
Part A: The Effects of Bilingualism on Children's Intelligence

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1. Introduction

What kind of impact bilingualism exerts on children's intelligence has been debated for years. The answer to this question correspondingly influences many parents' way of raising their children and policy makers' linguistic development nationwide. The dispute is caused by the following factors: different definitions of theories, misunderstanding of theories and over-generalization or over-simplification of theories. Thus, this essay intends to trace back the nature of bilingualism and intelligence, sort out the evolution of the correlation between bilingualism and intelligence, demonstrate the latest development and offer fair suggestions to readers.

2. Bilingualism

This essay mainly delves into individual bilingualism, namely seeing bilingualism as an individual phenomenon, rather than societal bilingualism found in groups or communities. When it comes to bilingualism, it cannot be simply defined. Historically, there were two kinds of definitions. One was known as maximal bilingualism such as “the native-like control of two or more languages(Baker 2001)” by Bloomfield, and the other was “Diebold's incipient bilingualism or minimal bilingualism, which includes people with minimal second language competence to the category(Baker 2001)”. Either of them is too general and exclusive or too narrow and inclusive. Those two definitions certainly cannot be taken as standards, and there is little consensus on that term as bilingualism consists of at least two aspects——language ability and language use.

According to Colin Baker(2001), four basic language abilities are primarily included, listening, speaking, reading and writing. Later, Skutnabb-Kangas and Cummins both put forward a fifth, namely, “the language ability to use one or both languages for reasoning and deliberation”(Baker 2001). Judging from the proficiency and competency of one's language ability, semilingualism or double semilingualism and balanced bilingualism are categorized by Collin Baker (2001), with the former referring to not “having sufficient competence in either language”; and the latter balanced competence in both languages. This categorization is similar to Weinreich's concept of “coordinate bilinguals, subordinate and compound bilinguals” (Gueye, 2015).

3. Intelligence

Before probing into the effects of bilingualism on children's intelligence, the term “intelligence” and how to measure intelligence has been a challenge and controversy for decades and has evolved over time. For instance, in the 1921 symposium, 13 different definitions of intelligence were given by 13 present psychologists(Gardner, 1999).

The earliest thinking about intelligence could be traced back to ancient China,

beginning in Han Dynasty with a national test to choose candidates for civil servants(Sternberg 2020). And then the ancient Greek writers like Homer recognized intelligence in Odyssey and philosophers like Plato and Aristotle also had many thoughts about it, followed by Augustine and other worldwide thinkers like Montaigne, Aquinas, Hobbs, Pascal, Locke and even Adam Smith, Kant and Mill(Sternberg 2020).

The modern research began with Francis Galton who tested how well people see, hear and how strong they are to measure their intelligence in the late 19th century; later in the early 20th century a measuring test of people's thinking and judgment skills was designed by Alfred Binet; and then both general ability and specific abilities were taken into account to measure intelligence by Charles Spearman. Around the middle of the 20th century, Louis Thurstone thought intelligence must cover "mathematical, semantic and spatial ability". Until the late 20th century, more complex and comprehensive models of intelligence were set up. Lewis Terman came up with the very first standardized intelligence test and was regarded as a landmark, showing a clear-cut "association between IQ and various real-world measures of life success"(Sternberg 2020). Then Howard Gardner developed the theory of Multiple Intelligences, which was well accepted and later incorporated into education. The Multiple Intelligences encompass eight different kinds, reflecting different approaches to interact with the outside world, namely "linguistic intelligence, logical-mathematical intelligence, musical intelligence, spatial intelligence, bodily-kinesthetic intelligence, intrapersonal intelligence and interpersonal intelligence and naturalist intelligence(Gardner 1999) ”.

In the meantime, the correlation study between intelligence and bilingualism also made progress. The following part will examine three developmental periods of the relationship between bilingualism and intelligence.

4. The effects of bilingualism on children's intelligence

4.1 Negative Effects

The development of the correlated effect of bilingualism on children's intelligence started from the negative effects from the 1920s to the 1960s. The early findings thought bilingualism did harm to children's intelligence and monolinguals scored higher in IQ tests. Later researchers found loopholes in this negative claim, such as varied definitions of intelligence, the language of IQ tests against bilinguals, too simple analysis and imprecise classification of monolinguals and bilinguals, non-random sample and inadequate generalization, subtractive language environment as well as questionable matched groups.

