

# Reading Strategies, Vocabulary Size and Reading Comprehension of Iraqi Secondary School EFL Learners

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**Abstract:** While research on reading comprehension and the factors influencing EFL learners' reading performance is construed as crucial for identifying the challenges they encounter, there is a scarcity of work that focuses on secondary school EFL learners, especially Iraqi secondary school EFL students. These studies also emphasized reading strategies and vocabulary size independently of the relationship between these factors and reading comprehension performance, and thus it is still unclear how both reading strategies and vocabulary size contribute to better reading performance. For this purpose, our study has three key objectives: i) to determine what are the reading strategies most frequently used by Iraqi 12th-grade secondary school EFL students, ii) to assess students' vocabulary size, and iii) to investigate the relationship between reading strategies, vocabulary size, and reading comprehension. Our participants answered a survey of reading strategy, a vocabulary size test, and a reading comprehension test. Our findings revealed that the problem-solving reading strategy was the most popular reading strategy among Iraqi secondary school EFL students. This strategy was also positively and significantly associated with better reading comprehension outcomes. The results also showed that our subjects had a vocabulary size of 2500 words on average, and that vocabulary size was positively and significantly associated with reading performance. In general, these observations provide EFL teachers with useful information about what influences reading comprehension among Iraqi secondary school EFL students and suggest possible areas of research.

**Keywords:** Reading comprehension; reading strategies; vocabulary size

## Introduction

The ability to read and comprehend is crucial for school success and necessary for students inside and outside of the classroom. With the expansion of technology, social media, science, and education over the last few decades, reading in English has become one of the most important linguistic skills for communication, especially for those who learn English as a Foreign Language (EFL) (Graesser et al., 2019; Suggate et al., 2018; Wexler et al., 2022). Reading is a cognitive skill, and there are various cognitive activities a reader must perform to comprehend a text, which includes but are not limited to drawing on their prior knowledge and applying it to the text, summarizing information, controlling reading speed, and drawing conclusions, among others (Samiei & Ebadi, 2021).

Reading ability might be influenced by several linguistic and metacognitive variables, such as the way you read and the size of your vocabulary. Reading strategies are various metacognitive processes that readers use to solve obstacles while reading the text (Oxford, 1990). For EFL learners, the effective use of varying reading strategies before and while reading may significantly improve reading comprehension (Kamaliah & Utaminingsih, 2023; Par, 2020; Peng et al., 2023). According to the literature, skillful readers are more likely to use a wide range of reading strategies in text reading, whereas poor readers show to have low familiarity with these strategies, and therefore they

demonstrate inferior reading comprehension abilities (Pressley et al., 2023). That said, explicit instruction of reading strategies may assist EFL learners in taking control of their reading processes and effective reading comprehension, which may in turn lead to improved reading performance and leading to improved comprehension and higher opportunities for academic success.

Previous studies also suggest that linguistic factors such as vocabulary size can demonstrate another significant determinant of reading comprehension among EFL learners (Alzahrani et al., 2021; Dong et al., 2020). Vocabulary size is construed as one of the main building blocks of successful language learning and the degree to which one may succeed in reading comprehension may largely depend on EFL learners' vocabulary knowledge (Kakvand et al., 2022). There is a multitude of reading studies that examined the relationship between vocabulary size and reading comprehension and showed how higher vocabulary knowledge significantly correlated with superior reading comprehension performance (Ocampo & McNeill, 2019; Zhang & Zhang, 2020), especially among EFL learners struggling with difficult texts. Therefore, poor vocabulary knowledge may significantly prevent someone from effectively engaging and comprehending a reading material (Alrickaby, 2024). Then, this would suggest that assisting EFL learners to expand their vocabulary resources is likely to lead to better proficiency in reading comprehension (Al-Nujaidi, 2003; Thompson & von Gillern, 2020).

So far, there are studies about reading comprehension among Iraqi secondary school EFL learners, especially in the light of the growing concern about the Iraqi education system in the English language. There is little-to-no-information about the particular reading strategies that secondary school EFL learners frequently use to comprehend English passages, as well as a scarcity of investigations on their vocabulary knowledge and how both reading strategies and vocabulary size may impact their attempts in reading comprehension. Given this lack of knowledge in the literature, the main aim of the present study is to examine students' ability in reading skills, and how likely both reading strategies and vocabulary size may impact their reading comprehension performance. All in all, this study sought to investigate:

1. the most and least frequently used reading strategies among Iraqi secondary school EFL learners
2. the level of vocabulary size among Iraqi secondary school EFL learners
3. the relationship between reading strategies, vocabulary size, and reading comprehension performance among Iraqi secondary school EFL learners

## **Literature Review**

Several studies provided strong support for the effectiveness of employing various reading strategies in enhancing EFL students' comprehension of reading texts (Banditvilai, 2020; Kamaliah & Utaminingsih, 2023; Par, 2020; Shehzad et al., 2021). The interplay between reading strategies and reading comprehension is believed to be the key to pinpointing which methods EFL students use to address text comprehension difficulties (Follmer & Sperling, 2018; Kendeou et al., 2016; Par, 2020; Song et al., 2020). Reading strategies basically concern three strategies: problem-solving, support, and global reading strategies. These methods allow EFL students to use practical strategies that increase comprehension speed and precision (Muche et al., 2024; Peng et al., 2023).

