

Analyzing the Effects of Second Language Acquisition on Cognitive Development

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Abstract. The purpose of this study is to explore the impact of second language acquisition (SLA) on cognitive development. In today's globalized world, children are more inclined to be exposed to a bilingual or even multilingual environment, and scholars have selected related literature over the past decade to see the current views of the academia. Most scholars believe that SLA is beneficial to children's cognitive development, such as fostering multidimensional learning patterns, and improving memory and concentration. However, a few studies suggest that SLA may hinder children's cognitive development. Based on this, the author provides suggestions from three dimensions, namely, language environment, family and society, to better understand the relationship between second language learning and cognitive development, and helps to better use the second language learning as a catalyst for cognitive development.

1 Introduction

1.1 Literature background

Many researchers have already conducted research on how SLA affects cognitive development. Whether SLA has a positive effect on cognitive development has been a controversial issue in academia. Some researchers hypothesized that students who study English as a second language, such as those who immigrate to English-speaking nations, show better levels of acquisition in some language domains during their elementary school years. According to some research, the development of cognitive skills is significantly impacted by the acquisition of a second language, and SLA is not always correlated with age. The discussion under this topic does not have a definitive answer and requires frequent updating as times change, the authors would like to organize the views of the academic community in recent years on the impact of SLA on cognitive development.

1.2 Reality background

SLA has been one of the most concerned issues for a long time. The exploration of the effects of SLA on cognitive development originates from the growing recognition of the globalized and diverse nature of modern societies. Within this context, many children today are exposed to multiple languages from an early age due to various social factors such as immigration, international

mobility, and multicultural environments. Moreover, with the advancement of technology, children's exposure to a bilingual or even multilingual environment is often closely related to SLA. Therefore, the author investigates whether learning a second language confers cognitive advantages.

1.3 Method

The study conducted a comprehensive search of multiple databases and websites, respectively, Science Direct, Web of Science, and Association for Psychological Science, using the search terms SLA, bilingualism, language acquisition, cognition, cognitive development, and children to narrow down the range of target literature.

1.4 The aim and significance of the study

The study aims to explore the impact of SLA on cognitive development. Meanwhile, the study holds substantial significance since more children nowadays are exposed to a bilingual or even multilingual environment, and the information they received is different from the current experience. Thus, understanding how learning a second language influences their young mindset is important. Therefore, it is important to be aware of potential changes in SLA. Additionally, the study bears relevance for caregivers, educators, and policymakers to optimize children's language experiences. For caregivers and educators, by comprehending how bilingualism shapes cognitive pathways,

they can apply more effective methods to construct a better language environment and assist children in understanding and acquiring new languages and knowledge. Overall, the study could advance the understanding of child development, the interconnected world.

2 Cognitive development and SLA

2.1. Introduction to the concepts

2.1.1 Cognitive development

Cognitive development is a neuroscience and psychology understand, process and reinforcement. It emphasizes how people perceive and then gain the overview of their surroundings through the genetic and learning aspects. The process starts from infancy when infants are around 18 month-old begin to pay attention to the people and things around them.

Developmental stages of cognitive development in children is recognized as the most authoritative theory in the 20th century, and is still development into 4 sequential stages, respectively, they are sensorimotor stage, preoperational stage, concrete operational stage and formal operational stage. The sensorimotor stage is from birth to age 2, which occurs first. Children learn about the world at this stage through their senses and their behaviours. Children express what they already know in a illogical and disorganised manner throughout the preoperational stage, which lasts from age 2 to age 7. In concrete operational stage, which is from 7 to 10, though children learn how to express themselves clearly in school, their mindset remains basic. In the last stage, formal operational stage, which is after age 11, children not only acquire the ability to know concrete things, they can also reason the abstract concepts [3]. Ecological Systems Theory is another important theory which specifically, they are chronosystem, macro system, exosystem, mesosystem and microsystem.