4.2 Neutral Effects

Between the 1930s to 1960s, following researchers learned from the previous deficiencies and flaws and found there was no correlated consequence of bilingualism on intelligence, and bilinguals and monolinguals didn't distinguish themselves much on verbal or nonverbal IQ performance, thus it somehow proved that the negative effects were wrong and faulty and paved an open way for the period of positive effects to come.

4.3 Positive Effects

The research of Peal&Lambert (1962) set a new trend for the following studies and turned the tide. Drawing lessons from previous studies, they managed to minimize the methodological deficiencies and yielded some surprising discoveries. Rather than harmful or none consequences of bilingualism on intelligence, possible advantages of bilinguals over monolinguals on cognition were suggested with IQ tests and beyond the scope of IQ tests. They pointed out that bilingualism brought about “greater psychological flexibility, more independent and divergent thinking ability and affirmative transfer between languages”(Baker 2001).

Since then, researchers across the world have moved to dig out more complicated cognitive connections by various experiments.

4.3.1 Cognitive advantages:

Both cross-sectional and longitudinal studies have been done on the possible cognitive advantages of bilinguals over monolinguals.

Across cultures, initial research has indicated thinking superiority of bilinguals, especially from subjects’ verbal performance(Baker, 2001). They claimed that the constant separation and transfer between two languages rendered bilinguals an upper-hand in linguistic flexibility and analytical ability. Recent research tends to focus on the cognitive process and reveal the bilingual superiority on metalinguistic awareness. According to Garcia(2009), “metalinguistic awareness is the ability to treat language as an object of thought”. With metalinguistic awareness, one is able to “reflect upon and manipulate the structural features of spoken language”, rather than just understand and reproduce the languages themselves. Bialystok (1987) mentioned more accurate judgment of sentence grammaticality, independent of meaning, could be found in bilingual children, and later his research(2004: 597-8) stated that “bilingual children perform better in specific tasks that measure their progress in coming to understand the structure of language and in learning how to read.”

However, some researchers like Paap and Johnson questioned the previous research’s validity and argued that it was a task-specific artefact that caused bilingual advantage(Kerrigan, alt 2017). Against this task-specific artefact accusation and in support of cognitive advantages of bilingualism, Kerrigan & Thomas (2017) checked the evidence for the previous claim by the change blindness task---- “a different and more ecologically valid method that mimics visual input from everyday life”. It uncovered that there’s a significant advantage in speed and accuracy in non-verbal reasoning among bilinguals, but no differences between monolinguals and bilinguals were disclosed on the verbal memory tasks.

Moving beyond verbal advantages of bilinguals across language itself to psychology, Anderson(2018) and his partners also confirmed that there were clear differences in the way that bilinguals and monolinguals implemented switching tasks, and the result of both verbal and non-verbal task switching unearthed their unique distinction in neural circuits for cognitive control. Distinctively, bilinguals can employ overlapping sets of regions, a common shared network, for language and executive function, and bilinguals’ exposure to everyday language switching honed and armored them with a more efficient and proficient mechanism in cognitive control which

“extends beyond language and into switching between tasks”.

Longitudinally, researchers have done various empirical studies on the effects of bilingualism on cognition, starting from infancy, childhood, adolescence, adulthood and older age. Bilingual benefits have been found all across the life span(Bialystok 2011). For instance, Bak and his partners (Bak, 2014) did a comparative study of 853 subjects tested firstly in 1947 and retested in 2008-2010. The results demonstrated that “bilinguals’ performance was way better than the prediction from baseline cognitive abilities” and illuminated an “additive effect of bilingualism on later-life cognition; Likewise, Padilla(2016) followed participants for 6 years and stated that older bilingual Mexican-American immigrants showed modest advantages in cognitive screening performance; Compared with monolinguals, Alzheimer’s symptoms were shown 4 to 6 years later among bilinguals, according to Collin Baker(2014). Besides, Sorman(2017) did a ten-year investigation of bilingual benefits in executive processing through dual-task performance, showing that bilinguals largely outperformed monolinguals in dual-tasks requiring executive functioning. That proposition was also in line with Baker(2014)’s view that bilinguals are more likely to be better at multitasking.

Apart from mentioned above, atypical bilingual cases were also studied as opponents condemned that those cognitive benefits were found just among balanced bilinguals and were skeptical about the validity of bilingual strengths. To refute the criticism, the study by Gueyue(2015) focused on the compound and subordinate bilinguals and illustrated the co-relational relationship between bilingualism and intelligence. To further the rebuttal, Vender(2021) investigated the interaction between bilingualism and dyslexia through a task to measure participants’ morphological abilities, and verified the typical bilingual advantage even in dyslexia cases. In addition, a high level of linguistic proficiency was not necessarily required to indicate a socio-emotional advancement by an increasing amount of work, as Chamorro& Janke(2020) listed in the paper.

