



## A Systematic Review of EFL Research on the Impact of Reading Comprehension on Students' Vocabulary Retention, and the Relation between Reading and Vocabulary Size

**Kholoud Binhomran**  
**Sultan Altalhab\***

*Curriculum and Instruction Department, College of Education, King Saud University, Saudi Arabia*  
[saltalhab@ksu.edu.sa](mailto:saltalhab@ksu.edu.sa)

**DOI:** <https://doi.org/10.36892/ijlls.v5i3.1395>

**APA Citation:** Binhomran, K. ., & Altalhab, S. . (2023). A systematic review of EFL research on the impact of reading comprehension on students' vocabulary retention, and the relation between reading and vocabulary size. *International Journal of Language and Literary Studies*, 5(3), 146–168. <https://doi.org/10.36892/ijlls.v5i3.1395>

**Received:**

28/07/2023

**Accepted:**

29/09/2023

**Keywords:**

*extensive reading, incidental learning, reading comprehension, repetition, vocabulary acquisition, vocabulary retention, and vocabulary size.*

**Abstract**

*This paper is a systematic review of studies conducted in the past two decades that addressed the effect of EFL reading comprehension on vocabulary retention, and the relation between reading and vocabulary size. Twenty-seven studies linking reading comprehension to a positive impact on EFL students' retention and vocabulary size were identified for inclusion. The analysis confirmed four major relationships: (1) learning vocabulary by reading supported participants' comprehension in almost all cases; (2) reading before engaging in vocabulary tasks supported participants' word retention in almost all cases; (3) repetition is crucial for enhancing new vocabulary recall, but the vocabulary should be introduced contextually; (4) there is limited evidence that EFL learners should cover 98% of the text to understand the vocabulary. However, some studies showed that reaching the lexical threshold required for reading is not necessary if the learner has covered enough frequent suffixes of word families to provide them with a basic coverage of the text.*

### 1. VOCABULARY AND READING

Some authors consider vocabulary learning to be most effective when it takes place incidentally, in activities such as reading (Nation, 2014). Vocabulary knowledge is essential for the comprehension of written texts, and the size of a student's vocabulary is positively correlated with their comprehension level. EFL learners have fewer opportunities for incidental learning than native speakers and should try to engage in more activities where such learning is possible (Nation, 2014). EFL teachers and researchers are well aware of the excellent opportunity that reading provides learners to expand their vocabulary. Horst (2005) emphasizes the importance of reading, as written texts incorporate more of the lexis than spoken language. In their book *Teaching and Researching Reading*, Grabe and Stoller (2002) raised concerns that EFL learners are not reading enough and that they must read a sufficient number of books

for their word recognition to improve. As discussed in the following sections, one of the ways to develop vocabulary is to provide EFL learners with an extensive reading program based on material that matches their competency level. We examined studies of incidental reading, deliberate reading, extensive reading, vocabulary tasks after reading, and their impact on vocabulary retention, while at the same time exploring the relation between reading and vocabulary size.

## **2. The current study Methodology**

### **2.1. Study selection**

For this systematic review, the following inclusion criteria were adopted:

- 1- The study was published in English.
- 2- The study appeared in a peer-reviewed journal.
- 3- The study included a comprehension reading passage where the research discussed the impact of reading comprehension on EFL students' retention, vocabulary size, or both.
- 4- The study focused on different EFL proficiency levels.

We searched for studies using the following keywords and operators:

“EFL vocabulary” and (“comprehension”, “reading”, “recall”, “retelling”, “retell”, “word recognition”, “inferences”, “inferencing”, intensive reading”, “extensive reading”, “word acquisition”). Also, the terms “EFL comprehension” and (“vocabulary size”, “text coverage”, “word percentage”, “maximize vocabulary”, and “vocabulary tasks”) were searched

### **2.2. Data coding and analysis**

After reading each study, the information was classified into 2 tables.

Table 1: Studies relating EFL reading comprehension to vocabulary retention (see Appendix 1), and Table 2: Studies relating EFL reading comprehension to vocabulary size (see Appendix 2) Both tables used the same coding scheme for the analysis. The following information was included in the tables:

### **2.3. Vocabulary intervention**

Several different vocabulary interventions were used in the studies, including comprehension followed by vocabulary tasks, mobile-based vocabulary games, and intensive or extensive reading followed by vocabulary activities.

### **2.4. Duration of intervention**

Whether the study was brief or long-term.

### **2.5. Participants**

Their age, grade, and English proficiency level (if the information was mentioned in the study).

## **2.6. Effect on retention/vocabulary size**

Whether reading comprehension followed by vocabulary tasks had a positive impact on participants' retention or vocabulary size.

## **3. RESULTS**

### **3.1. Overview of the studies**

Our final sample included 27 studies. Fifteen of these studies were concerned with the effect of reading comprehension on students' vocabulary retention, and twelve examined the relation between reading and vocabulary size. The final sample included studies that were published between 2002 and 2022. The majority (21 studies) focused on adult students aged between 16 and 35 years. Two studies were based on secondary school participants, while only one (Shintani, 2011) was concerned with elementary students aged from 6 to 8 years and no kindergarten studies that met our inclusion criteria were found.

### **3.2. Studies relating EFL reading comprehension to vocabulary retention**

#### **3.2.1. Studies with reading comprehension followed by vocabulary tasks**

Eleven out of the fifteen retention studies examined whether vocabulary tasks after reading enhanced the acquisition of new vocabulary. Peters (2012) compared two instruction methods and their effects on vocabulary recognition and retention. The first group had a message-oriented treatment (reading text and then answering comprehension questions) while the second group had a vocabulary-oriented treatment (reading text and then performing two vocabulary tasks). The participants were university students who were examined on fourteen target words. The results indicated that the vocabulary-oriented group gained more vocabulary and had higher retention than the message-oriented group in both immediate and delayed tests. Notably, the vocabulary-oriented group took less time answering the test, suggesting that vocabulary tasks might facilitate the learning process. Min (2008) compared one group using reading plus vocabulary enhancement activities (RV), to another using narrow reading of thematically related articles (NR). The results showed that the RV group performed significantly better than the NR group, and confirmed that reading followed by vocabulary exercises might be more effective at improving EFL learners' vocabulary and retention.