Similarly, the impact of vocabulary size on reading comprehension among EFL students has been discussed at various levels across the literature (Alnan & Abd Halim, 2024; Alzahrani et al., 2021; Dong et al., 2020; Zhang & Zhang, 2020). Many research studies examined the correlation between vocabulary size and reading comprehension and found evidence to support the view that vocabulary size plays an important role in achieving good reading comprehension (Alshehri, 2023; Alzahrani et al., 2021; Tong et al., 2023; Zhang & Zhang, 2020). Alzahrani et al. (2021) tested the likelihood that the vocabulary size of Saudi secondary school EFL students would affect their reading skills. Alzahrani and others cited research indicating that Saudi secondary school EFL students have low vocabulary sizes, but their relationship analyses also revealed that larger vocabulary sizes help learners do better on reading tests. Ocampo and McNeill (2019) also made similar conclusions. However, it is questionable how these results might translate to students of different educational levels

and cultures, with Iraqi secondary school EFL students still fairly underrepresented in previous studies.

A number of theories have emerged over the past few decades, each attempting to explain how complex the comprehension of reading is. These included, but were not limited to, the bottom-up model (Gough et al., 1972), the top-down model (Goodman, 1967) and the interactive model (Rumelhart & McClelland, 1986). The bottom-up model – one of the most traditional models of reading – considers reading comprehension to be an ordered hierarchy beginning with the analysis of individual letters, moving on to word decoding, and finally reading sentences or clauses, eventually aiming at successful comprehension (Amadi, 2019; Nadea, 2021). This approach is sometimes referred to as hierarchical because reading comprehension supposedly starts at the smallest linguist unit before it moves onto a sentence or clause understanding, implying that language skills are the key component of successful comprehension in EFL students (Birch & Fulop, 2020).

Unlike the bottom-up model, the top-down model treats prior experience and the use of metacognitive reading skills as the essential factors that determine good reading comprehension (Goodman, 1967). Whereas the bottom-up method focuses on decoding elementary linguistic components of the text, the top-down model takes a broad-based view that readers gain comprehension through the exercise of higher-level cognitive abilities, for example, coupling their prior knowledge, activating their schemas, and executing metacognitive reading strategies in order to access meaning (Birch & Fulop, 2020; Kakvand et al., 2022). This means that, instead of attempting to understand the linguistic construction and words of a sentence to grasp the meaning, the top-down approach insists on context and background knowledge as the way to understand the text's overall meaning (Hattan et al., 2023).

Just as its name implies, the interactive reading model treats the incipient act of reading as a complex combination of bottom-up and top-down processes. In particular, reading comprehension is when the reader applies linguistic and metacognitive capacities to create meaning (Stanovich, 1980), thus finding a middle ground between the bottom-up view, whereby reading comprehension exploits the basic units of language, and the top-down view, which emphasizes the importance of bringing the schema and prior knowledge into play to make sense of the written text (Kim, 2020; Rumelhart & McClelland, 1986).

While the aforementioned discussions of empirical studies and reading theories provide useful insights into the intricate process responsible for reading comprehension, appreciating how likely EFL learners of particular educational or cultural backgrounds would cope with challenges in reading comprehension remains a debated topic in recent reading studies. Understanding the ability to read and comprehend among Iraqi secondary school EFL students thus necessitates an appreciation of Iraq's broader educational context. English in Iraq is a mandatory subject in secondary schools, and it is considered crucial for higher education and professional development. Recently, the Iraqi education system underwent significant changes to renovate its educational standards (Issa & Jamil, 2010). However, these efforts were hampered due to several challenges, which include limited access to quality resources, insufficient teacher training, and a lack of exposure to English outside the classroom (Altae, 2022; Jawad & Al-Assaf, 2014).

Numerous studies demonstrate the value of reading strategies in improving reading comprehension across a range of education settings and literacy levels (e.g., Aini & Akhriyah, 2022; Do & Phan, 2021; Li et al., 2022; Manurung et al., 2023; Oranpattanachai, 2023; Par, 2020; Shehzad et al., 2021). For instance Alkhateeb and Hasan (2016) examined Iraqi primary schoolchildren studying English as a foreign language and observed that they adopted a variety of strategies, particularly indirect metacognitive strategies such as planning and self-monitoring, even when they experienced little or no exposure to English outside of school. This metacognitive use of strategies argues that students can use strategic methods to support comprehension in a foreign language, even from an early age. In a similar vein, Do and Phan (2021) examined the use of reading strategies among Vietnamese undergraduate English majors and found that higher-performing students engaged with problem-solving, global and support strategies more frequently than their inferior peers. This finding highlights the necessity of teaching strategies in clear terms, such as global and support strategies, as they can facilitate understanding by allowing students to process and understand information in text.

A study of Thai tertiary students by Oranpattanachai (2023) emphasised also the importance of reading strategies, indicating that top-down strategies (seeking the bigger picture of the text) were positively associated with better reading comprehension. No such relationship existed for bottom-up strategies, which focus on deciphering single words and sentences, indicating that strategies designed to read the big picture are probably more useful for more experienced readers who work with more complex content. Combined, these research results demonstrate that reading strategy should be an integral part of language learning, since it helps students engage with texts in greater depth and customize their strategy to match their ability. The more proficient students become, the more sophisticated their reading strategies will become, which also suggests the need for adaptive, skill-specific strategy instruction to produce effective comprehension.

