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Research Paper

Linguistic Influences on Cognitive Development of Young Dual Language Learners

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ABSTRACT

This study examines the linguistic influences on cognitive development in young dual language learners (DLLs), focusing on how bilingualism shapes executive functioning, memory, and brain development. Theoretical perspectives, including the Bilingual Advantage Hypothesis, highlight cognitive benefits such as enhanced flexibility and metalinguistic awareness. Factors like socioeconomic status and parental involvement are explored for their role in DLLs' cognitive outcomes. The findings emphasize the need for culturally responsive educational practices to support DLLs' holistic development.

Keywords: *Dual Language Learners, Cognitive Development, Bilingualism, Executive Functioning, Metalinguistic Awareness*

Language is a fundamental aspect of human communication and cognition, shaping our thoughts, perceptions, and interactions with the world. For young children, the acquisition and development of language play a crucial role in their overall cognitive growth.

Language acquisition and cognitive development are two intricate processes that intertwine and shape an individual's overall growth. As the world becomes increasingly interconnected, there is a visible rise in cultural and linguistic diversity. Consequently, the number of young dual language learners (DLLs), also known as bilingual or multilingual children, has been steadily growing. This phenomenon has sparked interest among researchers, educators, and policymakers, thereby promoting investigations into the intricate relationship between linguistic influences and cognitive development of DLLs.

The cognitive development of young children is a complex and multifaceted process encompassing various domains such as attention, memory, problem-solving, and executive functions. Understanding the factors that influence cognitive development in DLLs is crucial for effective educational interventions and support systems. Language, being a primary tool for communication and cognitive processing, plays a fundamental role in shaping the cognitive abilities of DLLs. The interactions between different languages and their impact on cognitive development have become a topic of great importance, leading to increased research in this area.

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1.1 Dual Language Learning: Definition and Characteristics

The term "dual language learner" refers to a child who is exposed to and acquiring two languages simultaneously or successively during their early developmental years.

DLLs come from diverse linguistic backgrounds, including immigrant families, Indigenous communities, and households where multiple languages are spoken. The acquisition of two languages involves a dynamic interplay between the home language (L1) and the societal language (L2), presenting unique challenges and opportunities for cognitive development.

"Language 1" and "Language 2" are terms used to refer to the two languages that an individual is proficient in. Language 1 typically refers to the first language or mother tongue, which is the language learned from birth or early childhood and is often the primary language of communication for an individual. Language 2, also known as the second language, is a language that an individual acquires after their first language. It could be learned in school, through immersion programs, or through exposure in the community.

The distinction between Language 1 and Language 2 is commonly used to differentiate the proficiency level and the order in which languages are acquired. Language 1 is usually considered the stronger or more dominant language, while Language 2 may require more effort or practice to develop fluency. However, the proficiency levels can vary among bilingual individuals, and some individuals may achieve a high level of proficiency in both languages, blurring the distinction between Language 1 and Language 2.

1.2 Cognitive Development in Young Children

Cognitive development encompasses the progressive growth of “cognitive abilities, which include perception, attention, memory, reasoning, problem-solving, and metacognition, during childhood.” Piaget's cognitive development theory provides a valuable basis for understanding the cognitive milestones and stages that children typically go through. He perceived humans as constantly adapting to their physical and social environment and viewed cognitive growth as a progressive change. He identified 4 stages through which every individual progresses, with every stage having distinctive learning capabilities. However, it is important to consider how the bilingual or multilingual context may influence these developmental courses.

1.3 Language and Cognitive Development in DLLs: Theoretical Perspectives

1.3.1 The Linguistic Relativity Hypothesis (Sapir & Whorf, 1929)

The linguistic relativity hypothesis, “also known as the Sapir-Whorf hypothesis,” states that, “the structure and content of language influence the way individuals perceive and think about the world.” In the context of DLLs, this hypothesis suggests that differences in language structures and concepts may lead to variations in cognitive processes and problem-solving strategies.

1.3.2 The Bilingual Advantage Hypothesis (Peal & Lambert, 1962)

The bilingual advantage hypothesis suggests that “bilingual individuals, including DLLs, exhibit cognitive advantages compared to monolingual individuals.” These advantages may include enhanced executive functions, improved attentional control, and greater cognitive flexibility. Various studies have provided empirical evidence supporting this hypothesis, although the specific mechanisms underlying the bilingual advantage are still under investigation.