Shintani (2011) was the only study that included elementary EFL learners. Learners aged from 6 to 8 were divided into an input-based group and a production-based group. The input-based group were not asked to produce the new vocabulary of the language in tasks like *help in the supermarket* and *help the animals*, while the production-based group were required to produce it in the activities *listen and repeat* and *guess the hidden items*. The results showed that both

groups had gained receptive and productive vocabulary knowledge of the 24 tested vocabulary words. While the two groups experienced similar impacts on vocabulary acquisition and retention, tracking the process of learning confirmed that the input-based learning group had more opportunities to interact with other learners than the production-based group (Shintani, 2011). This could explain why the input-based group outperformed the production-based group on the task-based comprehension test. It also supports the view that forcing participants to produce new vocabulary might not be the best teaching method – a view supported by the outcomes of the next study reviewed. Webb (2008) aimed to determine whether the quality of the learning context for a word or the frequency of encountering it, was more important for learning. Two groups were compared, the first had more encounters with the tested vocabulary words, while the second introduced the new vocabulary in a richer reading context. After both groups read the comprehension passage, students' recall of form, recognition of form, recall of meaning, and recognition of meaning were examined. The results revealed that the group with more contextual clues (higher quality) significantly surpassed the group encountering them more frequently (higher quantity), in both tests of vocabulary meaning. On the other hand, the group who had more encounters with the words performed better on the form tests. This indicates that repetition is still essential for vocabulary recall, but presenting the words to students within a more contextual concept in the passage may further enhance their learning.

Peters (2014) investigated three questions: the frequency of word repetition (1, 2, or 3 times), the type of occurrence (single words versus collocations), and the time of the first of two post-tests (immediately after learning or after one week). The results showed that more repetition produced better results than expected, which agrees with Waring and Takaki (2003) who stated that to have a 50% chance of recognizing the form of a word three months later, students need to have encountered it at least eight times, whereas to recall its meaning requires eighteen. Peters (2014) also found that single words were easier to recall than collocations. Finally, she found that the group whose first test was immediately after their learning treatment had better results in the first post-test than the delayed test. In contrast, the second group (first post-test one week after the treatment) surprisingly had better results on the second, delayed post-test.

Atay (2007) examined learning new vocabulary through context, in combination with different ESP vocabulary recall strategies, on fifty male army aviation pilots signed up for an air-traffic terminology course. The participants were split into two groups, one that read the aviation course book combined with ESP vocabulary recall strategies, and the other learnt the new words only through reading the course book. The group trained with ESP recall strategies

showed significantly better results, suggesting that learning with such strategies can improve students' recall and expand their vocabulary.

Pellicer-Sánchez and Schmitt (2010) explored whether reading alone was sufficient for vocabulary acquisition and recall. They suggested that reading an authentic novel might lead to incidental vocabulary acquisition. They investigated advanced L2 learners' development of spelling, word class, recognition, and meaning recall after reading the unmodified version of the novel *Things Fall Apart*. After more than ten encounters with the targeted vocabulary, the results revealed that participants could recollect the meaning of 55% of new words and recall 63%, while they could identify the meaning of 84% and spelling of 76% (Pellicer-Sánchez & Schmitt, 2010). However, other studies have claimed that reading by itself is not enough to acquire new words and that vocabulary exercises following the reading session can improve the recall of vocabulary (Sonbul & Schmitt, 2010; Laufer & Rozovski-Roitblat, 2011; Laufer & Rozovski-Roitblat, 2015).

The importance of vocabulary exercises was examined by Laufer and Rozovski-Roitblat (2015) in a study on one hundred eighty-five high school graduates divided into three groups. The first learnt the new vocabulary through reading only, the second reading with a dictionary, while the third group had reading with word-focused exercises. The results revealed that reading with word-focused exercises gave the best results independent of the number of encounters or the type of words. Laufer and Rozovski-Roitblat (2015) concluded that what matters the most is to guide the learner on how to use a word, not the number of word encounters. Similarly, Sonbul and Schmitt (2010) explored whether direct teaching of vocabulary after reading (direct learning) has the same impact as reading alone (incidental learning). They evaluated three levels of vocabulary knowledge (form recall, meaning recall, and meaning recognition) by using three types of tests (completion, L1 translation, and multiple choice). The treatment group (incidental learning plus direct vocabulary learning) scored higher than the reading-alone group in all three levels. The results confirm the importance of direct teaching of vocabulary after reading, and that it can increase the chances of vocabulary gain and recall from incidental learning. Laufer and Rozovski-Roitblat (2011) did another study assigning two groups: one group read a text with the use of a dictionary, while the other group read a text, and then solved some word-focused exercises. The results showed that the group who solved the word-focused exercises attained the highest scores in the passive recall and passive recognition tests. The participants also favoured the word-focused exercises when asked in an introspective questionnaire. Only one study in the vocabulary retention section undermined the importance

of reading to vocabulary recall and suggested that EFL learners do not need to recall new words. In this study, Laufer (2003) challenged claims that reading is a major source of vocabulary acquisition. In her study, she compared the results of vocabulary tests after reading with the results after word-focused tasks: (write an original sentence, complete the sentence, and use words in a composition). The results revealed that learners using the word-focused exercises produced higher scores than those using reading only.

### **3.2.2. Studies on learning vocabulary through technology**

In this review, two studies utilized technology to improve vocabulary gains and recall. Janebi and Haghghatpasand (2019) used an adventure video game to learn a new second language vocabulary. The participants were asked to read and comprehend the subtitles while listening to the dialogue and found the video game to significantly improve participants' vocabulary recall in the delayed post-test. Moreover, in subsequent interviews, almost all participants approved of utilizing video games as a beneficial method for language learning, following the actual results from the quantitative study. Additionally, when participants were asked if they thought that video games were interesting, almost all of them answered that they found the interactive games to be "motivating" and "interesting" and that such games could go some way to replace traditional textbook teaching and homework. However, some of the participants mentioned that the graphics quality and the game plot could be enhanced.