In addition to reading strategies, vocabulary plays an important role in reading comprehension (e.g., Al-Khasawneh, 2019; Alzahrani et al., 2021; Dong et al., 2020; Ocampo & McNeill, 2019; Tan & Goh, 2017; Zhang & Zhang, 2020). Al-Khasawneh (2019) surveyed first-year students at King Khalid University and found that vocabulary size correlated positively with reading comprehension. They taught pupils with around 2,025 word families to understand roughly 90% of texts, further proof that we need a wide range of words to be able to comprehend anything. Similarly, Alzahrani et al. (2021) compared vocabulary size among Saudi secondary school EFL students, and discovered that the majority were not sufficiently familiar with vocabulary which limited their ability to comprehend what they read. They found that vocabulary size was a strong predictor of reading achievement, and that students with larger vocabulary scored higher on comprehension tests. Similar reports were reported among Arab EFL learners (Alnan & Abd Halim, 2024; Alshehri, 2023). All of these findings suggest that vocabulary and planning in reading form a key part of the road to effective reading comprehension, particularly for foreign speakers.

All in all, while there is an extensive number of studies that investigated reading comprehension among EFL learners, these reports are context-specific and they do not generalize or apply to other students reading in a different cultural and educational environment. It is also worth noting that previous work largely focused on university-level students, thus leaving open how secondary school students deal with challenges in English reading (e.g., Al-Jarrah & Ismail, 2018; Alsamadani, 2009; Alzahrani et al., 2021). Furthermore, previous studies in the Iraqi context almost exclusively focused on investigating reading strategies or vocabulary size independently of reading comprehension (Abd Ali et al., 2023; Alsharhani et al., 2023; Dehham et al., 2022; Mukhlif & Amir, 2017; Rahooomi et al., 2019), thus did not address how these factors may influence Iraqi EFL learners' reading performance.

## **Methodology**

### *Participants*

A total 180 participants participated in our study. All were Iraqi secondary school EFL learners attending public schools in Baghdad, Iraq. The participants shared common characteristics related to their age, grade, and gender; therefore, maintaining some sort of homogeneity (Creswell, 2021). Both male and female students were included: 49% of the participants were male. All were 12th graders. The mean score of their age was 18 (in years,  $M = 17.8$ ,  $SD = .40$ ). A notable characteristic among the participants was that English was a foreign language to them, primarily learned through their English classes and not commonly used in their daily conversations.

### *Research Design*

This study employed a quantitative, correlational research design to analyze the relationships between reading strategies, vocabulary size, and reading comprehension performance among Iraqi secondary school EFL learners. By using a quantitative approach, we were able to gather numerical data on these variables, allowing for statistical analysis of patterns and relationships. A correlational design, as recommended by Creswell (2009), is particularly suitable for this purpose because it enables researchers to assess both the strength and direction of associations between variables, without

manipulating them. This approach aligns with our main research objective: to understand how variations in reading strategies and vocabulary size may correlate with differences in reading comprehension performance among students.

### *Instruments*

We used three instruments to carry out the study. These included a survey on reading strategies, a vocabulary size test, and a reading comprehension task. Each instrument is elaborated upon in the subsequent sections.

#### *a. Survey of Reading Strategies (SORS)*

A reading strategy questionnaire developed by Mokhtari and Sheorey (2002) was adapted. This questionnaire aimed to identify the specific reading strategies that readers employ to deal with reading comprehension difficulties encountered at the before-and-while reading comprehension stage (Mokhtari & Sheorey, 2002). These strategies fall into three main categories that are discussed below:

1. **Global Reading Strategies:** These strategies include techniques that readers use before reading the text. They involve methods, such as reflecting on the purpose of the text, identifying the main ideas, and summarizing information (Mokhtari & Sheorey, 2002).
2. **Problem-Solving Reading Strategies:** These strategies are more localized and focused, such as adjusting one's speed when the text becomes difficult, guessing the meaning of unknown words, and re-reading difficult parts among others. These strategies help readers cope with reading comprehension obstacles (Mokhtari & Sheorey, 2002).
3. **Support Reading Strategies:** These strategies include using additional aids or tools for readers to better understand the text. They include using dictionaries, taking notes, underlining, and highlighting (Mokhtari & Sheorey, 2002).

Regarding questionnaire scoring, each item in the questionnaire corresponds to a specific reading strategy or behavior. On a Likert scale of "Never" to "Always", participants were asked to rate the frequency with which they employ each strategy.

#### *b. Vocabulary Size Test (VST)*

This test aimed to provide an estimated measure of participants' vocabulary size. It was specifically meant to assess students' written receptive vocabulary size in English with the goal of determining whether EFL students have an adequate vocabulary size to complete tasks, such as reading a novel, reading a newspaper, or listening to a friendly conversation efficiently (Beglar & Nation, 2007).

This test has 14 word families that range between high-frequency words, mid-frequency words, and low-frequency words. Each family tests the knowledge of 10 English words, thus making a total of 140 questions overall. High-frequency words cover those basic words, whereas low-frequency words involve those that are less frequent. According to Beglar and Nation (2007), high-frequency words encompass those words listed between 1000 and 2000 words, while mid-frequency words are reflective of those with a frequency between 3000 and 9000 words. Words of frequency of 10000 and above are considered low-frequency words.

As with previous studies on the same topic (Al-Nujaidi, 2003; Alahmadi et al., 2018), our work used two distinct frequency levels: high-frequency words and mid-frequency words, with a special emphasis on families that fall between 1000 and 4000 frequency words. These 4 families make 40 questions. According to Nation (2012), these word families are suitable for testing non-native speakers of non-European origins.

