implies that bilingualism could help the development of children in deprived environments."

Boosting brain power with bilingualism

Other studies have shown that bilingualism can be used in a clinical setting to help children diagnosed with attention deficit hyperactivity disorder, or patients with impaired cognitive function. Professor Yang also hopes to demonstrate its benefits to individuals who do not demonstrate cognitive impairment.

Another area that Professor Yang would like to explore is the biology behind second language acquisition. Specifically, do bilingual speakers exhibit different patterns in their brain anatomy and physiology?

"So far we have focused on behavioural data, such as job performance and aptitude. We have not yet touched on neuroscience—the brain—particularly in the Asian context. For example, it would be interesting to examine what changes bilingualism has made to my brain in the last 20 years, and if that can in turn be associated with my behaviour," she muses.