The second study incorporating technology examined a novel in a mobile English vocabulary learning app with game-related functions. In this study, Chen et al. (2019) assessed students' language learning performance and vocabulary retention while playing this game on their mobiles. The results showed that the group using the app significantly outperformed the control group on vocabulary gain and retention measures. Questionnaire survey results also confirmed student perceptions of the effectiveness of the learning app, as they correlated with students' test results and overall performance. Most of the participants who responded to the questionnaire (Cronbach Alpha > 0.7) were satisfied with the vocabulary video game. Student ratings of several aspects of the mobile app were positively correlated with the test results: (Overall = .883, Effectiveness = .857, Usability = .803, Satisfaction = .887). These results are promising and encourage integrating more technology into language learning.

### **3.2.3. Studies with learning vocabulary through extensive reading**

Two studies concerned extensive reading in the recall section. Nation (2015) points out that the inclusion of extensive reading in a language learning course would have a positive impact on students' vocabulary gains and retention. He states four principles, well supported by research and theory, for guiding vocabulary learning through extensive reading. The first is

**A Systematic Review of EFL Research on the Impact of Reading Comprehension on Students' Vocabulary Retention, and the Relation between Reading and Vocabulary Size**

that the selected reading program should match students' graded readers' level, as well as being comprehensible. The second, and particularly important, is that there should be a sufficient quantity of reading input. For students to reach a satisfying level of vocabulary gains, the minimum quantity must be around one graded reader every two weeks (Nation & Wang, 1999). The third principle is creating learning opportunities, which depend on both the vocabulary instructor and the learner. The instructor guides participants to talk or summarise what they read and should encourage students to re-read, as repetition supports vocabulary retention, recognition, and reading fluency (Nation, 2015). Moreover, participants can choose to read different topics within their proficiency level and should be encouraged to seize every opportunity to learn and use the new vocabulary. The fourth principle is extensive reading, and like the previous one aims to maximise the effects of the learning environment (Nation, 2015). This principle motivates instructors and learners to combine extensive reading with planned learning. Deliberate learning after extensive reading would help the learner improve their results. Deliberate learning can be noticing a word or guessing the meaning of a word from context, then looking it up in a dictionary - a method considered effective for learning (Fraser, 1999; Mondria, 2003). Although Mondria (2003) found that there is no difference between deliberate learning after guessing a word, and deliberate learning without prior guessing. Nevertheless, guessing a word can keep students motivated to learn, and the repetition it involves would help improve students' retrieval of new vocabulary words.

The second study describes a case study of a language learner undergoing a one-month extensive reading program incorporating 133 vocabulary words to be subsequently tested. Pigada and Schmitt (2006) evaluated the spellings, meanings and associated grammar in elaborating one-on-one interviews. The results indicated that extensive reading supported vocabulary gains with 65% recognition of the target words giving an acquisition rate of about 1 of every 1.5 words tested. Spelling was improved greatly, as the grammar and meaning of words were enhanced but not the same as spelling (Pigada & Schmitt, 2006). Overall, this case study suggests that extensive reading can have a powerful impact on a participant's vocabulary acquisition subject to two conditions: the reading material should match the student's competence, and the minimum amount of reading is one graded reader per week.

### **3.3. Studies relating EFL reading comprehension to vocabulary size**

#### **3.3.1. The percentage of text coverage**

Twelve studies were selected linking reading to vocabulary size. An important question is how many words EFL learners need to acquire to read and understand passages of text. Nation (2006) explored how large a vocabulary is required for an EFL learner to read a novel, grade

readers, watch a movie, or join a conversation. Nation stated that in order to attain a 98% standard text coverage, an 8,000 – 9,000 word family vocabulary is required for written text, and 6,000 – 7,000 coverage for dealing with spoken language (Nation, 2006). On the other hand, Laufer and Ravenhorst-Kalovski (2010) suggested subdividing the lexical text coverage according to two thresholds: an ideal one which covers 98% with 8,000-word families (including proper nouns), and a minimal one that covers 95% with 4,000-5,000-word families. However, they do not claim that a meaningful level of reading comprehension would not occur if the learner has not reached such lexical thresholds (Laufer & Ravenhorst-Kalovski, 2010).

Schmitt et al. (2011) investigated the relationship between the percentage of known vocabulary in a text and the level of comprehension of the same text. Six hundred and sixty-one participants from eight countries were involved in this study. Participants did a vocabulary measure test (words were taken from two reading texts), then they read two texts, and finally they completed a reading comprehension test for each text. While the results showed a linear relationship between the percentage of known vocabulary and the level of reading comprehension, there was no sign of a vocabulary threshold, which is inconsistent with Laufer and Ravenhorst-Kalovski's (2010) suggested threshold. Furthermore, the results agree with Nation's (2006) estimation of 98% required text coverage. The previous studies lead to the question of whether EFL learners need to acquire knowledge of most of the derived words in a word family, or whether a small number of frequent affixes could be enough to cover the text. One study investigated this question using a text analysis computer program called MorphoLex. This computer program analysed the full lexis of the entered text, taking out words with prefixes and suffixes and counting unaffixed words as base words (Laufer & Cobb, 2020). The results showed that reaching the lexical thresholds for reading is not necessary as long as the learner covers a small number of frequent suffixes of a word family, providing them with a basic coverage of text (Laufer & Cobb, 2020).

In relation to Laufer and Ravenhorst-Kalovski's (2010) study suggesting the use of two thresholds for lexical text coverage, the following study proposed reassessing frequency and vocabulary size in EFL vocabulary teaching. Schmitt and Schmitt (2014) stated that high-frequency and low-frequency word boundaries should be reassessed on pedagogic grounds. They argue that high-frequency English vocabulary is supposed to contain the most frequent 3,000-word families instead of 2,000. In addition, they pointed out that the low-frequency vocabulary boundary should be lowered to 9,000 words instead of 10,000 in accordance with Nation's (2006) proposal that 8-9,000-word families are enough for EFL learners to cover a good range of authentic texts. Furthermore, Schmitt and Schmitt (2014) suggest a mid-



frequency level between the high-frequency (3,000) and low-frequency (9,000+) word numbers.

