

A Study on the Influencing Factors of Second Language Vocabulary Acquisition -- From the Perspective of Individual Differences

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Abstract: The acquisition of second language (L2) vocabulary is a complex process influenced by various factors, with individual differences playing a crucial role. This study examines multiple individual factors and explores their impact mechanisms based on existing theoretical frameworks such as the Input Hypothesis, the Involvement Load Hypothesis, and Sociocultural Theory. Drawing from existing literature, the research examines how gender, working memory, learning motivation, first language (L1), and age impact vocabulary acquisition. The findings reveal that while some factors significantly influence the vocabulary acquisition process, the mechanisms and interactions involved are complex and produce various results. The study suggests future research to further explore the interactions between these individual difference factors and their effects in various learning contexts, with the aim of offering theoretical support for the development of more effective personalized vocabulary teaching strategies.

Keywords: Second language acquisition, vocabulary acquisition, individual differences, input hypothesis, learning motivation

1. Introduction

Vocabulary acquisition plays a critical role in second language (L2) acquisition, impacting all language skills, including listening, speaking, reading, and writing. Notably, vocabulary learning is a multidimensional process, requiring attention to both the "breadth" and "depth" of vocabulary. The "breadth" refers to the vocabulary size needed to meet various task demands. Existing research indicates that learners need to acquire between 4,000 to 8,000 word families to satisfy the requirements for comprehension in written language [1]. On the other hand, the "depth" of vocabulary encompasses more than just meanings; it includes knowledge about usage, collocations, and cultural contexts. This demonstrates that vocabulary acquisition is a significant and complex learning activity, increasingly drawing the attention of researchers.

Given its importance, vocabulary acquisition is increasingly recognized as a complex and significant aspect of L2 learning, attracting considerable research attention [2,3].

Compared to other factors such as gender, age, and first language(L1), learners' personal motivation and cognitive abilities are particularly noteworthy. These factors, which fall under the broader category of individual differences, play a crucial role in shaping vocabulary learning outcomes. Therefore, this review aims to explore the individual differences affecting L2 vocabulary

acquisition, intending to provide theoretical support and deeper research directions for vocabulary teaching and learning.

2. Theoretical foundations of L2 vocabulary acquisition

Vocabulary acquisition is an important part of second language (L2) acquisition. To gain a deeper understanding of vocabulary acquisition, it is necessary to be familiar with some relevant theories of L2 acquisition.

2.1. Input Hypothesis

In the 1980s, Krashen proposed the revolutionary Input Hypothesis, marking an important milestone in the history of L2 acquisition research. The central idea of the Input Hypothesis is that language learners acquire new linguistic knowledge primarily through exposure to "comprehensible input." This input should be slightly above the learner's current proficiency level, often referred to as the "i+1" model. In this framework, "i" represents the learner's current language level, while "+1" indicates that the input should be slightly higher than the learner's current level to facilitate language development.

Building on this, Krashen and Cho further emphasized the need for high-quality and meaningful language input in vocabulary acquisition[4]. Their experiments found that when learners encountered new vocabulary that whose meanings could be inferred from the context while reading, those words were more likely to be acquired. This implies that for learners to acquire new vocabulary, they need to be exposed to the usage of those words in authentic contexts.

However, some researchers have argued that whether increasing input levels alone guarantees effective language acquisition. In response, Swain proposed the Output Hypothesis, emphasizing that learners also need to engage in language output to consolidate and internalize language knowledge[5]. In 1996, Long introduced the Interaction Hypothesis, stating that language acquisition also occurs when learners attempt to communicate in the target language[6]. This interaction prompts learners to notice language forms and engage in processing them. Moreover, Ellis proposed a dynamic model of second language acquisition that highlights the interaction of various factors, including input, output, learner awareness, and cognitive resources[7].

Despite the controversies, the Input Hypothesis remains a significant theory in L2 vocabulary acquisition research. The criticisms and supplements to the Input Hypothesis further demonstrate that vocabulary acquisition requires not only more diverse and complex input but also interaction, output, and a variety of cognitive factors that contribute to the process.