1.3.3 Theory of Cognitive Development (Piaget, 1936)

Jean Piaget proposed that, "children actively construct their understanding of the world through a series of stages:"

1. Sensorimotor stage (birth to 2 years): Infants learn about the world through their senses and motor actions. They begin to understand cause and effect relationships and develop object permanence.
2. Preoperational stage (2 to 7 years): Children start to represent objects and events using symbols, such as words and images. This is the stage where they show egocentric thinking and indulge in pretend play.
3. Concrete operational stage (7 to 11 years): Children acquire the ability to think logically about concrete objects and events. They start to understand conservations (that the quantity of a substance remains the same despite changes in appearance) and start to employ more systematic ways of problem-solving.
4. Formal operational stage (11 years and beyond): During adolescence, they acquire the ability to engage in abstract thinking and can reason hypothetically. They gain the ability to engage in complex problem-solving, think about possibilities, and consider multiple perspectives.

1.3.4 Dual Language Learning theories:

1. Interdependence Hypothesis (Cummins, 1978) proposed that the two languages in bilingual individuals are interconnected and influence each other during the language learning process. It suggests that "knowledge and skills developed in one language can transfer to the other language, facilitating overall language development."
2. Linguistic Threshold Hypothesis (Cummins, 1976) believed that there is a threshold level of proficiency in a second language that needs to be reached before bilingual individuals can fully benefit from their bilingualism. It suggests that once individuals attain a certain level of proficiency, they can effectively use both languages and experience cognitive and linguistic advantages.
3. Cumulative-Enhancement Model (Flynn et al., 2004) suggests that the positive effects of bilingualism on cognitive functioning and language development accumulate over time. It posits that as bilingual individuals continue to use and develop their languages, the benefits become more pronounced, leading to enhanced cognitive abilities and linguistic skills.
4. Dominance and Proficiency Model (Peal & Lambert, 1962). This theory emphasizes the role of language dominance and proficiency in bilingual individuals. It suggests that the language in which individuals have higher proficiency or dominance will influence their cognitive and linguistic abilities. The dominant language is often associated with better performance and faster processing.
5. Competition Model (Hermans & Bongaerts, 1999) proposed that, the two languages in bilingual individuals compete for cognitive resources during language processing. It suggests that there may be instances where the presence of two languages can lead to interference or difficulties in language production or comprehension.

1.4 Bilingualism and Multilingualism

Both bilingualism and multilingualism are considered valuable language skills, as they provide individuals with increased linguistic and cultural competence. Being bilingual or multilingual offers numerous benefits, including better communication abilities, enhanced cognitive flexibility, improved problem-solving skills, increased cultural understanding, and broader career opportunities. The extent of proficiency and the specific languages spoken

can vary among bilingual and multilingual individuals, depending on their exposure, education, and language use in daily life.

Bilingualism is the "ability of an individual to speak and understand two languages fluently." It involves being proficient in both languages and having the ability to switch between them depending on the context or communication needs. Bilingual individuals may have acquired their languages simultaneously from birth (simultaneous bilingualism) or learned a second language after already acquiring their first language (sequential bilingualism).

Multilingualism, on the other hand, refers to the "ability of an individual to speak and understand multiple languages." It goes beyond bilingualism and includes proficiency in three or more languages. Multilingual individuals may have gained their languages via multiple sources, such as being raised in a multilingual atmosphere, learning languages through educational and travel exposure, or having cultural or family bonds with different language communities.