2.1.2 Second language acquisition (SLA)

SLA describes the study of individuals and groups who are learning a second language after learning their first as young children. It can also refer to the process of learning that second language [4]. The languages that are learned after children acquire their first language can all be included in SLA field.

Critical period hypothesis is one of the most prominent theories in this relatively recent research field. First formulated by American psychologist Eric Lenneberg critical period hypothesis states that there is a critical period for people to acquire a language most easily. In other words, the hypothesis indicates that the earlier an individual start learning a second language, the easier he or she can acquire the grammar, pronunciation, spelling, etc. of the

2.2 Interrelationship between cognitive development and SLA

The present world is becoming more and more internationalized, and it is a common occurrence that people master two or more languages. Many parents realize the benefits of learning a second language (SL), and studies in brain science and neuroscience confirm that cognitive development of children, and there is a wide consensus that language acquisition has a significant impact on cognitive development. Therefore, it is worth reviewing development.

3 Evidence in support of SLA influencing cognition development

It is supported by numerous research that language acquisition has positive influence general cognitive development. Written by Lauren Head Zauche, Taylor A. Thul et al., in 2016, the review paper highlights a concept interactions with caregivers, and evaluate its influence through talking, interacting, or reading in the first three development.

Via integrated review, a research review method that include various perspectives and comprehensive understanding to a topic, the authors selected articles published in English between January 1990 and August 2014 according to precise and limited keywords. The results of the review show that rich linguistic environments and language skills and cognitive growth. In other words, abundant exposure to language helps children to gain language nutrition, which plays a crucial role in their childhood development, and promotes ideal linguistic and cognitive outcomes [6]. Additionally, researches prove that Paradis examines the roles of age, first language, cognitive ability, and input factors in examining the complex development. The study illustrates the positive impact of performance in different developmental stages. The author claims that early exposure to a second language extent. Moreover, age also plays a crucial role in acquiring language, for younger learners tend to exhibit greater language proficiency. Furthermore, the mastery of the first language facilitates the process of SLA, and promotes

The study also emphasizes the importance of the quality and quantity of language input, demonstrating how rich linguistic environment positively influence children to participate in the conversation and lose opportunities to cognitive development. Effective input, especially in the early childhood, develops cognitive abilities and enhances memory, problem-solving, and attention management.

Another article also suggests that bilingualism may not be as beneficial as previously thought. An analytic article by Lowe, Chhabildas, Goldsmith & Morton in 2021 focuses on the relationship between bilingualism and executive functioning (EF) in children. Executive functioning refers to a set of higher order cognitive processes responsible for goal-directed behaviors such as decision-making, working memory, and cognitive flexibility.

The article discusses the ongoing argument over whether bilingual youngsters have better executive functioning skills than their monolingual peers and if this advantage is due to a particular language or the bilingual experience itself. Through a comprehensive meta-analytic review, the authors critically examine numerous studies conducted in this area.

The authors explore whether the presumed "bilingual advantage" in executive functioning is contingent upon the specific language(s) spoken by bilingual children. The central argument of the review is that the cognitive benefits of SLA are not necessarily tied to the linguistic properties of the languages themselves.

The author raises four research questions to dig deeper into the topic:
- Do bilingual children outperform monolingual children in terms of executive functioning?
- Are there some areas where multilingual youngsters perform better than others in executive functioning?
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The review critically assesses the roles of language proficiency, exposure, and cognitive control demands in shaping the bilingual EF advantage. A key finding emerges that the cognitive benefits witnessed in bilingual children are not necessarily tied to the linguistic properties of the languages themselves.

Moreover, the review highlights the importance of methodological rigor and consistency in research in this field. Variability in study designs, participant demographics, and measurement tools across different studies can influence the interpretation of results. The authors recommend further research with standardized methodologies to gain deeper insights into the relationship between bilingualism, language status, and executive functioning.