### **3.3.2. Extensive reading and vocabulary size**

Nation (2014) points out that for the EFL learner to acquire sufficient vocabulary, they should do considerable extensive reading with material that matches their proficiency level. He explains that vocabulary learning happens by repetition, retrieval, creative use, and deliberate attention, and that can maximize vocabulary learning by employing narrow reading, repeated reading, linked skills reading, reading followed by discussion, and deliberate learning through reading with exercises. Computer-based activities could also equip language learners with great opportunities for deliberate learning, but should not replace extensive reading (Nation, 2014). In contrast to the previous study's promotion of extensive reading as one of the best means to gain vocabulary, Al-Homoud and Schmitt (2009) claim that both intensive and extensive reading have the same positive effect on L2 learners' vocabulary size. They compared intensive and extensive reading impact on students' vocabulary size and found both approaches equally effective for improving students' reading comprehension ability, reading speed, and vocabulary acquisition.

### **3.4. Vocabulary knowledge and prediction of performance**

Gu (2002) conducted a large-scale survey and found that female EFL students significantly outperformed male students in two tests: vocabulary size test and general proficiency. The author suggested that the female's success might be due to their use of learning strategies, as these correlated with their results. Comparison was also made between science students and arts students. While science students did better on the vocabulary size test, the arts students attained significantly higher scores on the general proficiency test.

Some studies investigated what type of vocabulary knowledge best predicts reading comprehension - word meaning recall or word meaning recognition. To answer this Laufer and Aviad-Levitzky (2017) undertook a study on 116 EFL college students. The participants had three tests: a reading test and two vocabulary size tests (meaning recall and meaning recognition). The results showed that both tests were good indicators of reading, although the recognition test yielded slightly higher results. Laufer and Aviad-Levitzky (2017) proposed the term 'comprehension vocabulary' and suggested that recognition tests are more suited to measuring comprehension vocabulary, while recall tests are more appropriate for measuring sight vocabulary.

One of the studies explored whether EFL learners' vocabulary size could predict their performance on TOFEL reading item types (for example: guessing the vocabulary, main idea, inference, and stated detail). In Alavi and Akbarian's (2012) study, 213 participants (low, middle, and high-level proficiency) were tested. The researchers found that the results of three of the TOFEL test items (guessing vocabulary, stated detail, and main idea) matched up with their performance in the vocabulary level test (VLT). Only one test item (guessing the meaning) was found to correlate with high proficiency-level students, while there was no correlation found in the results of middle or low proficiency-level students. The researchers suggested reconsidering the indiscriminate incorporation of different types of vocabulary tasks that ignore EFL proficiency levels (Alavi & Akbarian, 2012). Another study examined whether teachers can rely on multiple-choice results to measure EFL learners' vocabulary size. Gyllstand and Schmitt (2015) explored assessing vocabulary size through multiple-choice formats and investigated issues, such as guessing, which could lead to overestimation of results. They found that there was a mismatch between test scores and the results collected from the criterion measure. They also looked through sample rates and investigated if the sample rate of the evaluated vocabulary size in multiple-choice tests (MCT) represents knowledge of the underlying population of words. Gyllstad and Schmitt (2015) found that an increased sample rate is required to achieve a better representation of knowledge of the underlying population of words.

In a recent study, Zhang and Pei (2022) examined word knowledge components and their connection with L2 lexical inference. One hundred twenty-one college-level students were examined on several word-knowledge tests: vocabulary, size, word associates, morpheme-form knowledge, morpheme-meaning knowledge, morpheme discrimination and morpheme recognition. The results showed that word knowledge dimensions collectively contributed to L2 real-word and pseudo-word meaning inference. Specifically, vocabulary depth and morpheme-form knowledge were the best predictors. While this study confirms the influential role of vocabulary depth after comprehension, vocabulary size alone did not have similar significant power on lexical inference.

#### **4. DISCUSSION**

This systematic review showed four main findings:

- (1) Learning vocabulary through reading supports participants' comprehension in almost all cases.

- (2) The inclusion of reading prior vocabulary tasks supports participants' word retention in almost all cases.
- (3) Repetition is crucial to improve the recall of new vocabulary, however, it is more important to introduce vocabulary contextually.
- (4) There is currently limited evidence that EFL learners should cover 98% of the text to understand the vocabulary.

#### **4.1. Learning vocabulary through reading supported participants' comprehension in almost all cases**

Reviewing the studies showed that reading had a positive impact on participants' vocabulary (Pigada & Schmitt, 2006; Atay, 2007; Min, 2008; Pellicer-Sánchez & Schmitt, 2010; Sonbul & Schmitt, 2010; Shintani, 2011; Laufer & Rozovski-Roitblat, 2011; Peters, 2012; Nation, 2014; Laufer & Rozovski-Roitblat, 2015; Nation, 2015). Reading offers new opportunities to learn the new vocabulary incidentally, especially when the vocabulary is written contextually. While Pigada and Schmitt (2006) recommended that learners should read one graded reader per week, Nation's (2015) recommendation to read one graded reader every two weeks is more feasible and realistic. However, reading material should match student's competence if it is to achieve the learners' goal. Several studies found encouraging results indicating that extensive reading is effective for vocabulary gain and recall. However, one of the studies questioned whether extensive reading had a higher impact on EFL learners than intensive reading. Al-Homoud and Schmitt (2009) found that both approaches (intensive and extensive reading) are similarly effective on students' reading comprehension, reading speed, and vocabulary acquisition. This finding highlights the importance of reading in general and its positive effect on EFL learners, and that even if it was simply reading for pleasure it would have a great impact on their vocabulary gains.