### *c. Reading Comprehension Test (RCT)*

It is a standardized test adopted from the Common European Framework of Reference for Languages (CEFR). CEFR describes proficiency in language on a six-point Likert scale, where A1 refers to beginners, whereas C2 is for those who have mastered the English language. Our study selected a RCT from the B1 level, because it is a language test with content designed for school-aged students. Therefore, the readability level is accessible to learners with an intermediate understanding of English.

The test comprised two parts. The first part consisted of five short informational texts (e.g., notices, advertisements, emails, and labels), whereas the second part consisted of a 360-word long descriptive text, which focuses on the hobby and experiences of an artist. The test had a total of 10 comprehension questions. Each question offered three/four multiple-choice answers, from which the participants should select the option that best answers the question. Thus, the maximum possible score was 10, and the minimum was 0.

### *Data Collection Procedure*

Official approvals from the Ethics Committee at UiTM and the corresponding local schools in Iraq were first obtained. Before data collection, participants were provided with clear explanations of the study's objectives and procedures and how the questionnaires and tests should be completed. Their voluntary participation was also sought through informed consent.

Participants were asked to fill in the reading strategy questionnaire and complete the tests in two class times. In one class period (45 minutes), they were asked to complete the RSQ and VST, whereas they took the RCT in another class time. All participants were informed that their responses would be used for research purposes only and hence would be kept in strict confidentiality. After data collection, all responses were keyed into IBM SPSS for analysis.

### *Data Screening and Analysis*

Before data analysis, it is common practice to explore the data to make sure that it is free from any adverse events, including missing data points or the presence of an outlier (Field, 2018). For this purpose, the study conducted exploratory analyses. Participants whose mean score were above 3 SD were removed from the data. This procedure resulted in the removal of two participants (>1%) from a total of 180 participants. These two participants seemed uncooperative in their participation because they answered the questions of the questionnaires using a single-response type, making their overall mean score lie outside the data range of their peer participants.

The data was further explored to ensure it met the assumptions of normality. Data normality is the characteristic of data being in a bell-shaped distribution, or a symmetric pattern around the mean (Koziol et al., 2016). Non-normal data can affect some statistical analyses (Field, 2018). To examine data distribution, the study conducted Skewness and Kurtosis analyses, which are statistical measures that provide information about the shape and characteristics of data distribution (Field, 2018). The results of Skewness and Kurtosis for reading strategies (comprising global strategy, support strategy, problem-solving strategy), reading performance scores, and vocabulary size indicate that all data points fall within the range of -2 and +2, thus affirming the normal distribution of the study (Soriano et al., 2022; Jammalamadaka et al., 2021). To evaluate the internal consistency of the SORS, vocabulary size, and RCTs, Cronbach's alpha was used to assess internal consistency. The reliability of the SORS was confirmed with a Cronbach's of 0.713, higher than the commonly accepted value of 0.70, meaning that the questionnaire is reliable. On the other two tests, internal consistency was measured by a split-half reliability test (based on the Spearman-Brown correlation) (Field, 2018). Their Spearman-Brown correlation coefficients were 0.817 for vocabulary size and 0.852 for reading comprehension, respectively, which suggests high reliability for the present study (Chakrabartty, 2013). Following Guilford's Rule of Thumb, these results show that the test items are robust and positively related ( $r > .8$ ), which further supports the validity of the tests.

## Findings

### *Reading Strategies among Iraqi Secondary School EFL Learners*

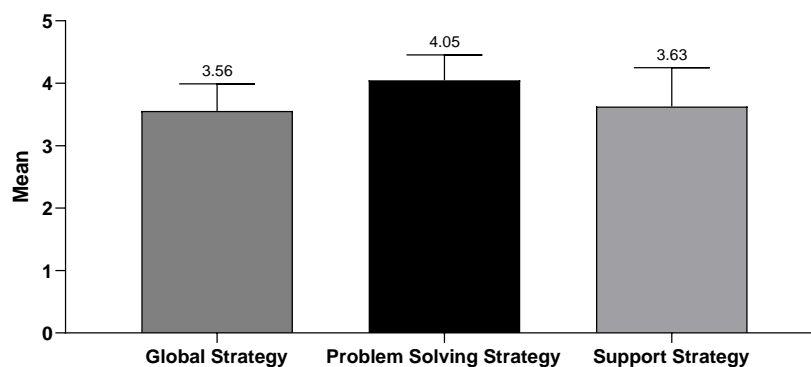
The study aimed to determine the most and least frequent reading strategies that Iraqi EFL school students employ in reading comprehension. This involved three types of reading strategies: namely, the global reading strategy, support reading strategy, and problem-solving reading strategy.

To determine the frequency with which each reading strategy was used, descriptive analyses were performed to calculate the mean for each reading strategy. The results obtained from these descriptive analyses are reported in Table 1 and visually illustrated in Figure 1 below.

**Table 1.** Mean and Standard Deviation of Reading Strategies

Strategy	Mean	SD	Level
Global	3.56	.435	Moderate
Problem solving	4.05	.406	High
Support strategy	3.63	.622	Moderate

*Note.* Frequency levels: Low (1 – 2.339), Moderate (2.34 – 3.669), High (3.67 – 5)



**Fig. 1.** Mean score for Each Reading Strategy Usage

According to Figure 1, it is obvious that Iraqi secondary school EFL learners rely more on the problem-solving reading strategy in reading comprehension ( $M= 4.05$ ,  $S= 0.406$ ) than the support reading strategy ( $M= 3.63$ ,  $SD= 0.622$ ) or global reading strategy ( $M= 3.56$ ,  $SD= 0.435$ ). The higher mean value for the problem-solving strategy suggests that learners tend to engage more actively with the text by using techniques like re-reading or adjusting reading speed. In contrast, the lower means for support and global strategies indicate a relatively less frequent use of methods such as note-taking or considering the text as a whole. However, to further understand the specific reading substrategies that were more dominant under each main reading strategy, the study conducted an item analysis. The results and findings for each reading strategy are presented below.

