

THE COGNITIVE BENEFITS OF BILINGUALISM AND MULTILINGUALISM ON BRAIN DEVELOPMENT

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Abstract

Multilingualism research shows unique properties of multilinguals, including early language representation, gray matter density, and lexical retrieval speed. Cognitive control, language switching, working memory, and consequences of multilingualism are reviewed. Structural differences exist between monolinguals and multilinguals' brains with different regions used for processing a given language in multilinguals compared to monolinguals.

Key words: cognitive benefit, bilingualism, multilingualism, brain development

In a world that is becoming increasingly interconnected, the ability to speak more than one language is a valuable skill. Beyond the obvious practical advantages of being able to communicate with a wider range of people, research has shown that bilingualism and multilingualism also have significant cognitive benefits.

One of the most well-documented advantages of being bilingual or multilingual is the improvement in cognitive functions. Studies have found that individuals who speak multiple languages tend to have better problem-solving abilities, attention, and multitasking skills. This is because constantly switching between languages requires the brain to be more flexible and adaptable, leading to improved cognitive function overall.

Furthermore, research has also shown that bilingual individuals tend to develop symptoms of dementia later in life compared to monolingual individuals. This delayed onset of dementia is believed to be due to the cognitive benefits of bilingualism, which may help to build a "cognitive reserve" that can delay the onset of age-related cognitive decline.

In addition to these benefits, bilingual and multilingual individuals also tend to have stronger executive function skills, such as inhibition, working memory, and cognitive flexibility. These skills are crucial for higher-level thinking and problem-solving, making bilingual individuals better equipped to navigate complex tasks and challenges.

Brain imaging studies have also found that bilingual individuals have greater neural connectivity in certain areas of the brain, particularly those related to language processing and executive function. This enhanced connectivity may contribute to better overall brain function and cognitive abilities.

Moreover, bilingual and multilingual individuals often have a greater awareness of language structure and grammar, as well as an increased ability to understand and manipulate language. This metalinguistic awareness can benefit overall language and literacy development, leading to improved communication skills and a deeper understanding of language.

When examining the latest literature on the neural foundations of multilingualism in conjunction with a volume focused on applied linguistics, it is essential to initially contemplate the definition of multilingualism and how it compares to bilingualism. Despite some scholars making distinctions between these two terms by defining multilingualism as the capacity to comprehend and converse in numerous languages, while others utilize this term more broadly to describe utilizing multiple languages, many still use bilingualism interchangeably with multilingualism.

Research suggests that when bilingual individuals utilize one language, the other is typically present simultaneously. Upon hearing a phrase, the brain processes sounds in a sequential manner rather than as a whole word. Prior to completion of the word, the brain's language mechanism infers its meaning by activating numerous words that complement the signal received. For instance, upon hearing "may," initial stages of comprehension may evoke thoughts of "candy" and "candle." This stimulation extends beyond just one language for bilinguals; auditory feedback triggers matching words regardless of their respective languages. Coping with this constant linguistic competition can result in linguistic challenges such as slower naming speed and increased tip-of-the-tongue states among multilingual speakers.

Why should we expose young children to a second language while they are still grappling with their primary one? It may seem like an overwhelming burden at a time when they are busy learning social skills, counting, playing and so much more. However, this is actually the ideal period for them to acquire another language.

During the first three years of life, children's brains possess remarkable flexibility that makes it easy for them to learn a new language. In fact, infants who are exposed to two languages from birth can detect switches between languages as early as six months old and pick up both languages with ease - just like walking or speaking their mother tongue. According to data from the US Census Bureau cited by the University of Washington News, 27% of American children under age six are now learning another language in addition to English; there is no evidence that such exposure has any deleterious effect on their native tongues.

Unlike adults who must struggle with grammar rules and practice techniques when acquiring foreign languages, young learners absorb sounds, structures and intonation patterns effortlessly. Until around age eight or so, they benefit from flexible ear and speech muscles that can easily distinguish between different sounds in a second language

Newt Gingrich, a former Speaker of the House of Representatives from Georgia and a member of the Republican Party, wrote an Op-Ed column in the New York Times on April 22, 2015. In his article, he called for Congress to double the budget for the National Institutes of Health. He specifically highlighted that if there was a breakthrough discovery that could delay the onset of Alzheimer's by five years, it would have a significant impact on reducing healthcare costs and stress on family members.

However, what Gingrich did not mention is that research has already documented that bilingualism can delay the onset of Alzheimer's symptoms by four to five years compared to monolinguals who are matched for age and education levels. This finding was reported by Bialystok, Craik, and Freedman in 2007 and later confirmed by Perani et al. in 2017. It is noteworthy that no known pharmaceutical agent has been found to have such an effect as bilingualism.

Bilingualism and multilingualism are expected to affect brain areas associated with language processing, learning and control. Researchers have found that knowing more than one language from early childhood to young adulthood can make the brain more efficient in handling demanding tasks related to language acquisition and processing. This is due to structural changes in the brain, which have been observed in regions associated with acquired skills. The study was conducted by researchers at the University of Reading and Georgetown University, based on a large repository of past imaging and behavioral data.

In conclusion, the evidence overwhelmingly supports the idea that being bilingual or multilingual offers a wide range of cognitive benefits that extend far beyond simply being able to communicate in multiple languages. The ability to speak and understand different languages has been shown to have a significant impact on brain health and function, with numerous studies demonstrating that bilingual individuals often exhibit enhanced cognitive abilities compared to monolinguals.

The cognitive benefits of being bilingual or multilingual are undeniable, and it is essential for individuals and society as a whole to recognize and prioritize the importance of language learning. By doing so, we can harness the full potential of multilingualism and its positive impact on overall brain health and function.

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