1.5 Factors Affecting Cognitive Development in DLLs

a) Language Proficiency and Cognitive Performance: Research has shown that the level of language proficiency in both L1 and L2 significantly impacts DLLs' cognitive performance (Kalia et al., 2019) (Cervates and Hermsen, 2018) (Palomar et al., 2014). Higher levels of language proficiency in both languages have been associated with better executive functions, increased metalinguistic awareness, and improved cognitive flexibility. The relationships between language proficiency, cognitive abilities, and academic achievement in DLLs need to be further explored to inform effective language instruction strategies.
b) Language Transfer and Cross-linguistic Influence: Language transfer refers to the influence of one language on the acquisition or use of another language. DLLs may transfer linguistic features, structures, or cognitive processes from one language to another, leading to cross-linguistic influences on cognitive development. Understanding the patterns of language transfer can shed light on the cognitive advantages and challenges that DLLs may experience.
c) Socioeconomic Status and Language Exposure: Socioeconomic status (SES) and language exposure in the home and educational environments play vital roles in DLLs' cognitive development. Low SES and limited exposure to rich linguistic environments may pose challenges for DLLs, affecting their vocabulary development, working memory, and cognitive flexibility. Designing inclusive and supportive educational environments can help mitigate these disparities and promote positive cognitive outcomes.
d) Parental Involvement and Language Support: Parental involvement and language support strategies significantly impact DLLs' cognitive development. Encouraging and empowering parents to engage in language-rich activities at home, such as reading, storytelling, and maintaining strong connections to their cultural heritage, can foster cognitive growth and support academic success.
e) Educational Implications and Interventions for DLLs: Effective educational interventions and support systems are essential for promoting optimal cognitive development in DLLs. Culturally responsive teaching practices, bilingual education models, and targeted language instruction programs can facilitate the linguistic and cognitive growth of DLLs while valuing their cultural identities. Additionally,

fostering a supportive and inclusive classroom environment that embraces linguistic diversity can positively impact DLLs' cognitive abilities and academic achievements.

1.6 The Cognitive Advantages of Bilingualism

Executive Functioning One of the prominent cognitive advantages associated with bilingualism is enhanced executive functioning. This section examines the research on how bilingualism positively influences executive functions, including cognitive flexibility, attentional control, and working memory.

Metalinguistic Awareness refers to the "ability to think about and reflect upon language." This subsection investigates how bilingualism fosters metalinguistic awareness, enabling young dual language learners to develop a more profound understanding of language structures, grammar, and semantic nuances.

Cognitive Flexibility and Creativity Bilingualism has been linked to increased cognitive flexibility and enhanced creativity. This section explores the cognitive processes underlying these advantages and highlights empirical evidence supporting the notion that bilingualism nurtures cognitive flexibility and creative thinking in young children.

This research paper aims to explore the linguistic influences on the "cognitive development of young dual language learners." By examining the intricate relationship between language and cognition, we can gain valuable insights into the mechanisms through which language affects various aspects of cognitive development. This exploration is essential for educators, psychologists, and other professionals working with DLLs to develop evidence-based strategies that optimize their learning experiences and promote their overall cognitive growth.

REVIEW OF LITERATURE

Lopez in 2023 investigated the extent to which memory is affected by one's native language, according to linguistic relativity. To do so she conducted 4 experiments on English speakers and Spanish English bilingual speakers. The results of experiment 1 and 2 explored the effect of salience on recognition memory and judgement of similarity, while findings of experiment 3 and 4 demonstrated the ease with which verbally expressing path component affect encoding. Overall, the findings conclude that language influences memory, but it is the grammatical structures used to encode motor events, and not the grammatical structures of native language, which influence memory and perception.

Ratto et al. in 2021 in this research, wanted to explore "the impact of dual language learning (DLL) and socioeconomic status (SES) on parent-reported executive functioning, verbal ability, and social-emotional functioning" in a group of 53 dual language learners and 106 monolingual youth diagnosed with autism spectrum disorder (ASD) without intellectual disability. Both groups were matched based on "gender and full-scale IQ scores." After accounting for the influence of SES, the results revealed that monolingual youth demonstrated better outcomes in terms of verbal ability, while dual language learners exhibited fewer parent-reported difficulties related to "executive functioning and unusual behaviours." These findings suggest that bilingualism might alleviate executive functioning challenges among youth with ASD.

Pliatsikas et al. in 2020 attempted to examine how development of brain structures is influenced by bilingualism especially during childhood and adolescent years. They

examined a dataset of 711 individuals, ranging from 3-21 years for their grey matter and white matter metrics. It was found that around late childhood and adolescents, bilinguals show "more grey matter (associated with less developmental loss) and white matter integrity (associated with developmental increase)" as compared to monolinguals. These findings indicate that monolinguals and bilinguals show difference in brain development at an early age, and resilience to brain aging starts during early development in bilinguals.

Nishanthi in 2020 reviewed different research papers to understand the importance of native language in early learning and development. After intensive study, the researcher derived various conclusions that, learning to conversate in native language is a crucial part for the child's comprehension development. It also supports learning of secondary languages and enrich their cognitive development. What more was observed that children who received primary education in a secondary language they did not completely understand lead to inadequate acquisition and learning of skills and knowledge. Dropout rate was also high among such children.