### *Global Reading Strategies*

The study conducted an item analysis for the global reading strategy (13 items), and the results indicated that Iraqi secondary school students used these strategies with varied frequencies, as shown in Table 2 below. The strategies more frequently used by the participants are listed first.

**Table 2.** Global Reading Strategies Used by Iraqi Secondary School EFL Students

Questionnaire Items	Mean	SD	Level
I think about whether the content of the text fits my reading purpose.	4.67	.703	High
I have a purpose in mind when I read.	4.38	1.083	High
When reading, I decide what to read closely and what to ignore.	4.31	1.135	High
I check my understanding when I come across new information.	3.81	1.093	High
I use typographical features like bold face and italics to identify key information.	3.79	1.248	High
I use tables, figures, and pictures in text to increase my understanding.	3.75	1.257	High
I take an overall view of the text to see what it is about before reading it.	3.74	1.602	High
I check to see if my guesses about the text are right or wrong.	3.59	1.355	Moderate
I review the text first by noting its characteristics like length and organization.	3.52	1.497	Moderate
I try to guess what the content of the text is about when I read.	3.24	1.488	Moderate
I use context clues to help me better understand what I am reading.	2.83	1.168	Moderate
I critically analyze and evaluate the information presented in the text.	2.56	1.332	Moderate
I think about what I know to help me understand what I read.	2.04	1.261	Moderate

According to the results in Table 2, Iraqi secondary school EFL students record high levels of relying on their background knowledge for interpreting the reading text, especially by finding if it aligns with their universal knowledge ( $M= 4.67$ ,  $SD= 0.703$ ). The results also suggested that Iraqi secondary school students tend to adopt an objective when they interact with the reading text ( $M= 4.38$ ,  $SD= 1.083$ ), so they sometimes ignore irrelevant details ( $M= 4.31$ ,  $SD= 1.135$ ).

However, at moderate levels, the students seem to be less reliant on guessing the content of the text ( $M= 3.59$ ,  $SD= 1.355$ ), assessing whether or not the content aligns with their reading purpose, or reviewing the text by noting its characteristics, such as length and organization ( $M= 3.52$ ,  $SD= 1.497$ ), among others.

These findings suggest that while Iraqi secondary school EFL students effectively use their background knowledge and focus on the main objectives of the text, they may benefit from developing their use of more comprehensive reading strategies. By improving their ability to engage with the text through prediction and structural analysis, they could enhance their overall reading comprehension and adaptability to various types of reading materials.

#### *Problem-Solving Reading Strategies*

The study conducted an item-based analysis by scoring participants' responses in the problem-solving reading strategy. This strategy has 8 items. On average, the results revealed that these problem-solving strategies were the most frequently used reading strategies by Iraqi secondary school EFL students



( $M= 4.05$ ,  $SD= 0.406$ ). The mean and standard deviation for each problem-solving reading strategy are presented in Table 3 below.

**Table 3.** Problem-Solving Reading Strategies Used by Iraqi Secondary School EFL Students

Questionnaire Items	Mean	SD	Level
When text becomes difficult, I re-read it to increase my understanding.	4.57	.696	High
I try to get back on track when I lose concentration.	4.41	1.102	High
When text becomes difficult, I pay closer attention to what I am reading.	4.33	.821	High
I try to picture or visualize information to help remember what I read.	4.32	.917	High
When I read, I guess the meaning of unknown words or phrases.	4.10	1.196	High
I read slowly and carefully to make sure I understand what I am reading.	3.90	.912	High
I adjust my reading speed according to what I am reading.	3.45	1.289	Moderate
I stop from time to time and think about what I am reading.	3.29	1.325	Moderate

As presented in Table 3, the use of these strategies ranged between high and moderate levels of frequency. Six out of eight strategies were used at high levels. These included re-reading the difficult parts of the text to facilitate comprehension ( $M= 4.57$ ,  $SD= 0.696$ ), trying to get back on track when losing concentration ( $M= 4.41$ ,  $SD= 1.102$ ), paying closer attention to the text when it becomes difficult ( $M= 4.33$ ,  $SD= 0.821$ ), visualizing information for remembering purposes ( $M= 4.32$ ,  $SD= .917$ ), guessing the meaning of unknown words or phrases ( $M= 4.10$ ,  $SD= 1.196$ ), and reading slowly to enhance their understanding ( $M= 3.90$ ,  $SD= 0.912$ ). These results suggest that Iraqi secondary school EFL students actively employ a range of problem-solving strategies to enhance their understanding of the reading text. The high frequency of these strategies indicates their importance in overcoming difficulties and improving overall reading proficiency for these EFL learners.

### *Support Reading Strategies*

The participants' use of support reading strategies was analyzed by calculating the mean and standard deviation for each strategy item. There were nine strategy items in total. On average, the findings revealed that Iraqi secondary school students relied considerably on support reading strategies, with a high level of frequency ( $M= 3.63$ ,  $SD= 0.622$ ). However, the extent to which these strategies were utilized varied among the participants, as detailed in Table 4 below.

