DOI:doi.org/10.65766/alyj.2025.23.02.13

Iraqi EFL Learners' Cognitive Strategy Use and their Reading Comprehension Performance: A correlational Study

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Abstract

The research paper investigates the use of cognitive strategies employed by Iraqi secondary school sixth grade students and how they correlates with their reading performance. The study sample are (100) students at the sixth grade preparatory. The study makes use of the Strategy Inventory For Language Learning (SILL) of Oxford (1989) , a Likert scale questionnaire, to probe the cognitive strategies used by the participants. Also, the second tool is a reading comprehension test which is administered to have an insight into the reflection of the cognitive strategies on the reading performance of the sample subjects. Data collection of the comprehension test results and understanding strategy data are performed sequentially over the same day. Research data are described and analyzed by product moment correlation technique.

The research found that students' scores in cloze tests ranged from A to D. This score indicates that students have varying abilities in reading comprehension. The research findings also showed that students used various cognitive strategies in understanding text reading. The results of the correlation analysis did not find a negative correlation; it found varying strengths of positive correlations.

Keywords: *cognitive strategy and* reading performance

استعمال الطلبة العراقيين دارسي الانجليزية لغة اجنبية للستراتيجيات المعرفية وادائهم في القراءة: دراسة ارتباطية

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DOI:doi.org/10.65766/alyj.2025.23.02.13

الملخص

تتمحور الورقة البحثية حول استخدام الاستراتيجيات المعرفية التي يستخدمها طلاب الصف السادس الاعدادي العراقي وكيف ترتبط بأدائهم في القراءة. عينة الدراسة (100) طالبا بالصف السادس الاعدادي. تستخدم الدراسة مقياس أكسفورد لإستراتيجيات تعلم اللغة (SILL) (1989)، وهو استبيان قياس نوع ليكرت، لفحص الاستراتيجيات المعرفية المستخدمة من قبل المشاركين. أيضًا، الأداة الثانية هي اختبار فهم القراءة الذي يتم إجراؤه للحصول على نظرة ثاقبة عن الاستراتيجيات المعرفية الخاصة بأداء القراءة لعينة البحث. تم إجراء جمع بيانات نتائج اختبار الاستيعابي وبيانات إستراتيجية الفهم تباعا خلال نفس اليوم. يتم وصف وتحليل بيانات البحث باستخدام تقنية الارتباط اللحظي.

وجد البحث أن درجات الطلاب في اختبارات cloze تراوحت من A إلى D. تشير هذه النتيجة إلى أن الطلاب لديهم قدرات متفاوتة في فهم القراءة. كما أظهرت نتائج البحث أن الطلاب استخدموا استراتيجيات معرفية مختلفة في فهم قراءة النص. أظهرت نتائج تحليل الارتباط أن استخدام الإستراتيجية المعرفية له مساهمة إيجابية أو سلبية في نتائج الفهم القرائي اعتمادًا على دقة استراتيجية الاختيار وفقًا للنص الذي قرأه.

الكلمات المفتاحية: الاستراتيجية المعرفية، وأداء القراءة.

Section One: Introduction, Theoretical Background and Previous Studies

Foreign language learning is dependent on mastery of major skills; reading is among the major ones. Reading is seen as the primary means of L2/FL acquisition (**Sarhan, Taha, 2017, p. 110**). Comprehension is the ultimate aim of reading. Reading comprehension is about the capacity to understand and comprehend written texts. Reading comprehension requires readers to refer to multifarious cognitive skills to tackle a text effectively (**Ali& Abbas, 2020, p.437**).

According to Birch (2009) reading is a complex mental activity because it encompasses considerable knowledge that must be acquired or learned and requires numerous processing strategies that must be practiced until they are automatic **(p.2).**

To be independent readers, leaners need effective comprehension strategies because comprehension is about thinking and understanding. Proficient readers show awareness of the strategies involved in grasping meaning associated with print. They can make predications, inferences, see images in the eyes of their minds, draw

DOI:doi.org/10.65766/alyj.2025.23.02.13

conclusions, and revise hypotheses about the text **(Booth and Swartz, 2008, p.153)**

The process of reading pertains to an active cognitive system operating on printed material to grasp the message. Effective readers control their understanding. When they experience a lapse of meaning loss with what they are reading, they often unconsciously choose and use a reading strategy (such as rereading or asking questions) that can help them reconnect with the meaning of the text.

Reading comprehension strategies provide a window on how reading tasks can successfully be accomplished. Further, increasing the use of cognitive, metacognitive, and affective strategies can foster and better students' performance in a teacher-made reading comprehension tests, a standardized reading tests and in their study **(*Syaiful Islam*, 2018, p.134).**

Cognitive strategies require direct interaction with the task. They can facilitate comprehension, act directly on incoming information manipulating it in ways that improve learning. Cognitive strategies can be related to any of the following : recognizing, using topics, guessing from the context, using a dictionary, writing down, imagery, activating background information, summarizing, using linguistic clues, using text markers, skipping the difficult parts' and repeating words or phrases **(Wahyono, 2019, p. 257).**

The level of reading comprehension of Iraqi EFL learners is disadvantageous owing to a number of factors such as the strategies and techniques they follow in their reading comprehension and the types of methods teachers employ (Sarhan& Taha, 2017, p. 110)

Albeit the plethora of reading passages in the syllabus adopted in Iraqi schools by the Ministry of Education, a host of students experience comprehension problems. Thus, when they finishing their secondary schools, there is a little indication marking the development of students' reading comprehension skills. Previous studies pinpointed students' delicacy in reading comprehension of English (such as Al-Marsumi, 1988, p.71; Al-Rifa'i, 1994, p.3; Al-Qaisi, 2002, p.95, AlNua'emi,2013, p. 2 (all cited in Sarhan & Taha, 2017, p. 110) and (Al-Saadi, 2019, p.3 cited in Habeeb& Abbas, 2019, p.73).