Tannenbaum and Har in 2020 aimed to enhance the theoretical comprehension of the influence of native language on emotional processes and to offer practical recommendations for therapists and training institutions. The article specifically investigated the significance of utilizing native language in cognitive-behavioural therapy (CBT) when dealing with patients who are bilingual or multilingual immigrant. The reviewed studies indicated that conducting treatment in the patient's new language yielded moderate success in reducing anxiety and stress levels. However, for more complex mental conditions such as post-traumatic stress disorder (PTSD), there was limited improvement observed.

Alimi et al. in 2020 with this research wanted to assess the impact of native language instruction on the academic performance of primary class (V) students in literacy and numerical skills. A "pre-test/post-test control group quasi-experimental design" was employed, and a total of 233 participants were randomly chosen from three primary schools. The findings revealed a notable disparity in the achievements of students taught with mother tongue instruction compared to those using conventional strategies in both literacy and numeracy skills. Specifically, students who were exposed to the mother tongue strategy exhibited the highest average scores in post-assessment for both literacy and numerical skills. Therefore, the utilization of mother tongue instruction proved to be beneficial in enhancing the literacy and numerical abilities of primary school students.

Kalia et al. in 2019 wanted to examine the "connection between vocabulary and executive functions in DLL's". The researchers conducted a comparison between 61 DLL's enrolled in a "Spanish English dual language immersion program" and 55 "monolingual English-speaking" children attending a traditional English-only school. Children ranging from kindergarten to 3rd grade participated in the study and completed "standardized vocabulary tasks" as well as "two measures of executive functions." Despite having smaller English vocabularies compared to the monolingual children, the DLL demonstrated superior performance on the executive function measures.

Cervantes and Hermsen in 2018 assessed how accurately bilinguals self-perceive memory in Spanish (L1) and English (L2), to find out if an individual has more accurate metamemory in primary or secondary language. It was hypothesized that memory associated to English information would be more accurately judged by native Spanish speakers, than memory for Spanish information. The participants consisted of 16 Spanish English bilinguals. It was

found that the English JOLs (judgement of learning) were more accurate in judgements that the Spanish JOLs. Not only this but, same patterns of actual memory. These results suggest that bilingual speakers evaluate their memory more accurately in L2 compared to L1, which means while learning or remembering any information which is not in the speaker's native language, they monitor the ongoing cognitive functions more closely.

Lane et al. in 2018 explored the impact of "cognitive control on the acquisition of second language vocabulary in dual language learners." Spanish English dual language learners from a "Spanish English immersion program" in the US were assessed for first and second language vocabulary, phonological awareness, and cognitive control. The participants came from monolingual homes and acquired their second language in school. The results showed a strong negative correlation between the children's first language vocabulary and their second language vocabulary. Additionally, their sound segmenting skills, specifically elision, predicted both first and second language vocabulary scores. Mediation regression analyses indicated that the "relationship between first and second language vocabulary was mediated by phonological awareness." These findings underscore the significance of "sound segmenting skills" in the acquisition of "second language vocabulary."

Cox et al. in 2016 examined the relation between bilingualism and social cognition and executive functioning. The researchers studied a total of 90 males, out of which 26 participants were bilingual, and 64 participants were monolingual. An intelligence test was administered on them at the age of 11 and they were later again assessed at the age of 74 for different executive and social cognition tasks. The results of the study revealed that there is a selective and bi-directional relationship between cognitive functions and bilingualism. It is also safe to conclude that learning dual languages equips an individual to better understand and process a conflict.

Dukhan et al. in 2016 aimed to determine if there were disparities in the quality of English notes created by students based on whether English was their first or second language. A sample of 90 students (30 per year) was randomly selected. It was also examined whether these differences had an impact on their academic grades. As expected, students whose first language was English produced notes that were better organized and more comprehensive, and they also achieved higher academic performance compared to students whose second language was English. However, when students received training that emphasized using writing to enhance critical thinking, there was a notable enhancement in the individualization of their notes. This improvement had a significant positive effect on the grades of second-language students.

