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| RESEARCH ARTICLE

The Role of Glosses in L2 Incidental Vocabulary Acquisition in Reading

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| ABSTRACT
Incidental vocabulary acquisition is the primary way for second language learners to acquire vocabulary knowledge and adding glosses has been proven a great contributor to this process. Generally speaking, glosses refer to the translation equivalent words, L2 synonyms or brief L2 explanations of target words. This paper reviewed studies on the role of glosses in L2 incidental vocabulary acquisition in reading in terms of gloss languages, gloss types, gloss locations and gloss modalities. Findings indicate that 1) adding glosses is conducive to vocabulary acquisition; 2) effects of gloss languages are mediated by learners' L2 proficiency; 3) multiple-choice glosses are better than single-translation glosses; 4) multi-modal glosses are better than single-modal glosses. These findings support the Revised Hierarchical Model, the Involvement Load Hypothesis and the Cognitive Theory of Multimedia Learning. Future research should focus more on the measurement of productive knowledge, the measurement of the depth of vocabulary knowledge, the measurement standard of second language proficiency and the vocabulary learning process in reading.

| KEYWORDS

Glosses; second language; incidental vocabulary acquisition; reading

| ARTICLE INFORMATION

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1. Introduction

Incidental vocabulary acquisition (IVA) is the primary way for second language (L2) learners to acquire vocabulary knowledge (Bordag et al., 2015; Çakmak & Erçetin, 2018; Huang & Lin, 2014; Khezrlou & Sadeghi, 2017; Miyasako, 2018; Rassaei, 2020; Türk & Erçetin, 2014; Xu, 2017). Unlike intentional vocabulary learning, incidental vocabulary acquisition refers to the process in which learners acquire vocabulary knowledge incidentally while focusing on other tasks, such as reading comprehension. This process may be consciously involved, but the main task is not directly related to vocabulary acquisition. In principle, incidental vocabulary acquisition can occur in listening, speaking, reading and writing, but most researchers have focused their attention on IVA in reading (Gai, 2014). Even though studies have shown that L2 learners can acquire vocabulary knowledge in reading (Boers et al., 2017; Chen, 2016; Ko, 2012; Ouyang et al., 2020; Pigada & Schmitt, 2016), their learning effects are not satisfactory because of the limitation of context or other factors (Choi, 2016). Therefore, researchers have tried to modify reading texts, and adding glosses to target words is a widely used means.

Generally speaking, glosses are the translation equivalent words, L2 synonyms or brief L2 explanations of target words (Nation, 2010). However, the wide application of multimedia technology has made images and videos become new gloss forms. Although adding glosses to target words is beneficial to incidental vocabulary acquisition, none of these glosses has shown an absolute advantage. This paper aims to review the effects of glosses on L2 incidental vocabulary acquisition in reading from four perspectives: gloss languages, gloss types, gloss locations and gloss modalities, hoping to shed some light on future IVA research.

1. 1 Gloss language and incidental vocabulary acquisition

Many researchers have discussed the role of L1 glosses and L2 glosses in L2 incidental vocabulary acquisition in reading. Some hold that L1 glosses and L2 glosses are equally effective (Chen, 2002; Choi, 2016). Chen (2002) examined the effects of L1 and L2 glosses on vocabulary retention and found that the L2-gloss group did better than the no-gloss group, but the differences between the L1-gloss group and the L2-gloss group were not significant. Similarly, Choi (2016) also investigated the role of L1 and L2 glosses in vocabulary retention, and results showed that L1 and L2 glosses are equally effective in the short-term retention of words.

However, other researchers argue the advantage of one gloss language over the other (Yoshii, 2006; Wang, 2013). For instance, Yoshii (2006) examined the role of L1 and L2 glosses in the acquisition of word meanings for high school students. Results showed that whether in immediate or delayed posttests, L1 glosses are more effective than L2 glosses in acquiring word meaning. Wang (2013) examined the effects of L1 and L2 glosses on the acquisition of receptive vocabulary knowledge and productive vocabulary knowledge. Results indicated that L1 glosses contributed more to the acquisition of receptive vocabulary knowledge, while L2 glosses promoted the acquisition of productive vocabulary knowledge.