**Table 4.** Support Reading Strategies Used by Iraqi Secondary School EFL Students

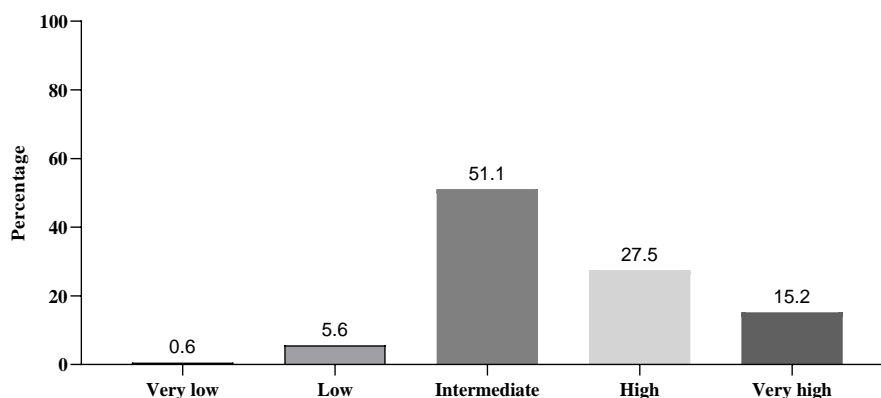
Questionnaire Items	Mean	SD	Level
I take notes while reading to help me understand what I read.	4.42	1.210	High
I paraphrase (restate ideas in my own words) to better understand what I read.	4.22	1.273	High
I underline or circle information in the text to help me remember it.	4.11	1.330	High

When text becomes difficult, I read aloud to help me understand what I read.	3.97	1.445	High
I ask myself questions I like to have answered in the text.	3.35	1.585	Moderate
When reading, I think about information in both English and Arabic.	3.26	1.387	Moderate
I go back and forth in the text to find relationships among ideas in it.	3.26	1.362	Moderate
When reading, I translate from English into Arabic.	3.08	1.428	Moderate
I use reference materials (e.g., a dictionary) to help me understand what I read.	2.98	1.507	Moderate

According to the results in Table 4, the strategies that recorded high levels of frequency among Iraqi secondary school EFL learners included the reliance on taking notes while reading ( $M= 4.42$ ,  $SD= 1.210$ ), paraphrasing ( $M= 4.22$ ,  $SD= 1.273$ ), underlining or circling information ( $M= 4.11$ ,  $SD= 1.330$ ), and reading aloud ( $M= 3.97$ ,  $SD= 1.445$ ). The high-frequency use of strategies like note-taking, paraphrasing, and underlining suggests that Iraqi secondary school EFL learners are actively engaging with the text in a hands-on manner to reinforce their comprehension. These strategies are likely to indicate a proactive approach to reading among our participants, who prioritize understanding and memory retention.

#### *Vocabulary Size among Iraqi Secondary School EFL Students*

The study conducted descriptive analyses to examine participants' vocabulary size. The results revealed that the average score was 25 ( $M= 24.90$ ,  $SD= 6.77$ ), with individual scores ranging from a minimum of 8 to a maximum of 40. To gain a more detailed understanding of individual performance on the vocabulary test, the scores were divided into five specific score groups: scores ranging from 1 to 8 classified as "Very Low," 8.1 to 16 as "Low," 16.1 to 24 as "Intermediate," 24.1 to 32 as "High," and 32.1 to 40 as "Very High." The distribution of participants among these five categories is visually represented in Figure 2, which shows the percentage of participants within each category.



**Fig. 2.** Level Of Vocabulary Size of Iraqi Secondary School EFL Students

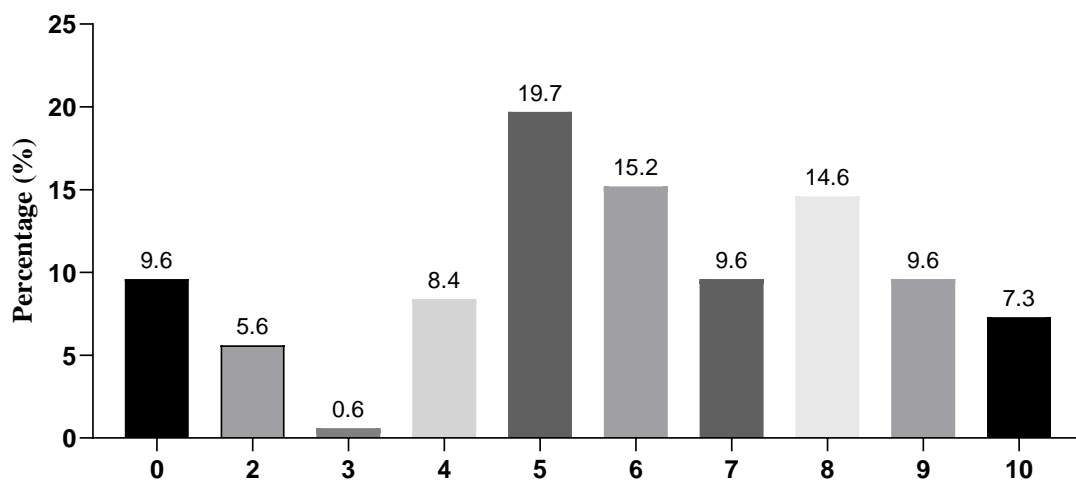
Notably, the results in Figure 2 demonstrated that a considerable proportion of the participants (51.1%) showcased an "intermediate" level of vocabulary size, with an additional 27.5% falling within the "high" category. Conversely, only a small proportion of participants exhibited a "very high" (15.2%), "low" (5.6%), or "very low" (1%) vocabulary size on the 1,000-4,000 vocabulary test. These results strongly suggest that the majority of the Iraqi secondary school students involved in this study

possess limited lexical knowledge. This outcome is perhaps anticipated given that English is considered a foreign language in Iraq and is not regularly utilized in day-to-day communication.