4.3.2 Communicative Sensitivity

It should be noted that some research linked cognition with communicative skills, moving to bilinguals’ emotional intelligence and social skills. The connection of executive function with social competence was shown and proved by many researchers. Therefore, “it is difficult to conceive of a social skill that does not include some cognitive ability(Chamorro&Janke 2020).” For instance, both Collin Baker(2001) and Ofelia Garcia(2009) summarized in their books, bilinguals tend to be more sensitive to listeners’ needs, the language of a specific situation and the content of messages, which were considered as “communicative sensitivity”.

Some other rather recent studies also illustrated bilinguals’ advantageous emotional and social competence over monolinguals. Chamorro and Janke(2020) had done a comparative experiment of 6-7 years old Spanish children, who got bilingual primary education yet monolingually raised, and run a full set of cognitive and social tests to explore distinction on subjects’ selective and sustained attention (cognitive) and social skills. In accordance with previous studies, their research result unfolded that those children with one-year bilingual education performed significantly better

than monolinguals on a sub-set of cognitive and social skills. The authors also predicted that this kind of bilingual superiority would help children “build more confidence in future interpersonal communications”. Besides, the comparative study by Alqarni and coworkers(2020) with 205 Arabic-English bilinguals and 71 Arabic monolinguals and 333 English monolinguals also indicated that bilinguals outscored counterparts on Trait Emotional Intelligence, which was considered to be related to emotional perception. It suggested that relevant bilingual benefits on emotional and psychological domains affected subjects’ personality and emotional skills. Moreover, the follow-up study by Zhang (2021) confirmed bilinguals’ superior abilities in discerning emotions of foreign culture, exhibiting better communication skills. Those studies are consistent with previous understanding of bilingual benefits on cognitive ability and extend the cognitive process beyond linguistics to emotions and communications.

5. Conclusion

After reviewing the terminology “bilingualism” and “intelligence” from historical literature, it’s not difficult to understand the controversy over the effects of bilingualism on intelligence. Because of various understanding toward the terms and possible uncontrolled variables in the experiment, previous studies had reported the negative or neutral bilingual effects. To make up those deficiencies, research in recent years produces opposite results and witnesses almost a landslide turn to the proposition of positive bilingual effects on intelligence. The bilingual advantages on intelligence are primarily centered on the cognitive function and communicative sensitivity, which could be seen among people of different age groups, not just children; in both balanced bilinguals and semi-bilinguals as well as impaired bilinguals, such as people with dementia and dyslexia.

Part B:

Bilingual education should be encouraged because of the following advantages:

1. Bilingualism optimizes cognitive function and enhances communicative sensitivity all across people’s life span.
2. Cultural, educational, social and economical benefits are followed in the long run.

For instance, in education and culture, bilinguals could exert their language advantage to acquire more information, more skilled in learning new languages, achieve better academic performance and know more about other cultures; consequently more liable to develop a confident, open-minded and inclusive personality; in society, bilinguals could use their language advantage to expand their circle of communication, whether in family life, leisure or work, fueling them to gain more opportunities economically. This kind of positive circle goes on and interacts with each other within itself.

3. The bilingual benefits could even be found in impaired groups, such as people suffering Alzheimer, dyslexia and a loss of hearing(Grosjean 2020).

However, it’s misleading not to mention there’re always doubts about bilingualism's additive effects, such as the claim that there’s no pronounced advantage

of bilingualism on intelligence or there're only marginal benefits or simply no difference. Actually, there are a number of factors to affect how much benefits gained, like language proficiency, age, gender, time and approaches to second language acquisition and teaching, etc., as Ni(2014) pointed out in his paper. Even though researchers controlled those variables as much as they can to do experiments, there can never be guaranteed that two children in the world can have exactly the same condition, even twins, and no research could possibly exclude all associated variables.

To conclude, the majority of research about bilingualism on intelligence in recent years is voting for the benefits and the skepticism still needs more evidence to take a firm stand. What should be noted is that all those cognitive, cultural, educational, social as well as economic rewards make bilingualism worthy. After all, every human move is accompanied by gains and risks. If we have choked at every possible risk, there would never have been Armstrong on the moon.

Therefore, as advantages outweigh possible doubts, bilingual education should be promoted internationally.

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