In our review, the utilization of technology in EFL teaching showed promising results on participants' vocabulary recall and motivation (Janebi & Haghighatpasand, 2019; Chen et al., 2019). By reading the subtitles of the adventure video game, and comprehending the dialogue, participants significantly improved their vocabulary recall at the post-test and the delayed post-test, as well as giving high satisfaction ratings about the game's benefits when interviewed (Janebi & Haghighatpasand, 2019). Likewise, reading a novel from an English learning app with related games had significant results on participants' recall and motivation (Chen et al., 2019). While computer-based activities can be effective for vocabulary learning, it might be advisable not to use them as a reading session replacement (Nation, 2014).

#### **4.2. The inclusion of reading before vocabulary tasks supported participants' word retention in almost all cases**

As explored in this systematic review, the incidental learning of vocabulary through reading showed positive results, consistent with Nations's (2014) view that most vocabulary learning happens this way while listening and reading. On the other hand, some studies (e.g., Schmitt, 2008) stated that learning vocabulary through reading alone is not enough to acquire and recall new vocabulary. Schmitt (2008) suggests this can be remedied by combining incidental and intentional strategies. In our review, almost all the studies that employed reading followed by vocabulary tasks showed better results than a reading alone approach (Atay, 2007; Min, 2008; Sonbul & Schmitt, 2010; Laufer & Rozovski-Roitblat, 2011; Peters, 2012; Laufer & Rozovski-Roitblat, 2015; Nation, 2015). Only one study questioned reading as an effective approach to learning vocabulary, and suggested that vocabulary tasks achieve better results (Laufer, 2003). However, the latter view is probably an unwarranted generalisation as it was based on a study where reading was not combined with vocabulary tasks, which would likely lead to better results, as the students could enjoy reading and learning at the same time.

A further factor addressed in this review was the type of vocabulary tasks needed for successful acquisition and recall of new words. The review revealed that words that have been taught using active processing (for example: using the word in a sentence, sentence completion, and incorporating words in a composition) are better retrieved than words presented as a dictionary definition (Atay, 2007; Min, 2008; Sonbul & Schmitt, 2010; Laufer & Rozovski-Roitblat, 2011; Peters, 2012; Laufer & Rozovski-Roitblat, 2015; Nation, 2015). In all the studies that examined reading plus dictionary definition, or reading followed by vocabulary tasks, the group that exercised vocabulary tasks had the best results. Also, when students were interviewed or answered questionnaires, they always favoured vocabulary tasks involving active processing over both regular reading paired with dictionary definitions, and reading alone. This finding is encouraging for EFL teachers as they could introduce vocabulary to students deliberately and employ incidental approaches to expand participants' vocabulary gains and recall.

#### **4.3. Repetition is crucial for improving the recall of new vocabulary**

In examining the impact of reading on EFL learners' vocabulary retention, repetition was found to be very important for recalling the new vocabulary. However, what is more important, is for the increase in word encounters to be introduced in a meaningful context - as Schmitt (2008) suggests it would be challenging to remember new words by only incidental learning. Repetition is considered a classic and successful method for recognizing and remembering new vocabulary, especially when EFL learners have a sufficient number of exposures (Nation,

2015). Pellicer-Sánchez and Schmitt (2010) stated that between 10 and 17 encounters with target words are required to recall them, which aligns with Peters' (2014) and Waring and Takaki's (2003) finding that the more encounters with targeted vocabulary, the better its recall. However, relying on repetition only could lead to passive learning devoid of the new vocabulary meanings. This could be resolved by placing the new vocabulary in contextual sentences, thereby leading to richer representations of the word meanings and consequent higher recall.

Other studies claimed, however, that reading is not enough to acquire vocabulary (Cobb, 2007; Webb, 2008). Cobb (2008) claimed that by reading alone, EFL learners would not be able to gain targeted vocabulary, and that they need at least six to ten encounters with a word family to recall the new words. Webb (2008) compared a group that received several encounters with the targeted vocabulary, with one that received the new words more contextualized. Webb (2008) found that the group with contextual clues performed significantly better than the group with the higher number of encounters. This is not to diminish the importance of repetition to vocabulary recall, only to emphasize the importance of the way the new vocabulary is presented. EFL curriculum designers and teachers could achieve positive results by prioritizing the quality of the learning material in conjunction with increasing the number of word encounters.

#### **4.4. There is limited evidence that EFL learners should cover 98% of text to understand the vocabulary**

This review covered studies investigating the percentage of text coverage required for an EFL learner to read novels or graded readers, watch movies, or join conversations. Some studies claim that 98% is needed to comprehend a text, while other studies stated that reaching the lexical thresholds for reading is not necessary as long the learner covered a sufficient number of word families. Another study suggested reconsidering the lexical threshold. Nation (2006), while stating that 98% is the standard coverage for comprehension, suggests that this level requires an 8,000 – 9,000 word-family vocabulary for written text, and a 6,000 – 7,000 coverage for dealing with spoken language. Similarly, Schmitt et al. (2011), investigated the relationship between the percentage of known vocabulary in a text and the level of comprehension of the same text. They found that there is a linear relationship between the percentage of known vocabulary and the level of reading comprehension which is consistent with Nation's (2006) estimation of a 98% required text coverage. On the other hand, Laufer and Ravenhorst-Kalovski (2010) suggested reconsidering the lexical text coverage and using two thresholds: an ideal one, covering 98% with 8,000-word families (including proper nouns),

and a minimal one that covers 95% with 4,000-5,000-word families. However, they do not claim that any meaningful reading comprehension is impossible without students reaching either specified lexical threshold (Laufer & Ravenhorst-Kalovski, 2010). That reaching such thresholds is unnecessary is suggested by Laufer and Cobb's (2020) study employing a text analysis computer program called MorphoLex. Their results showed that reaching the lexical thresholds for reading is not necessary as long the learner covers a sufficient number of frequent word family suffixes to provide them with basic coverage of a text – and that number is relatively small (Laufer & Cobb, 2020). Based on these current findings, there is only limited evidence that EFL learners should cover 98% of text to understand the text. More studies are needed to remeasure text coverage requirements.