Alhuqbani in 2016 aimed to validate "Bialystok's theory on analysis and control in a bilingual population." The participants included "twenty Arabic-English bilingual children in grades 1 and 2", along with five English monolingual children. All children completed six metalinguistic tasks and a language proficiency test. The results provided support for Bialystok's assertion that there would be no significant difference between bilingual and monolingual children in solving "metalinguistic tasks that require a high level of linguistic knowledge analysis." However, the findings did not support Bialystok's claim that bilingual children would outperform monolingual and partially bilingual children in "metalinguistic tasks" that require strong attentional control. Specifically, English monolingual children performed better than "Arabic-English bilingual children on symbol substitution and grammaticality judgment related tasks."

Zauche et al. in 2016 with this comprehensive review aimed to "assess the impact of language nutrition", which includes "talking, interacting, and reading, on early childhood language and cognitive development". A systematic search was conducted in various databases, along with a review of relevant articles published between 1990 and 2014. Out of 1273 articles initially identified, 103 articles met the search criteria. The findings consistently indicate that the amount and quality of verbal communication, interaction, and reading experienced by children during the first three years of life significantly influence their "language and cognitive development," as well as their "readiness for school and academic performance."

Caldwell in 2015 attempted to understand if language impacts affective processing of an individual (foreign vs native). They reviewed several papers to understand the phenomena governing this affect and the practical applications it could have. One such article was where the researcher used online questionnaire with a sample of 1500 respondents. The findings implied that when the language was learned through social interactions or naturalistically, it was a preferred medium to express emotions as it felt more emotional. After reviewing many such studies, the researchers were able to draw the conclusion an individual associates more emotions with their native language as compared to the foreign or second language and hence whenever some situation requires to think and decide more analytically and reasonably, people are often seen doing that in their 2nd language. This is because of the reduced emotional component of the 2nd language.

Barac et al. in 2014 reviewed the "cognitive development of young bilingual learners".
The researchers reviewed major databases of studies conducted with developing preschool bilingual learners between 2000 to 2013 and 102 reviewed articles. The study aimed to examine mainly the effects on executive functioning processes like inhibitory control, working memory and cognitive flexibility. The research conducted on development of executive functioning in children under 6 years of age have focused primarily on nonverbal tasks using visual stimuli. It was found that Bilingual children performed better than monolingual children on a series of executive control tasks that assessed different components of "executive function," although this advantage was relatively strong in "inhibitory control and cognitive flexibility." These results demonstrate that a clear superiority of bilinguals in enforcement administration is evident from the first year of life, applies to different language pairs and differs from the influence of "culture, immigration history and language of instruction."

Costa et al. in 2014 evaluated how "decision making is influenced by the language in which a particular problem is presented (native language (NL) and foreign language (FL))" The study was inspired by the previous findings of study conducted by Keysar et al. in 2012, The researchers tested about 700 participants on different kinds of decision-making problems and reported 4 major studies. The results of this study indicated towards some general conclusions: a.) framing effects were diminished in the Fl condition compared to the NL condition, i.e., there is a decline in loss aversion when using FL; b) use of FL promotes coherent choice behaviour and reduces aversion to ambiguity; c) FL processing makes people more risk neutral and therefore they give more objective answers to problems in FL; c) decision making in settings that evoke biases based on emotional responses are sensitive to the language in which the problems are described. Overall, we can conclude that these findings point towards a direct effect of FL on decision making. They also report that when a problem is reported in FL, the choices made are more objective and based on rational and logical thinking as they are less influenced by intuitive biases.

Kaushanskaya et al.in 2014 investigated whether bilingual education in the classroom affects "children's cognitive function by comparing monolingual children" with those who had studied Spanish for an average of two years in the classroom. This study focused on cognitive abilities that previous studies have shown to be "sensitive to bilingualism" like "Task switching, verbal memory, word learning." Bilingual and monolingual children were found to perform similarly in the classroom on task substitution and measures of short-term verbal memory. Therefore, it is safe to conclude that exposure to bilingual classrooms does not affect "task-shifting skills and short-term verbal memory." In contrast, bilingual classroom promotes verbal working memory and learning.

Kilman et al. in 2014 in the present study investigated how fluency of a non-native language affects the perception of speech in noise. 23 native Swedish listeners with normal hearing participated, aged 28 to 64. Participants also completed standardized tests of English fluency, nonverbal reasoning ability and working memory. The study explores how English proficiency affects speech perception of native speakers (Swedish) and non-native speakers (English) under four speech receptivity threshold conditions (SRT), including two energy masks and two information masks. The main result was that for non-native speakers, English proficiency was a determinant of speech intelligibility in noise. High proficiency in English language enhanced performance in all four conditions when English was used at the target language. In summary, it has been observed that fluency in a non-native language greatly affects the "perception of speech in noise." The study provided evidence supporting the "prediction that informational maskers affect speech intelligibility more than energetic noise maskers" specifically for non-native targets. The research also validated that SRT performs more effectively when used with a native language as opposed to a non-native language.