The prevalence of "intermediate" levels among the participants suggests a modest level of familiarity with English vocabulary, while the lesser representation in the "low" and "very low" categories might indicate some foundational understanding or exposure to English language learning. Conversely, the limited presence in the "very high" category suggests a scarcity of participants with an extensive English vocabulary, reinforcing the notion that comprehensive English proficiency might be less common among these students in an Iraqi context.

#### *Relationship between Reading Strategies, Vocabulary Size, and Reading Comprehension*

To evaluate students' reading performance, the study analyzed students' mean score on reading. The results showed that, on average, the students achieved a score of 6 out of 10 on the reading task ( $M=5.8$ ,  $SD=2.76$ ), indicating that the RCT presented a significant challenge for them. The distribution of students' scores on the reading task is depicted in Figure 3.



**Fig. 3.** Percentage of Students Scoring between 0 and 10 on the Reading Task

As visually illustrated in Figure 3, a significant portion of students, approximately 59% of the total participants, scored within the range of 5 to 8 out of 10 in the reading task. In contrast, roughly 24% of the participants obtained scores falling between 0 and 4, while around 17% achieved scores ranging from 9 to 10 on the test. Overall, these results illustrate a varied distribution of performance levels among the participants, indicating differing degrees of comprehension and mastery of the material assessed in the reading task.

To investigate the relationship between reading strategies, vocabulary size, and reading comprehension, the study employed a multiple linear regression analysis. The study utilized three reading strategies (global, problem-solving, supplementary strategy) and students' vocabulary size as independent variables, while reading comprehension was the dependent variable. All the variables were included in the model using a forced entry method and were subjected to a bootstrap robust procedure to enhance the statistical analysis. However, before conducting the analysis, the study ensured that the dataset met the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Assessments of Tolerance and Variance Inflation Factor (VIF) statistics suggested an absence of multicollinearity issues, as indicated by the model's tolerance value surpassing .10 and the VIF value remaining below 10. The results of the regression analysis, presenting the relationship between reading strategies, vocabulary size, and reading comprehension, are presented in Table 5 below.

**Table 5.**Results of Multiple Regression Analysis between Reading Strategies, Vocabulary Size, and Reading Comprehension

Predictor	<i>B</i>	SE <sup>a</sup>	<i>t</i>	$\beta$	Sig <sup>b</sup>
(Constant)	-7.214	(1.980)	-3.340		.002
Global strategy	-.360	(.399)	-.885	-.057	.385
Problem-solving strategy	1.914	(.429)	4.216	.281	.001
Support strategy	.228	(.277)	.764	.051	.418
Vocabulary size	.229	(.023)	9.224	.562	.001

Note.  $R^2 = .37$ ; F-test = 25.323 ( $p = .001$ )

<sup>a</sup> Standard error bootstrapped (BCa)

<sup>b</sup> Significance tests bootstrapped (BCa)

As presented in Table 5 above, the overall regression model was significant ( $F(4, 173) = 25.323, p = .001$ ), accounting for 37% of the variance in the dependent variable (i.e., the reading comprehension performance). The two predictor variables *problem-solving strategy* and *vocabulary size* also appeared to be the only two independent variables that are statistically significant and positively correlated with the dependent variable, although the predictor *vocabulary size* records a higher beta value ( $t(173) = 9.22, p < .001$ , bootstrap estimates) than problem-solving strategy ( $t(173) = 4.22, p < .001$ , bootstrap estimates). This suggests that participants with higher vocabulary size and reliance on the problem-solving reading strategy were more likely to perform better in the reading comprehension task. The results also revealed that neither the global reading strategy nor the support reading strategy significantly correlated with reading comprehension ( $p > .05$ ), indicating that these strategies did not contribute to improved reading comprehension performance.

## Discussion

Our principal objective in the present study was to identify the particular reading strategies that are frequently used by Iraqi secondary school EFL learners, as well as the level of vocabulary size and how both reading strategies and vocabulary size may directly impact students' performance in reading comprehension. All students took a survey questionnaire on reading strategies, the VST, and a RCT. As for the reading strategies, our findings indicated that the problem-solving reading strategy was the most frequently used strategy to deal with the difficulties in reading comprehension among Iraqi secondary school students, whereas the support and global reading strategies were moderately and less frequently used, respectively. The latter two strategies require metacognitive skills such as inferring meaning and deducing conclusions, and therefore our school participants still needed to develop their higher-level cognitive skills or proficiency to be able to grapple with these strategies (Kamaliah & Utaminingsih, 2023; Par, 2020; Shehzad et al., 2021).

This was illustrated in our data where participants demonstrated a mild tendency towards critically analysing and evaluating information in the text, which is likely to imply that there is some sort of difficulty in using these more cognitively demanding strategies. Recent treatment studies suggest that training students to employ reading strategies that demand high cognitive efforts can result in improvements in reading comprehension performance and overall reading awareness (Afflerbach et al., 2020; Mohseni et al., 2020).

Our findings further revealed that students' highly frequent use of problem-solving strategies has positively and significantly impacted reading comprehension scores. This suggests that students with higher scores on their problem-solving reading strategy had higher scores in their reading comprehension, and vice versa. Our findings corroborate previous findings (Cho & Ma, 2020; Kamaliah & Utaminingsih, 2023; Oranpattanachai, 2023; Par, 2020). For example, Par (2020) examined the link between reading strategies and reading performance in Indonesian EFL students, concluding that problem-solving reading strategies contributed to students' reading performance.