## **5. CONCLUSION**

This systematic review is due to the lack of such reviews in the general EFL field, and more specifically in vocabulary research. After reviewing 27 studies linking reading comprehension to improved EFL students' retention and vocabulary size, the review revealed that in almost all cases reading had a positive impact on the students' comprehension of the new vocabulary. In addition, in almost all cases the inclusion of vocabulary tasks after reading had a significant effect on participants' word retention. This confirmed the importance of repetition for new vocabulary recall, yet without neglecting the importance of presenting the vocabulary contextually. Finally, the need for more studies to re-evaluate the 98% text coverage threshold for EFL learners to understand text passages.

### **5.1. Limitations and recommendations**

- There are several limitations in this study. It is only focused on the impact of reading comprehension on two aspects: vocabulary retention and vocabulary size. It did not examine teaching strategies or students' use of learning strategies. Considering teaching vocabulary strategies in the future would be beneficial.
- The review showed that only one study involving elementary school EFL learners. In addition, there is a shortage of kindergarten and elementary school EFL vocabulary studies, and therefore future research should consider more studies on young language learners.
- Most of the studies were short-term studies. It would be helpful for future research to employ more long-term studies to understand the process of vocabulary acquisition and the best method(s) for learning new words.
- This review only focused on extensive reading. Therefore, it would be helpful to have more studies concerning different types of reading (for example: narrow reading and

intensive reading) and different types of reading comprehension (for example: lexical comprehension, literal comprehension, and interpretative comprehension).

- As pointed out previously, there is limited evidence that EFL learners should cover 98% of text to understand it. Therefore, more studies are needed to measure the text coverage.
- Based on the studies reviewed on using technology in EFL learning, there is a need for more studies and more applications that combine reading with vocabulary tasks, which mix incidental and deliberate learning.

## REFERENCES

Alavi, S. M., & Akbarian, I. H. (2012). The role of vocabulary size in predicting performance on TOEFL reading item types. *System*, 40(3), 376-385.

Al-Homoud, F., & Schmitt, N. (2009). Extensive reading in a challenging environment: A comparison of extensive and intensive reading approaches in Saudi Arabia. *Language Teaching Research*, 13(4), 383-401.

Ali, M. A. A., Mohammed, O. S. M., Ahmed, H. R., Munasser Awadh, A. N., Abdulfatah, H. M., & Sheikh, E. Y. (2023). English language teaching through a short story: A technique for improving students' vocabulary retrieving. *Cogent Education*, 10(1), 2161221.

Atay, D., & Ozbulgan, C. (2007). Memory strategy instruction, contextual learning and ESP vocabulary recall. *English for specific purposes*, 26(1), 39-51.

Chen, C. M., Liu, H., & Huang, H. B. (2019). Effects of a mobile game-based English vocabulary learning app on learners' perceptions and learning performance: A case study of Taiwanese EFL learners. *ReCALL*, 31(2), 170-188.

Cobb, T. (2007). Computing the vocabulary demands of L2 reading. *Language Learning & Technology*, 11(3), 38-63.

Fraser, C. A. (1999). Lexical processing strategy use and vocabulary learning through reading. *Studies in second language acquisition*, 21(2), 225-241.

Grabe, W., & Stoller, F. L. (2019). *Teaching and researching reading*. Routledge.

Gu, Y. (2002). Gender, academic major, and vocabulary learning strategies of Chinese EFL learners. *RELC journal*, 33(1), 35-54.

- Gyllstad, H., Vilkaitė, L., & Schmitt, N. (2015). Assessing vocabulary size through multiple-choice formats: Issues with guessing and sampling rates. *ITL-International Journal of Applied Linguistics*, 166(2), 278-306.
- Horst, M. (2005). Learning L2 vocabulary through extensive reading: A measurement study. *Canadian modern language review*, 61(3), 355-382.
- Janebi Enayat, M., & Haghghatpasand, M. (2019). Exploiting adventure video games for second language vocabulary recall: A mixed-methods study. *Innovation in Language Learning and Teaching*, 13(1), 61-75.
- Laufer, B. (2003). Vocabulary acquisition in a second language: Do learners really acquire most vocabulary by reading? Some empirical evidence. *Canadian modern language review*, 59(4), 567-587.
- Laufer, B., & Aviad-Levitzky, T. A. M. I. (2017). What type of vocabulary knowledge predicts reading comprehension: Word meaning recall or word meaning recognition? *The Modern Language Journal*, 101(4), 729-741.
- Laufer, B., & Cobb, T. (2020). How much knowledge of derived words is needed for reading? *Applied Linguistics*, 41(6), 971-998.
- Laufer, B., & Ravenhorst-Kalovski, G. C. (2010). Lexical threshold revisited: Lexical text coverage, learners' vocabulary size and reading comprehension. *Reading in a foreign Language*, 22(1), 15-30.
- Laufer, B., & Rozovski-Roitblat, B. (2011). Incidental vocabulary acquisition: The effects of task type, word occurrence and their combination. *Language Teaching Research*, 15(4), 391-411.
- Laufer, B., & Rozovski-Roitblat, B. (2015). Retention of new words: Quantity of encounters, quality of task, and degree of knowledge. *Language Teaching Research*, 19(6), 687-711.
- Liao, Y. F. (2004). A survey study of Taiwan EFL freshmen's vocabulary learning strategies. *Journal of Pingtung Teachers College*, 21, 271-288.
- Min, H. T. (2008). EFL vocabulary acquisition and retention: Reading plus vocabulary enhancement activities and narrow reading. *Language Learning*, 58(1), 73-115.



**A Systematic Review of EFL Research on the Impact of Reading Comprehension on Students' Vocabulary Retention, and the Relation between Reading and Vocabulary Size**

Mondria, J. A. (2003). The effects of inferring, verifying, and memorizing on the retention of L2 word meanings: An experimental comparison of the “meaning-inferred method” and the “meaning-given method”. *Studies in second language acquisition*, 25(4), 473-499.