Palomar et al. in 2014 attempted to determine whether "neural activation differs between bilinguals and monolinguals when performing a receptive and expressive language task in their native language." The current study used "fMRI to measure brain activity" during "passive listening and visual naming tasks" with a group of highly competent "Spanish-Catalan bilinguals," with predominant Spanish, and a group of native Spanish speakers.

The sample group had a mean age of 19yrs and consisted of 44 undergraduates out of which 21 were Spanish monolinguals and 23 Spanish-Catalan bilinguals. Three main results were observed: a) both monolinguals and bilinguals produced similar neural activations during the listening task; b) bilinguals and monolinguals produced different neural activations during the picture naming task; c) the difference between the neural activities of bilinguals and monolinguals was affected by the similarity between translation words of L1 (language 1) and L2 (language 2). It was thus concluded that overall auditory word processing of L1 is not considerably affected by handling two languages; speech production processes of native language are affected by bilingualism; more language areas of the brain are activated by monolinguals than bilinguals while performing the same language tasks.

Leikin and Tovli in 2014 aimed to explore the potential influence of "bilingualism on creativity in nonmathematical and mathematical problem-solving abilities among preschool-aged children." The study involved two groups of children, with an average age of 71 months, from monolingual kindergartens. One group consisted of 15 balanced bilingual children proficient in both Russian and Hebrew, while the other group comprised 16 monolingual children who spoke only Hebrew. All participants underwent various assessments, including "the Working Memory Test, Verbal (Semantic) Fluency Test, Pictorial Multiple Solution Task to measure general creativity, and Creating Equal Number

Task to evaluate mathematical creativity." The findings revealed that balanced bilingualism had a positive impact on the development of problem-solving creativity; however, the specific effect varied depending on the type of creativity: verbal, general, or mathematical.

Hammer et al. in 2014 conducted a thorough examination of the literature, involving a "search of major databases for studies focusing on young typically developing dual language learners (DLLs) between 2000 and 2011." A total of 182 peer-reviewed articles were identified and analysed. Conclusions were drawn based on the availability of sufficient evidence in specific areas. The findings indicate that DLLs possess two distinct language systems from an early age. Furthermore, differences in certain aspects of language development, such as vocabulary, seem to exist among DLLs depending on the timing of their exposure to the second language. "DLLs' language and literacy development may differ from that of monolinguals initially, but DLLs tend to catch up over time."

Li in 2013, in the following study investigates the interaction between "two types of feedback (implicit and explicit) and two skill components (linguistic analysis and short-term memory) in learning Chinese as a second language." 78, L2 Chinese learners from two major US universities were sampled. Treatment efficacy was measured with a grammatical judgment test and an elicited imitation test. "Multiple regression analyses" showed that "language analytic ability" predicted the impact of "implicit feedback, and that working memory mediated the effect of explicit feedback."

Nicolay and Poncelet in 2013 with this study wanted to examine the "impact of bilingualism acquired through second-language immersion education on cognitive development." The study involved a "total of 106 eight-year-old" French-speaking children, divided into "two language groups: 53 children" who had been enrolled in "English immersion classes since the age of five (the immersion group) and 53 children attending monolingual French-speaking classes (the monolingual group)." The two groups were carefully matched in terms of "verbal and nonverbal intelligence as well as socioeconomic status (SES)." The findings indicated that the immersion group exhibited significantly faster reaction times compared to the monolingual group in tasks assessing "alertness, auditory selective attention, divided attention, and mental flexibility," although there was no significant difference in interference inhibition. These results suggest that even after a relatively short period of three years, a second-language immersion education can yield certain cognitive benefits associated with early bilingualism.

