Analyzing the Effects of Second Language Acquisition on Children’s Cognitive Development

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Abstract. The purpose of this study is to explore the impact of second language acquisition (SLA) on children’s cognitive development in recent years by reviewing the literature. In an increasingly globalized world, children are more intend to be exposed to a bilingual or even multilingual environment, and scholars have been paying more attention to the effects and trends of SLA on children’s cognitive development. The article 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, promoting brain development, 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 authors provide suggestions from three dimensions, namely, language environment, family and society, and culture, to better utilize the advantages of SLA for children’s cognitive development. This study contributes to advancing the understanding of 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 second language acquisition (SLA) influences children’s growth. Whether SLA has a positive effect on children’s 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 [1]. According to some research, the development of children’s cognitive abilities is not significantly impacted by the acquisition of a second language, and SLA is not always correlated with age [2]. As 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 children’s cognitive development through a literature review.

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 children’s 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 bi- or multi-languages from an early age due to various social factors such as immigration, international mobility, and multicultural environments. Moreover, with technology popularization, children’s early development attracts people’s attention, and the cognitive development of children is often closely related to children’s language acquisition. 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 discuss how SLA impacts children’s 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 receive 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 children’s cognitive growth and prepare ideas for the future. Additionally, the study bears relevance for caregivers, educators, and policymakers to optimize children’s learning experiences. For caregivers and educators, by comprehending how bilingualism shapes cognitive pathways,

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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, education, and intercultural competence in today’s 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 field of study that concerning child’s ability to acquire, understand, process and learn information. 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.

The Swiss psychologist Jean Piaget’s 4 stages of cognitive development in children is recognized as the most authoritative theory in the 20th century, and is still influential today. He divided a child’s cognitive 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 an 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]. Bronfenbrenner’s Ecological Systems Theory is another important theory which consider children’s development within 5 systems, 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 [5]. 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 second language. Once the period ends, an individual still maintain the ability to learn a new language, though it can be much difficult. The hypothesis is of great importance in the academia, but is also controversial due to the difficulty of implementing experiments to prove it.

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 give attention to both their children’s mother tongue and SL from infancy onwards. Meanwhile, a large number of studies in brain science and neuroscience confirm the rapid 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 literature to see how SLA influence children’s cognitive 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 called “language nutrition”, which refers to language-rich interactions with caregivers, and evaluate its influence through talking, interacting, or reading in the first three years of life on children’s language and cognitive development.

Via integrated review, a research review method that include various perspectives and comprehensive understanding of 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 interactions with the caregivers contribute to children’s language skills and cognitive growth. In other words, abundant exposure to language helps children to gain language nutrition, which plays a crucial role in early childhood development, and promotes ideal linguistic and cognitive outcomes [6]. Additionally, researches prove that SLA boosts children’s cognitive development. In particular, Paradis examines the roles of age, first language, cognitive ability, and input factors in examining the complex relationship between SLA and children’s cognitive development. The study illustrates the positive impact of SLA on cognitive development by analyzing children’s performance in different developmental stages. The author claims that early exposure to a second language environment can lift children’s cognitive ability to a large 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 children’s cognitive flexibility.
The study also emphasizes the importance of the quality and quantity of language input, demonstrating how rich linguistic environment positively influence children’s cognitive development. Effective input, especially in the early childhood, develops cognitive abilities and enhances memory, problem-solving, and attention management. Furthermore, the study shows that while there are age-related disparities in language competency, cognitive talents continue to be crucial for maximizing the potential for language learning. Paradis argues that learning a second language involves more than just verbal proficiency; it also involves broadening one’s cognitive abilities. The study demonstrates that early involvement with a second language provides the framework for cognitive growth, giving benefits that go beyond the area of language abilities by examining the complex web of age, first language, cognitive characteristics, and input. Overall, the study emphasizes how crucial second language learning is in forming children’s cognitive skills throughout their developing process [1]. Baraka, El-Dessouky, Ezzat, and Al-Sharif’s 2019 study also prove that SLA positively influence children’s cognitive development, because when acquiring a second language, children build a neural network to connect the new language with the native one. This process not only activate and inhibit children’s ability in various linguistic levels, but also practice how to select words and correct mistakes while using languages [7]. To be specific, children who learn two languages show better prediction ability of word decoding development by grapheme-to-phoneme knowledge comparing to children who only learn their mother tongue [8]. The study by Trebits, Koch, Ponto, Bruhn, Adler, and Kersten (2022) investigates the cognitive benefits of SLA in children across immersion and English as a Foreign Language (EFL) learning contexts. The research underscores the positive relationship between early SLA and cognitive development. Irrespective of socioeconomic status, children in both immersion and EFL settings experience cognitive gains. The article emphasizes that exposure to a second language early in life enhances cognitive skills, which may contribute to a broader understanding of the advantages associated with bilingual education in the future [9].

To sum up, the benefits of SLA for children’s cognitive development are obvious. SLA stimulates children’s brain 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 supported that SLA or bilingualism contributes to children’s early cognitive development by enhancing their brain growth. However, there are some researches present that SLA might not show significant impact on children’s cognitive development.

Language input is a crucial factor for children to learn a language and promote their cognitive development. In Zauche, Thul, Mahoney, and Stapel-Wax’s article, The use of imperatives and other sorts of directives by carers may have a harmful effect on youngsters, according to the authors. The use of language that indicates to control or manage children’s action could disinterest children to participate in the conversation and lose opportunities to express themselves [6].

Another article also suggests that bilingualism may not be beneficial to children’s cognitive development. A meta-analytic article by Lowe, Cho, 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. They synthesize findings from various research papers to explore whether the presumed “bilingual advantage” in executive functioning is contingent upon the specific languages spoken by bilingual children. The central argument of the review is that the cognitive benefits observed in bilingual children’s executive functioning are not determined by the languages they speak, but rather by the cognitive demands of managing multiple languages.

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?
- What other factors affect how children’s executive functioning and linguistic status are related.
- Is the research on children’s bilingual advantages biassed towards supporting rather than refuting certain findings?

The review critically assesses the roles of language proficiency, exposure, and cognitive control demands in shaping the bilingual EF advantage. A key argument emerges that the cognitive benefits witnessed in bilingual children’s EF are not intricately linked to the individual linguistic properties of the languages they acquire, but rather to the intricate demands of orchestrating multiple languages within their cognitive frameworks. In other words, this advantage is 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 contends 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...
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 relationship between SLA and children’s cognitive 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 children’s cognitive prowess. This enriched environment not only improves their memory capacities but enhance their problem-solving skills and concentration levels.

While some studies have shown that bilingualism has no significant benefits or even hinders children’s cognitive 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 ramifications for children’s cognitive advancement. The 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’s cognitive development, the author makes the following suggestions in light of the literature reviewed above. First, high-quality language exposure could stimulate children’s brains to learn grammar, collocations, situational use, etc., 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 emphasized in children’s early stage of growth, so as to enrich children’s language accumulation. 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 includes a limited number of literatures, therefore, the 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 children’s cognitive development from a comparatively 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 in the paper, which can also relate to the author’s expertise 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 for children’s cognitive development, but most scholars still support the view that learning a new language helps children’s cognitive development, which is also supported 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 acquisition can do to develop children’s minds, and to help them learn a foreign language while exercising their 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.

References

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