2.2. Involvement Load Hypothesis (ILH)

The Involvement Load Hypothesis (ILH), proposed by Laufer and Hulstijn, builds upon the Depth/Levels of Processing Theory from cognitive psychology. This theory seeks to explain how information is processed and remembered, with a particular focus on the retention and retrieval in long-term memory. The ILH applies this cognitive concept to the assessment and optimization of second language vocabulary acquisition tasks[8].

The ILH posits that the degree of cognitive involvement in language input (i.e., the amount of effort learners put into processing language input) is a key factor determining the success of vocabulary acquisition. According to the ILH, cognitive involvement can be measured through three main cognitive loads: need, search, and evaluation. The research empirically demonstrated that words processed with a higher Involvement Load (IL) are retained better than those processed with a lower IL[8].

However, many studies have shown results that are inconsistent with ILH predictions. For instance, activities with higher IL do not necessarily yield more effective vocabulary learning compared to those with lower IL, or activities with the same IL can result in significantly different learning outcomes[9-11]. To address the inconsistencies in research findings and improve the existing ILH model, researchers conducted a meta-analysis of related studies, incorporating more influencing factors and more precisely measuring the effect levels of different components of IL, leading to the proposal of ILH Plus, which enhances the reliability of the ILH model [12].

In conclusion, both the original ILH and refined ILH Plus lay a preliminary theoretical framework that can help scholars and educators better understand the factors that facilitate or hinder vocabulary acquisition, providing a robust tool for understanding and predicting the cognitive mechanisms involved in second language vocabulary acquisition.

2.3. Social and cultural theory

Sociocultural Theory, proposed by Russian psychologist Lev Vygotsky in the 1920s and 1930s, emphasizes the interplay between internal and external factors in learners' cognitive development and highlighting the role of social interaction and cultural tools in this process. The concepts of mediation, Zone of Proximal Development (ZPD), and scaffolding from sociocultural theory have had a significant impact on the field of second language (L2) acquisition [13].

According to sociocultural theory, human activities are regulated and controlled through symbolic artifacts, with language being the most commonly used symbolic tool. Language serves as a medium for thinking and cognitive development. Vygotsky's concept of ZPD indicates that learners can perform at a higher level with the assistance of more capable others than they would be able to on their own [14,15].

Linguists have extended Vygotsky's framework to explain the social and collaborative aspects of language learning. Long emphasized the role of social interaction in language acquisition, noting that learners need to communicate through actual language use to promote language development[6]. Research by Doughty and Pica showed that collaborative learning environments can enhance language acquisition by providing social interaction and scaffolding within the ZPD[16]. In this framework, second language learners can acquire more advanced language structures with the support of teachers or peers. Scaffolding refers to the assistance provided by teachers or peers that helps learners complete learning tasks. As learners' abilities improve, the scaffolding gradually decreases until they can complete tasks independently.

Nonetheless, some linguists have pointed out that sociocultural theory may overemphasize the role of social interaction while neglecting the impact of individual differences and intrinsic motivation on learners' cognition and development [17,18].

3. Individual difference factors influencing L2 vocabulary acquisition

3.1. Gender

While extensive research exists on the impact of gender on overall second language (L2) acquisition, studies specifically examining the relationship between gender and L2 vocabulary acquisition are relatively limited. Most of these studies differentiate between informal and formal learning environments.

Sylvén and Sundqvist found that boys tend to acquire more vocabulary through games than girls, which may be attributed to their more frequent participation in gaming, leading to greater exposure to English[19]. Hannibal Jensen, on the other hand, observed no significant gender differences in meaning recognition tests but noted that boys' scores were influenced by gaming, an effect not seen in girls. This suggests that girls may benefit more from classroom input, while boys may rely on gaming

for similar vocabulary outcomes[20]. Puimège and Peters found that boys scored higher in meaning recognition and recall tests, attributing this to their increased vocabulary exposure through gaming[21]. However, they did not establish a direct link between gender and vocabulary acquisition, proposing that the observed vocabulary advantage for boys was more likely related to their gaming habits rather than gender itself. Notably, in their study of French learners, no such gender-based gaming advantage was observed, as boys rarely engaged with games in French.