Kapa and Colombo in 2013 aimed to examine how" the age at which a second language (L2) is acquired affects the cognitive advantages associated with bilingualism in childhood." Specifically, the focus was on comparing the "attentional control abilities" of bilingual children who varied in the age at which they started speaking their L2. The participants, ranging in age from 5;8 to 14;11, were 79 school-age children. To assess attentional control, the Attention Network Test (ANT) was administered. The findings revealed that early bilingual children exhibited "faster responses on the ANT compared to both monolingual and later bilingual children." This suggests that early bilinguals have an "advantage in attentional monitoring." The findings support the notion that "children who begin speaking a second language at an earlier age may have larger advantages" due to either the specific effects of early L2 acquisition during development or the longer duration of bilingual experience.

Jang et al. in 2013 investigated the variations in "reading achievement and mastery skill development among Grade-6 students with different language backgrounds." The researchers employed cognitive diagnosis modelling. The findings showed that students residing in different language environments at home exhibited distinct patterns of reading achievement growth. Over time, any initial gaps in reading achievement diminished for students who resided longer in a community where the target language was spoken. Furthermore, students who used English and another language equally in their home environments displayed higher levels of skill mastery achievement. This suggests that the diverse language environments of immigrant students do not have a negative impact on their long-term reading achievement. The study's results provide support for the notion that "multilingual home language environments are not a contributing factor to low academic achievement."

Kulkarni in 2012 wanted to investigate the impact and significance of multilingualism on children's cognitive development. Through a review of previous studies, it was determined that multilingualism does not negatively affect cognitive development in children. On the contrary, multilingualism plays a crucial role in enhancing cognitive development. It is recommended that children be exposed to multiple languages, using appropriate language teaching methods, during the critical stages of cognitive development.

Diaz et al. in 2012 aimed to study how self-regulatory private speech development is affected by bilingualism. The sample for this study comprised of 34 preschool students, who spoke Spanish and learned English as a secondary language. The observations for the same were video recorded as the students worked in a classroom setting. The results showcased normal private speech development in bilingual children. The results also indicate that bilingual school programmes affected private speech positively and also supported other diverse functions.

Significance of the Study

The findings of this study contribute to a deeper understanding of the cognitive benefits and challenges associated with dual language learning. By identifying the factors that influence DLLs' cognitive development, this research provides valuable insights for educators, psychologists, and policymakers. Understanding these dynamics enables the creation of culturally responsive teaching methods and supportive environments that foster academic success and overall well-being for DLLs. Furthermore, this study underscores the importance of leveraging bilingualism as a cognitive and social asset in diverse communities.

METHODOLOGY

This study employed secondary research ("the process of gathering and analysing existing data and information that has already been collected by others, rather than collecting data directly from primary sources.") to analyse and synthesize existing data on linguistic influences on the cognitive development of DLLs. Peer-reviewed journal articles, books, and credible online databases were reviewed to ensure a comprehensive understanding of the topic.

Sources were included based on:

- Relevance: Studies focusing on dual language learners, bilingualism, and cognitive development.
- Timeframe: Research conducted between 2010 and 2023 to ensure current and relevant findings.

- Peer Review: Only articles published in peer-reviewed journals were considered to maintain academic rigor.
- Geographic and Demographic Diversity: Studies encompassing various cultural and linguistic backgrounds to provide a holistic perspective.

Aim

To assess the linguistic influences on cognitive development of young dual language learners

DISCUSSION AND CONCLUSION

Bilingualism, the "ability to speak and understand two languages," has become a subject of growing interest among researchers in the field of cognitive development and education. The present discussion aims to critically analyse and synthesize findings from various research studies that explore the effects of bilingualism or dual language learning on cognitive functions, decision-making, memory, executive functions, metamemory, brain development, and academic performance. The studies reviewed in this research paper provide valuable insights into the various aspects of bilingualism and its impact on cognitive development, decision making, memory, language processing, and academic performance. The findings from these studies contribute to our understanding of how bilingualism influences different cognitive functions and shed light on the advantages and challenges associated with being bilingual.

Several studies focused on the cognitive development of young bilingual learners. (Barac et al., 2014) found that "bilingual children outperformed monolingual children in executive control tasks, particularly in inhibitory control and cognitive flexibility". This advantage was observed from an early age and was independent of factors such as culture, immigration history, and language of instruction. Kaushanskaya et al. (2014) examined the effects of bilingual education in the classroom and found that "bilingual and monolingual children performed similarly in task-shifting and short-term verbal memory tasks", but bilingual children showed advantages in verbal working memory and word learning. Decision making was another area of focus in several studies. Costa et al. (2014) demonstrated that decision making can be influenced by the language in which a problem is presented. Bilingual individuals showed reduced framing effects, increased coherent choice behaviour, and greater risk neutrality when using a foreign language, leading to more objective decision making. This suggests that the use of a second language can mitigate certain biases associated with decision making. The results from these studies highlight the positive impact of bilingualism on executive functions and decision-making, suggesting cognitive advantages for bilingual individuals.