Nation, I. (2006). How large a vocabulary is needed for reading and listening? *Canadian modern language review*, 63(1), 59-82.

Nation, P. (2007). The four strands. *International Journal of Innovation in Language Learning and Teaching*, 1(1), 2-13.

Nation, P. (2014). Designing reading tasks to maximise vocabulary learning. *Applied Research on English Language*, 3(1), 1-8.

Nation, P., & Wang, K. (1999). Graded readers and vocabulary. *Reading in a Foreign Language*, 12(2), 355-380.

Pellicer-Sánchez, A., & Schmitt, N. (2010). Incidental vocabulary acquisition from an authentic novel: Do things fall apart? *Reading in a Foreign Language*, 22(1), 31-55.

Peters, E. (2012). The differential effects of two vocabulary instruction methods on EFL word learning: A study into task effectiveness. *International Review of Applied Linguistics in Language Teaching*, 50(3), 213-238.

Peters, E. (2014). The effects of repetition and time of post-test administration on EFL learners' form recall of single words and collocations. *Language Teaching Research*, 18(1), 75-94.

Pigada, M., & Schmitt, N. (2006). Vocabulary acquisition from extensive reading: A case study. *Reading in a foreign language*, 18(1), 1-28.

Schmitt, N. (2008). Instructed second language vocabulary learning. *Language teaching research*, 12(3), 329-363.

Schmitt, N., & Schmitt, D. (2014). A reassessment of frequency and vocabulary size in L2 vocabulary teaching1. *Language Teaching*, 47(4), 484-503.

Schmitt, N., Jiang, X., & Grabe, W. (2011). The percentage of words known in a text and reading comprehension. *The Modern Language Journal*, 95(1), 26-43.

Shintani, N. (2011). A comparative study of the effects of input-based and production-based instruction on vocabulary acquisition by young EFL learners. *Language Teaching Research*, 15(2), 137-158.

Sonbul, S., & Schmitt, N. (2010). Direct teaching of vocabulary after reading: Is it worth the effort? *ELT journal*, 64(3), 253-260.

Waring, R., & Takaki, M. (2003). At what rate do learners learn and retain new vocabulary from reading a graded reader? *Reading in a Foreign Language*, 15(2).

Webb, S. (2008). The effects of context on incidental vocabulary learning. *Reading in a foreign language*, 20(2), 232-245.

Zhang, H., & Pei, Z. (2022). Word knowledge dimensions in L2 lexical inference: Testing vocabulary knowledge and partial word knowledge. *Journal of Psycholinguistic Research*, 51(1), 151-168.

**Appendix 1: Vocabulary retention studies**

<b>Study</b>	<b>Vocabulary interventions</b>	<b>Duration of intervention</b>	<b>Participants</b>	<b>Effects on participants' retention</b>
Peters, E. (2012). The differential effects of two vocabulary instruction methods on EFL word learning: A study into task effectiveness. <i>International Review of Applied Linguistics in Language Teaching</i> , 50(3), 213-238.	Reading text followed by two vocabulary tasks.	Brief	University students	Yes
Min, H. T. (2008). EFL vocabulary acquisition and retention: Reading plus vocabulary enhancement activities and narrow reading. <i>Language Learning</i> , 58(1), 73-115.	Reading plus vocabulary enrichment activities.	Brief	3 <sup>rd</sup> year secondary school students	Yes
Shintani, N. (2011). A comparative study of the effects of input-based and production-based instruction on vocabulary acquisition by young EFL learners. <i>Language Teaching Research</i> , 15(2), 137-158.	Input-based instruction (Showing students real objects or photos of the tested vocabulary words),	Brief	Elementary students (6-8)	Yes

**A Systematic Review of EFL Research on the Impact of Reading Comprehension on Students' Vocabulary Retention, and the Relation between Reading and Vocabulary Size**

	followed by tasks.			
Webb, S. (2008). The effects of context on incidental vocabulary learning. <i>Reading in a foreign language</i> , 20(2), 232-245.	Reading 3 sets of 10 sentences (included targeted vocabulary)	Brief	Second year university students	Yes
Atay, D., & Ozbulgan, C. (2007). Memory strategy instruction, contextual learning and ESP vocabulary recall. <i>English for specific purposes</i> , 26(1), 39-51.	Learning vocabulary through context.	Brief	23-35 years old	Yes
Janebi Enayat, M., & Haghghatpasand, M. (2019). Exploiting adventure video games for second language vocabulary recall: A mixed-methods study. <i>Innovation in Language Learning and Teaching</i> , 13(1), 61-75.	Learning new vocabulary through video games: by reading and comprehending the subtitles and listening to the dialogue.	Brief	University students	Yes
Chen, C. M., Liu, H., & Huang, H. B. (2019). Effects of a mobile game-based English vocabulary learning app on learners' perceptions and learning performance: A case study of Taiwanese EFL learners. <i>ReCALL</i> , 31(2), 170-188.	A novel mobile English vocabulary learning APP with game-related functions.	Brief	University students	Yes
Peters, E. (2014). The effects of repetition and time of post-test administration on EFL learners' form recall of single words and collocations. <i>Language Teaching Research</i> , 18(1), 75-94.	A list of words contained definitions followed by vocabulary activities.	Brief	University students.	Yes
Laufer, B., & Rozovski-Roitblat, B. (2015). Retention of new words: Quantity of encounters, quality of task, and degree of knowledge. <i>Language Teaching Research</i> , 19(6), 687-711.	Reading and word focused exercises.	Brief	High school graduates	Yes
Sonbul, S., & Schmitt, N. (2010). Direct teaching of vocabulary after reading: Is it worth the effort? <i>ELT journal</i> , 64(3), 253-260.	Direct teaching of vocabulary after reading comprehension	Brief	University students	Yes
Pigada, M., & Schmitt, N. (2006). Vocabulary acquisition from extensive reading: A case study. <i>Reading in a foreign language</i> , 18(1), 1-28.	Extensive reading program	Brief	27 years old	Yes
Pellicer-Sánchez, A., & Schmitt, N. (2010). Incidental vocabulary acquisition from an authentic novel: Do things fall	Reading an authentic novel, then	Brief	University students (aged from 23 to 26)	Yes

