Bilingualism: The Interaction of Neurobiological, Social, and Educational Factors in Second Language Acquisition (SLA)

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Abstract:

Second Language Acquisition (SLA) is a complex and multidimensional field of research, encompassing factors such as age, environment, motivation, and social context. This study aims to review recent advancements in SLA theories and practices, with a focus on variability, plasticity, and the influence of age in second language acquisition and bilingualism. The review also explores social dimensions and multilingual processes within transnational contexts. A systematic review was conducted following PRISMA guidelines. Literature searches were performed in academic databases such as Scopus, PubMed, and Google Scholar using keywords including "second language acquisition," "bilingualism," "age of acquisition," and "multilingual socialization." Articles published between 2018 and 2023 were selected based on relevance and quality. The selection process involved identification, screening, and quality assessment of studies meeting inclusion criteria. Relevant data were extracted and analyzed thematically. The findings reveal that age plays a critical role in modulating plasticity and variability in SLA, with critical periods significantly influencing second language proficiency. Factors such as motivation, self-confidence, and social environment also contribute substantially to successful language learning. Additionally, recent studies emphasize the importance of social dimensions and multilingual practices in global contexts, including translanguaging and incomprehensible. This review identifies challenges and inequities faced by language learners from minority backgrounds. The findings highlight the need for more holistic and inclusive approaches in SLA research and pedagogy, considering socio-political contexts and multilingual identities. Practical implications include developing flexible curricula and teaching methods that support language learning in diverse environments. Further research is required to explore the interplay between neurobiological, cognitive, and social factors in SLA.

Keywords: Second Language Acquisition; bilingualism; age; plasticity; social dimensions

INTRODUCTION

Second Language Acquisition (SLA) has been widely studied in applied linguistics, education, and psychology. SLA refers to the process through which individuals acquire a language other than their native one (Ellis, 2019). It has been shown that age plays a significant role in determining second language success. Neuroplasticity is higher in younger learners, allowing them to achieve native-like proficiency in aspects like

phonology. However, adult learners may excel in syntactic comprehension. Various theories have been developed to explain how a second language is acquired, including nativism (Chomsky, 1965), behaviorism (Skinner, 1957), and input hypothesis by Krashen (1982), which emphasizes the role of social interaction in language learning through the Zone of Proximal Development (ZPD). This study aims to analyze how factors such as age, motivation, and environment influence SLA, and how effective teaching methods can be applied.

METHOD

This study is a systematic literature review following PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). Literature searches were conducted in databases such as Scopus, PubMed, and Google Scholar, using keywords such as "Second Language Acquisition (SLA)", "Language Learning Theory", "Bilingualism and Age", and "Krashen Input Hypothesis". Inclusion Criteria include studies addressing age, motivation, and social interaction in SLA, which are aligned with the main topics of this research. Meanwhile, the Exclusion Criteria consist of articles unavailable in full text, studies not using experimental or correlational approaches, and articles focusing only on phonology without connection to SLA. Data selection was done through identification, screening, and quality assessment based on predefined criteria, focusing on the neurobiological and social aspects of SLA.

PRISMA Flowchart

After conducting a literature search, the data collected were analyzed using the PRISMA method, with the following breakdown: Articles found (PubMed, Scopus, Google Scholar): 75; Articles after duplicate removal: 63; Articles selected based on abstract: 40; Articles meeting inclusion criteria: 20; and Final articles used in analysis: 10.

RESULTS AND DATA ANALYSIS

Study 1: Plasticity, Variability, and Age in SLA

Method: Experimental study using fMRI analysis to observe brain activity in SLA.

Findings: The younger the age at which second language acquisition begins, the more likely the individual is to reach fluency levels similar to a native speaker.

Discussion: Age has a significant impact on SLA due to the decreased plasticity of the brain as one ages (Birdsong, 2018).

Study 2: The Role of Motivation in SLA

Method: Quasi-experimental study using motivation surveys and language proficiency tests.

Findings: Intrinsic motivation has a greater impact than extrinsic motivation on language skills.

Discussion: Learning environments that offer opportunities for practical language use are more effective in improving SLA.

Study 3: Interactionist Perspective on SLA

Method: Observational study of bilingual and monolingual children.

Findings: Bilingual children show higher cognitive flexibility compared to monolingual children.

Discussion: Social interaction in bilingual environments enhances metacognitive capacity and language processing (Duff, 2019).

DISCUSSION

Based on the analysis of various journals, the following key findings in SLA emerge:

Age and SLA: Children have an advantage in phonology, while adults are more proficient in syntactic comprehension.

Motivation as a Key Factor: Learning based on intrinsic motivation is more effective in improving language skills compared to methods based on rewards or punishments.

Social Interaction: Models that involve real communication are more effective than methods based on rote learning or explicit grammar rules.

Recommendations: Use interaction-based approaches in language teaching, increase exposure to second languages in authentic environments, develop language immersion programs in educational institutions.

CONCLUSION

Second Language Acquisition is a process influenced by age, motivation, and social environment. Studies show that children excel in phonology, but adults outperform in grammatical understanding. Intrinsic motivation and social interaction are key factors in SLA, making interaction-based teaching methods preferable to rote memorization.

Future research should focus on longitudinal studies on the long-term effects of SLA, further research on neuroplasticity in SLA, and evaluating the effectiveness of AI-based learning technologies in enhancing SLA·

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