Overall, boys often perform better than girls in informal language learning environments, while girls typically outperform boys in classroom settings. These findings suggest that the differences in vocabulary acquisition between genders may be influenced by external factors, such as learning environments and the types of activities in which learners engage. Future research may focus on examining learners' receptive vocabulary knowledge in two foreign languages—one learned in formal education and the other acquired informally—and explore potential gender differences within these distinct contexts.

3.2. Working Memory

Working Memory(WM), as a critical cognitive skill, exhibits significant individual differences and greatly influences learners' vocabulary acquisition achievements[22]. Research has shown that learners with greater WM capacity perform better in vocabulary acquisition, indicating that WM capacity significantly impacts language learning. For instance, in multimedia vocabulary input environments, learners with high WM capacity can more effectively coordinate cognitive and linguistic resources, resulting in better retention of learning outcomes [23]. Other studies have found that WM affects phonological skills, further influencing English vocabulary learning. Karousou and Nerantzaki conducted research involving phonological memory training, demonstrating a significant relationship between phonological working memory and L2 vocabulary size. Their findings demonstrated that phonological memory training could enhance vocabulary acquisition for young second language learners[24]. However, earlier studies have failed to establish a significant relationship between WM and vocabulary learning outcomes. Yang and other researchers indicated that WM was a significant predictor of vocabulary scores for two other groups but not for the sentence writing group, suggesting that the role of WM may vary depending on the type of learning activity[9]. Li Hong also found no significant inhibitory effect of WM capacity on the semantic retrieval of second language vocabulary, nor a strong linear relationship between WM span and L2 vocabulary knowledge levels[25]. It is worth noting that Li Hong's study involved undergraduate students majoring in English.

In summary, current researches can underscore the importance of WM in second language vocabulary learning. However, its influence may be moderated by various factors, including the type of learning activity and the cognitive skills of the learner.

3.3. Motivation

Learner motivation is considered a key factor in L2 acquisition [26]. Among the various psychological theories of motivation, Deci and Ryan's Self-Determination Theory (SDT) posits that a characteristic of individual motivation is the level of autonomy exhibited by individuals in learning activities[27]. It distinguishes between two broad motivational orientations: extrinsic motivation, which aims to achieve goals outside the activity, and intrinsic motivation, which stems from the inherent satisfaction provided by the activity itself.

Regarding extrinsic motivation, Deci and Ryan categorize it into three forms, ranging from least autonomous to most autonomous: 1) External regulation, which is characterized by low autonomy where learning is driven by external rewards or threats of punishment; 2) Introjected regulation,

representing a partial internalization of learning behaviors that are not fully self-determined; 3) Identified regulation, occurring when an individual fully internalizes the importance or value of the learning task, leading to a more autonomous form of extrinsic motivation.

In contrast, intrinsic motivation is further categorized by Vallerand and other researchers into three types: 1) Knowledge, where learners feel pleasure or satisfaction in acquiring new information; 2) Achievement, based on the accomplishment of specific learning goals; 3) Stimulation, related to the excitement and thrill derived from the learning process itself [28].

Despite the considerable research on motivation in L2 acquisition, studies specifically investigating its impact on vocabulary acquisition remain relatively limited. Zheng affirmed the crucial role of motivation in Chinese university students' vocabulary learning of English as a foreign language[29]. Similarly, Fontecha and Gallego found a correlation between motivation and L2 learners' knowledge of Spanish vocabulary[30]. However, both studies did not differentiate between forms of intrinsic and extrinsic motivation, and the question of how different motivational factors differently influence L2 vocabulary acquisition remains to be explored.

3.4. L1

Learner's L1 plays a crucial role in the process of learning a L2. The accumulation of vocabulary is a core aspect of this process and is significantly influenced by L1. How L1 shapes L2 vocabulary learning is cognateness is a widely discussed question.