Concerning support and global reading strategies, our relationship analyses found no strong correlation between the two strategies and reading comprehension. This might be because, as our results suggest, students use the support and global reading strategies less often, or because they need high-level cognitive skills unavailable to lower-achieving students (Garca-Pérez et al., 2021; Kormos & Smith, 2023). Analogously, the cognitive load imposed by both support and global reading strategies might have contributed to their underutilization among Iraqi secondary school EFL students (Al-Nujaidi, 2003; Al Roomy & Alhawsawi, 2019). Al-Nujaidi (2003) also suggests that students of lower proficiency may be less capable of implementing these strategies, putting them at a disadvantage to the overall reading performance of EFL students.

Our findings are consistent with work by Alzahrani et al. (2021) – an EFL secondary-school students in Saudi Arabia that evaluated the relationship between reading strategies and reading performance. They also found that problem-solving was more common for reading comprehension than support or global reading strategies. They also found that students with higher problem-solving reading strategies scored much higher in reading comprehension compared with their classmates who used them at lower levels. These reports, and the fact that EFL secondary school students report problem-solving strategies more than any other strategy, will likely be interpreted to mean the usefulness of such strategies in solving reading difficulties in particular, and to mean the existence of a common practice of reading among secondary school students in general (Par, 2020).

Yet, our results were different from several other studies that found evidence for the view that global and support reading strategies are more prevalent among secondary school students. Kamaliah and Utaminingsih (2023), for example, investigated the relationship between reading strategies and reading comprehension in high-school students in Indonesia. They found that subjects chose the global reading strategies rather than the problem-solving and support reading strategies, indicating that differences in strategy use might be due to context and classroom differences. They also found a robust and positive correlation between general use of reading strategies and reading performance. This goes hand in hand with Al-Rubaye (2012) who reported that Iraqi college students in the US overwhelmingly favored global reading strategies over other reading strategies, suggesting that students of differing educational and language backgrounds would draw on different reading strategies. Crucially, these results-reference disagreements demonstrate how critical we should be of the role that context and competence play in the students' approach to reading among EFL students.

Our results indicated that our participants' average vocabulary consisted of 2500 words, i.e., intermediate-level high-frequency words, which indicates that they have low-quality vocabulary that might be critical to reading comprehension. Our findings align with earlier studies on vocabulary size testing in EFL settings (Alzahrani et al., 2021; Dong et al., 2020; Ocampo & McNeill, 2019; Zhang & Zhang, 2020). For instance, Alzahrani et al. (2021) found that 13000 words are available for Saudi EFL learners, which is about the same size as our participants' vocabulary, indicating that students from various educational levels may possess a different vocabulary size, regardless of their education level. The same goes for Mohammed and Alwadai (2019), who noted that 1000 words were the average number of words in a student's vocabulary at a Saudi secondary school EFL course. These findings demonstrate that targeted vocabulary education is necessary for reading comprehension and that targeted vocabulary instruction and intervention are needed to help EFL learners develop improved vocabulary resources.

Concerning the effects of vocabulary size on reading comprehension, our findings showed that vocabulary size is a strong predictor of reading comprehension performance. Users with larger vocabulary resources performed better on their RCTs. These findings are consistent with recent studies claiming that bigger words might make it easier to recall words more quickly and to exploit higher-order cognitive functions needed for text comprehension (Alzahrani et al., 2021; Zhang & Zhang, 2020). Other findings confirm this hypothesis, suggesting that knowledge of vocabulary determines whether readers will pass their reading exams (Dong et al., 2020; Ocampo & McNeill, 2019; Zhang & Zhang, 2020).

## Conclusion

Our study examined the reading strategies most frequently used by Iraqi secondary school EFL learners in public schools in Iraq, as well as participants' vocabulary size, and the relationship between reading strategies, vocabulary size, and reading comprehension. Overall, our results revealed that the problem-solving reading strategies were more dominant than the global or support reading strategies in reading comprehension among Iraqi secondary school EFL learners. The participants also showed an average level of vocabulary size of 2500 words but with notable differences between the participants. The analyses of the relationships between reading strategies, vocabulary size, and reading comprehension also provided evidence that more frequent usage of reading strategies can significantly lead to better performance in reading comprehension. This was illustrated in our data. Participants who used the problem-solving reading strategies more frequently and had larger vocabulary sizes at their disposal were significantly superior in their RCT scores than peers with low strategy frequency and low vocabulary size. All together, our study provides useful insights into the Iraqi EFL students' well-being in reading comprehension, reading strategies, and vocabulary size and underscores the need for EFL educators to emphasize both vocabulary development and the use of diverse reading strategies.

## Suggestion for Future Research

Given that our study was conducted on participants with particular cultural and educational backgrounds, future research may benefit from conducting comparative studies that examine reading comprehension processes and difficulties across different cultural and educational contexts. They can also employ focus-group discussions in which they can probe information about other factors that may hamper reading comprehension, which include but are not limited to psychological, linguistic, and contextual factors.

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## Co-Author Contribution

The authors confirmed that there is no conflict of interest in this article. Author 1 conceptualised the study, designed the methodology and supervised the research process. Authors 2 and 3 conducted the data collection, performed the formal analysis and contributed to the manuscript writing. All authors read and approved the final manuscript.

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