The influence of bilingualism on social cognition and executive functions was investigated by Cox et al. (2016). They found a selective and bidirectional relationship between cognitive functions and bilingualism, indicating that learning two or multiple languages enhances an individual's ability to understand and process conflicts and may improve social cognition skills. This highlights the cognitive advantages associated with bilingualism and its potential impact on social cognition. Meanwhile, Kilman et al. (2014) focused on non-native language proficiency and its influence on speech perception. Their study suggested that high fluency in a non-native language improved speech intelligibility in noise. The combination of these findings indicates that bilingual individuals may possess better social cognitive skills and speech perception abilities, demonstrating the broader social benefits of bilingualism.

Language and memory were explored in the study by Lopez (2023). The findings indicated that language influences memory, particularly in relation to the grammatical structures used to encode motion events. The study suggested that the grammatical structures used to describe motion events affect memory and perception, regardless of whether they are from the native language or a second language. Furthermore, Li (2013) studied "the interactions between implicit and explicit feedback and individual differences in language analytic ability and working memory". The results suggested that the effectiveness of feedback in second language learning was influenced by individual cognitive abilities. These findings emphasize the role of language and cognitive factors in memory and learning processes, underscoring the complexity of bilingual cognition.

The impact of bilingualism on brain development was examined by Pliatsikas et al. (2020) and Pliatsikas et al. (2020). They found that bilingual individuals showed differences in brain structures, with increased grey matter and white matter integrity compared to monolingual individuals. These findings suggest that bilingualism has a positive impact on brain development, starting from an early age.

The importance of the mother tongue in various contexts was highlighted in several studies. Nishanthi (2020) emphasized the crucial role of the native language in a child's comprehension development and cognitive enrichment. Díaz et al. (2012) demonstrated that bilingual school programs positively affected private speech development in children, supporting diverse functions. Additionally, Dukhan et al. (2016) showed that students' academic performance and note-taking abilities were influenced by their first or second language. These studies highlight the positive effects of bilingual education on cognitive skills and the importance of mother tongue learning in supporting children's comprehension and overall development.

In conclusion, the reviewed studies provide valuable insights into the effects of dual language learning on various aspects of cognitive development, decision making, memory, language processing, brain development, and academic performance of young learners. The findings consistently demonstrate cognitive advantages for bilingual individuals, including enhanced executive functions, improved decision making, better social cognition skills, and increased speech perception abilities. Bilingualism also influences memory and learning processes, highlighting the complex interplay between language and cognitive factors. Furthermore, bilingualism has been shown to positively impact brain development, with differences observed in brain structures of bilingual individuals compared to monolingual individuals. The studies also underscore the importance of the mother tongue in cognitive enrichment and comprehension development, as well as the positive effects of bilingual education on academic performance. Overall, these findings contribute to our understanding of the advantages and challenges associated with bilingualism, emphasizing its potential for enhancing cognitive abilities and supporting individuals' overall development. By unravelling the intricate relationships between language, cognition, and environmental factors, educators, policymakers, and researchers can collaborate to develop evidence-based strategies that optimize the cognitive growth and academic success of DLLs. Through such efforts, we can foster inclusive educational environments that embrace linguistic diversity and promote the holistic development of young dual language learners.

Limitations

This study is limited by its reliance on secondary research, which may not fully capture the nuances of individual experiences among DLLs. Additionally, the reviewed studies vary in methodologies and sample populations, which could influence the generalizability of findings.

Future Implications

Future research should focus on longitudinal studies to track the cognitive development of DLLs over time. Exploring interventions that address socioeconomic disparities and leveraging technology to enhance bilingual education could provide actionable insights. Expanding research to include diverse linguistic and cultural contexts will further enrich our understanding of bilingualism's impact on cognitive development.

Bilingualism offers significant cognitive advantages, supporting lifelong learning and adaptability. Through continued research and practice, educators and policymakers can foster inclusive environments that empower DLLs to thrive.

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Conflict of Interest

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