Swan explained the influence of the mother tongue on foreign language vocabulary learning and application, particularly highlighting the importance of cognateness [31]. Cognates are words that have similar forms and meanings across different languages and share a common root. Research by Hulstijn and Laufer conducted with English learners in Israel and the Netherlands showed that the influence of L1 on L2 vocabulary learning varies among different learner groups[8]. Their findings indicated that while cognateness plays a key role in vocabulary learning, its effect might differ due to L1 differences among learners.

Gooskens and other researchers explored the concept of mutual intelligibility based on cognates, referring to the ability of speakers using closely related languages to understand each other without prior study of the other's language[32]. Uchihara and other researchers conducted a meta-analysis on the impact of repeated exposure to cognates on vocabulary learning and found out that cognateness is extremely important in L2 learning, especially for low-proficiency learners who rely on their mother tongue to infer the meanings of foreign vocabulary[33]. De Wilde also discovered that the numerous cognates between Dutch and English facilitate children's autonomous learning of English, suggesting that the similarities between L1 and L2 can promote the development of L2 vocabulary[34].

Existing literature indicates that cognateness has profound implications for language teaching and learning methods, demonstrating that L1 can promote the potential for L2 vocabulary acquisition under specific circumstances. Nevertheless, further research is needed to explore the nuances of L1's influence on L2 vocabulary learning, such as the impact of L1 proficiency on L2 vocabulary acquisition. Additionally, effective teaching strategies could be developed by leveraging the cognate relationships between L1 and L2.

3.5. Age

In the field of L2 acquisition research, there has been ongoing curiosity about the most beneficial age to start learning a second language. Research evidence indicates that Age of Acquisition (AoA) plays a significant role in L2 vocabulary learning and memory.

The AoA effect describes the phenomenon where vocabulary learned at an earlier age is represented more robustly in memory, making it easier to recall than vocabulary learned later. This

phenomenon has been widely documented in L1 vocabulary learning [35,36], but research on L2 learning is relatively limited. Ellis demonstrated that in the process of L2 vocabulary acquisition, vocabulary acquired earlier enables faster responses in tasks such as picture-word matching and word selection[37]. This indicates that the timing of L2 vocabulary acquisition directly affects the rapid retrieval and recognition for vocabulary.

However, Crossley and McNamara found that L2 learners tend to use later-acquired vocabulary more in L2 writing compared to L1 writing[38]. This may be due to L2 learners rely more on written materials rather than spoken language, leading to greater familiarity with the vocabulary acquired later.

In summary, the influence of age on L2 vocabulary acquisition presents many avenues for exploration, requiring further research to fully understand the complex relationships between age, vocabulary acquisition, and vocabulary use. For instance, the interaction between age and other individual differences warrants further investigation to help educators develop suitable teaching plans for L2 learners across different age groups.

4. Conclusion

This article explores various factors that influence L2 vocabulary acquisition from the perspective of individual differences. It begins by reviewing the theoretical foundations of L2 vocabulary acquisition, including the Input Hypothesis, the Involvement Load Hypothesis, and Sociocultural Theory, which provide a framework for understanding the mechanisms of vocabulary acquisition. The article then analyzes individual difference factors such as gender, working memory, motivation, L1, and age, highlighting their potential impacts on L2 vocabulary acquisition. Although specific studies on certain individual differences are relatively limited, they undoubtedly constitute important factors affecting vocabulary acquisition.

Based on the summary of this article, future research could further explore the interactions among these individual difference factors and how they collectively influence L2 vocabulary acquisition. For instance, age may impact motivation and working memory, indirectly influencing vocabulary learning. Additionally, research could focus on vocabulary acquisition strategies in different learning environments and how to apply these theories to teaching practices to enhance the effectiveness of vocabulary instruction. By gaining a deeper understanding of these interacting factors, educators can provide L2 learners with more personalized and effective support for vocabulary learning.

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