apart? <i>Reading in a Foreign Language</i> , 22(1), 31-55.	measuring participant's incidental vocabulary acquisition.			
Nation, P. (2015). Principles guiding vocabulary learning through extensive reading. <i>Reading in a foreign language</i> , 27(1), 136-145.	Learning vocabulary through extensive reading	All	Different levels	Yes
Laufer, B. (2003). Vocabulary acquisition in a second language: Do learners really acquire most vocabulary by reading? Some empirical evidence. <i>Canadian modern language review</i> , 59(4), 567-587.	Learning vocabulary through reading	Brief	University students	No
Laufer, B., & Rozovski-Roitblat, B. (2011). Incidental vocabulary acquisition: The effects of task type, word occurrence and their combination. <i>Language Teaching Research</i> , 15(4), 391-411.	Reading texts with various exercises	Brief	University students	Yes

**Appendix 2: Vocabulary size studies**

<b>Study</b>	<b>Vocabulary interventions</b>	<b>Duration of intervention</b>	<b>Participants</b>	<b>Effects on participants' vocabulary size</b>
Nation, I. (2006). How large a vocabulary is needed for reading and listening? <i>Canadian modern language review</i> , 63(1), 59-82.	Investigating how large a vocabulary is needed to read a novel, graded readers, or watch a movie.	N/A	Different levels	If we take 98% as the ideal coverage, a 8,000–9,000 word-family vocabulary is needed for dealing with written text, and 6,000–7,000 families for dealing with spoken text.
Nation, P. (2014). Designing reading tasks to maximise vocabulary learning. <i>Applied Research on English Language</i> , 3(1), 1-8.	Learning vocabulary through a range of reading activities.	Long-term.	Different levels	Yes
Laufer, B., & Aviad–Levitzky, T. A. M. I. (2017). What type of vocabulary knowledge predicts reading comprehension: Word meaning recall or word meaning recognition? <i>The Modern Language Journal</i> , 101(4), 729-741.	Utilizing recognition test to measure comprehension vocabulary.	Brief	College level	Yes
Laufer, B., & Ravenhorst-Kalovski, G. C. (2010). Lexical threshold revisited: Lexical text coverage, learners' vocabulary size and reading comprehension. <i>Reading in a foreign Language</i> , 22(1), 15-30.	Comprehension followed by a vocabulary levels test.	Brief	College level	suggested reconsidering the lexical text coverage to two thresholds: the ideal one which covers 98% with 8,000-word families, and the minimal one that covers

				95% with 4,000-5,000-word families
Laufer, B., & Cobb, T. (2020). How much knowledge of derived words is needed for reading? <i>Applied Linguistics</i> , 41(6), 971-998.	The experiment utilized a text analysis computer program called Morpholex.	Brief	None	The results show that reaching the lexical thresholds for reading does not require the knowledge of most of the derived words in a word family
Gu, Y. (2002). Gender, academic major, and vocabulary learning strategies of Chinese EFL learners. <i>RELC Journal</i> , 33(1), 35-54.	A large-scale survey was conducted amongst a group of adult Chinese EFL learners on their vocabulary learning.	Brief	University students	Female students significantly outperformed their male counterparts in both a vocabulary size test and a general proficiency test.
Zhang, H., & Pei, Z. (2022). Word knowledge dimensions in L2 lexical inference: Testing vocabulary knowledge and partial word knowledge. <i>Journal of Psycholinguistic Research</i> , 51(1), 151-168.	Comprehension followed by a vocabulary levels test.	Brief	College level	The results showed that word knowledge dimensions collectively contributed to L2 real-word and pseudo-word meaning inference. Specifically, vocabulary depth and morpheme-form knowledge had the highest predictive impact.
Alavi, S. M., & Akbarian, I. H. (2012). The role of vocabulary size in predicting	Examining if there was a relation	Brief	Undergraduate & post graduate students	The study showed that the performance in

**A Systematic Review of EFL Research on the Impact of Reading Comprehension on Students' Vocabulary Retention, and the Relation between Reading and Vocabulary Size**

performance on TOEFL reading item types. <i>System</i> , 40(3), 376-385.	between vocabulary knowledge and the performance on TOEFL reading tests.			the type of test items used is influenced by vocabulary knowledge and vocabulary proficiency level.
Schmitt, N., & Schmitt, D. (2014). A reassessment of frequency and vocabulary size in L2 vocabulary teaching. <i>Language Teaching</i> , 47(4), 484-503.	Reassessing the frequency and vocabulary size in second language.	N/A	Different levels	To reassess the boundaries between high-low frequency words and to propose the concept of mid-frequency words.
Schmitt, N., Jiang, X., & Grabe, W. (2011). The percentage of words known in a text and reading comprehension. <i>The Modern Language Journal</i> , 95(1), 26-43.	Measuring vocabulary by reading the text, followed by answering a comprehension test.	Brief	Ranged from 16-33 years old, and varied with all levels of proficiency	No
Gyllstad, H., Vilkaitė, L., & Schmitt, N. (2015). Assessing vocabulary size through multiple-choice formats: Issues with guessing and sampling rates. <i>ITL-International Journal of Applied Linguistics</i> , 166(2), 278-306.	The Vocabulary Size Test (VST) (Nation & Beglar, 2007)	Brief	Ranged from 21 to 30 years old	No (The results shows that there is mismatch & overstimulation in the results of MCTs)
Al-Homoud, F., & Schmitt, N. (2009). Extensive reading in a challenging environment: A comparison of extensive and intensive reading approaches in Saudi Arabia. <i>Language Teaching Research</i> , 13(4), 383-401.	Measuring vocabulary after intensive and extensive reading comprehension	Brief	College level	Yes