Kim et al. (2020) conducted a meta-analysis on the effects of gloss languages on incidental vocabulary acquisition and concluded that language proficiency is a key mediator. To be more specific, L1 glosses are more effective for low-proficiency learners, but both L1 glosses and L2 glosses facilitate vocabulary acquisition for advanced learners. These findings support the Revised Hierarchical Model (Kroll & Stewart, 1994), that is, low-proficiency L2 learners access L2 concepts through L1 translation, but as proficiency increases, learners can access L2 concepts directly through L2.

2. Gloss types and incidental vocabulary acquisition

Single-translation glosses and multiple-choice glosses have also received much attention. The former directly presents translation equivalent words, L2 synonyms or L2 definitions of target words, while the latter provides one correct choice and several distractors, thus requiring learners to interact with the context and involving a deeper level of processing (Craik & Lockhart, 1972). According to the Involvement Load Hypothesis (Laufer & Hulstijn, 2001), a deeper level of processing means more involvement load, and more involvement load leads to better learning results.

Numerous studies have compared the effects of single-translation and multiple-choice glosses on incidental vocabulary acquisition, but they did not reach an agreement. Yoshii (2013) examined the effects of these two gloss types on IVA for low-intermediate learners and found that single-translation glosses are more effective because they provide immediate feedback to learners and thus interfere less with attention allocation during reading. Nonetheless, most researchers concluded that multiple-choice glosses are more effective (Duan & Yan, 2004; Rott, 2005). For one thing, multiple-choice glosses require learners to fully understand the text and then choose the correct choice based on contextual information, so they involve a deeper level of processing and increase the involvement load. For another, some learners may skip unknown words and their glosses in reading, but they cannot do so when encountering multiple-choice glosses. This "forced" processing, to some extent, enhances the effectiveness of vocabulary learning.

3. Gloss locations and incidental vocabulary acquisition

According to the relative position between glosses and target words, glosses can be divided into in-text glosses, marginal glosses, bottom glosses and pop-up window glosses. In-text glosses follow target words; marginal and bottom glosses appear in the right or bottom margin; pop-up window glosses are available only when learners click the mouse or place the cursor on target words.

So far, it remains unknown which gloss location is more effective in incidental vocabulary acquisition. Chen et al. (2013) investigated the effects of these four types of glosses on reading comprehension and IVA and found that in-text glosses are the most effective because they ensure the fluency of the reading process and do not interfere with learners' attention allocation. Their findings are consistent with the Spatial Contiguity Principle (Mayer, 2001). As a key principle in the Cognitive Theory of Multimedia Learning (Mayer, 2001), the Spatial Contiguity Principle refers to the fact that when target words and their relevant information are close to each other, better learning results can be produced.

AbuSeileek (2011) compared the effects of the marginal, bottom, and pop-up window glosses on IVA for low-intermediate learners and concluded that marginal glosses produced the best learning results. Chen & Yen (2013) examined the interaction between gloss locations and language proficiency and observed that gloss location did not affect vocabulary acquisition for low-proficiency learners, but pop-up window glosses significantly increased IVA for advanced learners. Chen (2016) investigated the interaction between gloss locations and vocabulary knowledge measurement on incidental vocabulary acquisition for low-proficiency learners and found that the marginal-gloss group outperformed other groups in multiple-choice tests, but learners using in-text glosses did better in vocabulary translation tasks and vocabulary matching tasks.

4. Gloss modalities and incidental vocabulary acquisition

With the rapid development of multimedia technology, computer-assisted language learning (CALL) has received plenty of attention. Mayer (2011) defines multimedia as the simultaneous presentation of lexical and pictorial information. Lexical information refers to any form of linguistic information, including written texts, oral texts, etc.; pictorial information contains both dynamic (videos, animations, etc.) and static (illustrations, etc.) forms of presentation. Single-modal glosses only involve one form of media, bimodal glosses involve two forms of media, and multi-modal glosses include three or more forms of media.

When exploring the effects of single-modal and bimodal glosses on IVA, most researchers have observed that bimodal glosses contribute more to vocabulary acquisition. For instance, Kost et al. (2013) compared the effects of text, picture, and text+picture glosses on incidental vocabulary acquisition and found that text+picture glosses significantly facilitated vocabulary recognition. Akbulut (2015) used three tasks (word form recognition, word meaning recognition and word meaning retention) to evaluate the effects of IVA. Results indicated that text+video glosses outperformed text glosses in all three tasks.