In conclusion, the study concludes that the bilingual advantage in children's executive functioning is more directly correlated with the cognitive difficulties of maintaining multiple languages than with the unique linguistic characteristics of those languages. This has implications for our understanding of the cognitive benefits

development are obvious. SLA stimulates children's cognitive development, develops their minds, and promotes their cognitive development to a certain extent.

4 Evidence for non-correlation between SLA and cognitive development

Though in recent decades, it is widely reported that SLA or bilingualism contributes to children's cognitive development by enhancing their brain growth. However, there are some researches present that SLA might not show a significant correlation with cognitive development.

Language input is a crucial factor for children to learn a language and promote their cognitive development. Zauche, Thul, Mahoney, and Stapel (2019) argue that the use of imperatives and other sorts of directives by carers may have a harmful effect on youngsters according to the

of bilingualism and underscores the need for future research to explore these dynamics in greater detail [10].

5 Discussion and suggestion

5.1. Overall conclusion

In conclusion, this paper extensively examines the intricate development. Through a meticulous review of the existing literature, it becomes evident that a prevailing consensus within current research highlights the myriad benefits of childhood SLA on cognitive growth. This is manifested through the facilitation of brain development and the cultivation of multisystemic learning modes, among other advantageous outcomes.

Synthesizing the studies mentioned above, it becomes apparent that a trifecta of factors encompassing a substantial language input, high-quality content, and diverse linguistic contexts collaboratively contributes to the augmentation of memory capacities but enhance their problem-solving skills and concentration levels.

While some studies have shown that bilingualism has no development, it is noteworthy that there have been fewer such articles published within recent years. The academia, in general, is increasingly aligned with the prevailing notion that bilingualism or SLA inherently engenders positive combined weight of empirical evidence underscores the multifaceted cognitive benefits of early SLA, solidifying the idea that SLA indeed fosters cognitive growth in children.

5.2. Suggestion

To maximize the positive effects that SLA can bring to children, the following suggestions in light of the literature reviewed above. First, high-quality language exposure should simulate real-world situations, such as role-play, which helps to develop their deeper language skills. In addition, when exposed to two different languages, children are able to naturally develop two different yet interconnected systems of linguistic analysis, which enhance their brain processing. Moreover, language input should come from multiple sources in the family and the society. For example, not only should mothers be encouraged to speak to their babies more often, but also the language input from fathers should be encouraged. At the cultural level, children will realize the diversity of cultures from an early age, and therefore develop a stronger sense of inclusiveness towards their surroundings, which could also be beneficial to their future cognitive development.

5.3. Limitations

It is worth noticing that the study is subject to some limitations. To begin with, the study included a limited number of literatures, therefore, it only shows the major results of the discussion in the academia. The selection of the present literature may cause selection bias, which could potentially lead to a skewed representation of the field. Second, the article discusses the effects of SLA on a macro perspective and does not address a specific aspect of cognitive development. This could be improved in future studies. Last, the paper may not be able to explain all the causation of the literatures, because the articles that included in the paper are using various kinds of research methods. Thus, some trends or association could remain unexplained and knowledge background.

5.4. Possible improvement in future study

With the frequent global communication and rapid technological advances, people are able to learn about cutting-edge developments in SLA and cognitive psychology in faster and richer forms, so in the future, review papers on this topic may be able to develop in the following ways. First, scholars working on the topic globally could collaborate to enhance the breadth of the review paper by making the encompassing literature review more culturally contextualized and diverse, resulting in a fuller and more fully fleshed out thesis and connections. Additionally, by incorporating AI or data modelling future retrospectives may be able to extract the most accurate and promising content from the vast amount of literature through more sophisticated data organization and analysis methods.

6 Conclusion

In conclusion, SLA has both advantages and disadvantages. Support the view that learning a new language helps children by many experiments in brain science and psychology. It is clear that in the foreseeable future, parents, educators, and society will need to explore in depth what language they learn a foreign language while exercising the brain power, which will not only lay a good foundation for them at all stages of their lives, but also allow them to better integrate into a more closely connected world.

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