Based on studies on the comparison between single-modal and bimodal glosses, comparative studies between bimodal and multi-modal glosses have also become popular. Yeh & Wang (2013) compared the effects of text glosses, text+picture glosses and text+picture+audio glosses on IVA. Results indicated that text+picture glosses are the most effective. However, Sadeghi et al. (2017) investigated the effects of text+picture glosses, text+audio glosses, and text+picture+audio glosses on vocabulary acquisition and observed that text+picture glosses are the most effective in the immediate posttest, but text+picture+ audio glosses are the best in the delayed posttest.

According to the results of the meta-analysis (Kim et al., 2020), when gloss modalities are the same, low-proficiency learners acquire vocabulary knowledge more effectively than advanced learners. As low-proficiency learners have a smaller vocabulary, they cannot infer the correct meaning of target words with only one modality of glosses, so adding more modalities of glosses reduces their cognitive load and helps them evaluate and correct their previous judgments, thus effectively improving the accuracy rate of guessing word meaning. However, advanced learners are able to use background knowledge and contextual clues to infer the meaning of the targets, so adding more modalities of glosses is not very effective.

5. Conclusion

This study reviewed and summarized the effects of glosses on L2 incidental vocabulary acquisition in reading from the perspective of gloss languages, gloss types, gloss locations and gloss modalities. Even though the results of the studies above are controversial, there has been some basic consensus: Glosses are conducive to incidental vocabulary acquisition; the effects of gloss languages are mediated by language proficiency; multiple-choice glosses are better than single-translation glosses; multi-modal glosses are better than single-modal glosses. These findings basically support the Revised Hierarchical Model (Kroll & Stewart, 1994), the Involvement Load Hypothesis (Laufer & Hulstijn, 2001) and the Cognitive Theory of Multimedia Learning (Mayer, 2001). Future studies can be enriched from the following four aspects.

Measurement of productive knowledge. Currently, the measurement of vocabulary knowledge mainly focuses on two aspects: productive knowledge and receptive knowledge. Productive vocabulary knowledge involves the production of language, while receptive vocabulary knowledge only requires learners to identify the target words. Measurement of receptive knowledge usually includes vocabulary recognition, picture recognition, multiple choice questions, matching test, etc., while measurement of productive knowledge requires students to provide the translation equivalent words or synonyms of target words. However, Mondria & Wiersma (2014) hold that providing the translation equivalent words of L2 words still measures receptive vocabulary knowledge, not product knowledge. Moreover, learners often fail to find a proper translation equivalent word to the target word because of cross-language differences, so this task only helps learners identify words in the context but does not contribute to vocabulary production. Future research should actively explore more appropriate ways to measure productive knowledge to comprehensively examine the effect of vocabulary acquisition.

Measurement of depth of vocabulary knowledge. Vocabulary depth, as opposed to vocabulary breadth, has not been clearly defined because of its wide coverage but can be roughly regarded as the mastery of vocabulary. Based on studies of Nation (2010) and Richards (2017), depth of vocabulary knowledge includes lexical meaning (e.g., conceptual meaning, connotative meaning, etc.), lexical collocation, morphological features (e.g., roots, affixes, derivatives, etc.), language use, etc. Most researchers only focused on learners' mastery of lexical form and meaning but ignored deeper knowledge, like collocations and language use. Therefore, future research should pay more attention to the development of vocabulary knowledge and language use in incidental vocabulary acquisition.

Measurement standard of second language proficiency. A large number of empirical studies have involved learners of different L2 proficiency, but their measurement standard is not consistent. Some used international English test scores (e.g., IELTS, TOEIC, etc.), some used the Oxford Placement Test (OPT), and others used Vocabulary Size Test (VST) scores to measure students' second

language proficiency. The discrepancy in the measurement of L2 proficiency has, to some extent, affected the reliability and validity of experimental results. Future research should explore a unified standard to measure second language proficiency to further promote the development of second language acquisition research.

The vocabulary learning process in reading. Most studies on incidental vocabulary acquisition in reading have equated the scores in posttests with vocabulary learning results. They only focused on the learning outcomes after reading but ignored the vocabulary learning process in reading. Warren et al. (2018) not only compared the effects of picture glosses, text glosses, and picture+text glosses on incidental vocabulary acquisition but also used eye-movement techniques to explore the correlation between reading time and vocabulary acquisition effects. In future studies, using more sophisticated techniques, such as eye movements, ERP, EEG fMRI, etc., to investigate the role of glosses in incidental vocabulary acquisition will be a major trend.

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