This paper aims to collect data to describe the cognitive strategies used by Iraqi preparatory students during reading tasks and uncover how these strategies can correlate with comprehension outcomes. This revelation is paramount to EFL teachers and can aid them design their classes more effectively.

DOI:doi.org/10.65766/alyj.2025.23.02.13

1.1.1 AIMS

1.1.2 The current study aims at investigating:

1.The cognitive reading strategies employed by the Iraqi EFL preparatory students.

2. The reading performance of Iraqi preparatory students during comprehension tasks.

3. The relationship between cognitive reading strategy use and the reading comprehension performance of the participants in the study.

1.1.2 Limits

The current study is limited to Iraqi EFL sixth grade preparatory school male students, the scientific branch in Diyala Governorate during the academic year 2024 – 2025.

1.1.3 Value

The findings of this paper is hoped to be insightful to Iraqi EFL preparatory school teachers wishing to develop and raise their students' awareness of cognitive language learning strategies. The study findings can be an invitation for teachers to integrate some strategy training in their classes. Thereby, teachers can enhance their students' reading comprehension on the way to become more independent and to empower them in dealing with reading texts. Curriculum designers may be another party interested in the findings of this study paper to give more focus to cognitive strategies related to reading comprehension by designing tasks that foster them. Researchers of reading comprehension might, also, be interested in the findings of this study.

1.2 Theoretical background

1.2.1 Reading Strategies

Reading strategies research for the most part focussed on the strategies that good readers use. According to Afflerbach, Pearson, and Paris (2008), reading strategies are define as "deliberate, goal-directed attempts to control and modify the reader's efforts to decode text, understand words, and construct meanings of text" (p. 386).

Pressley and Afflerbach (1995) study examined skilled readers and found that the reading process reflected conscious active reading and that monitoring and evaluation of the reading process and materials prevailed in various skilled readers. Skilled readers have such features as:

1.determine their reading purposes and goals before reading

2.Overview the text while paying attention to the text structure.

3.They put plans for their reading task.

4.They consciously skim or skip at flexible speed. They may pause to reread.

DOI:doi.org/10.65766/alyj.2025.23.02.13

5. Skilled readers always make predictions and inferences.

6. They continuously interact with the text to make interpretations.

7. Their reading does not end with the last word. Instead, they reread, make notes and summarise the important part. Their reflection on their reading continues long after reading is concluded (Li& Kaur, 2014, p.3).

Pressley and Afflerbach's (1995) research opened to researchers and educators a window to have an overview onto the strategies skilful readers use.

Various categorizations and kinds of reading strategies are put forward. For example, Paris, Wasik and Turner (1996) classified strategies according to the different stages of the reading process and divided them into pre-reading, while-reading and after-reading strategies.

1.2.2 Cognitive Strategies

The study of strategies is connected to the theory *of cognition.* Cognition is the means by which the brain holds, stores, selects, retrieves and processes information. Two memory systems are involved: the working memory and the long-term memory (LTM). The brain stores language information as meaning, 'ideas' or 'propositions'. Selecting, converting, finding ways of storing and retrieving language from long term memory is done by the working memory. Frequent use of the language information makes the leaner more proficient with it until the speed with which the working memory retrieves it from the LTM appears to be 'automatic'. The retrieval of the linguistic item is no longer 'controlled' by the fact that the learner has to refer to explicit knowledge about the pattern they have noticed or have been taught (Macaro, 2001, p.22).

Bachman and Palmer's (2010, p,.43) define cognitive strategies as the strategies used by language learners during executing and actualizing their plans in language use. While O'Malley and Chamot (1990) defined cognitive strategies as behaviors that "involve mental manipulations or translations of materials or tasks" which improve "comprehension, acquisition, or retention" (p. 229).

Wenden (1991) claims that cognitive strategies are "mental steps or operations that learners use to process both linguistic and sociolinguistic content" (p. 19). Finally, Purpura (1999) envisages cognitive strategies as "a set of conscious or unconscious mental or behavioral activities or operations which are directly or indirectly related in comprehending, storing, or retrieval of information" in language acquisition and use situations (p. 7).

Learning strategies classifications affected the categorization of reading

DOI:doi.org/10.65766/alyj.2025.23.02.13

strategies. Learning strategies, as suggested by O'Malley and Chamot (1990), can be classified into two main kinds: cognitive and metacognitive strategies (p.45).

Cognitive strategies are specified and localized, involving manipulating the material to be learned or applying a specific technique to the learning task. While metacognitive strategies are more general and globalized. They oversee, direct and regulate the learning process by thinking about the learning process, planning, monitoring and evaluating learning.

1.2.3 Reading Comprehension Performance

There different definitions of reading comprehension. Urquhart and Weir (1998, p. 22), for example, defines reading comprehension as "the process of receiving and interpreting information encoded in language form via the medium of print."

Koda (2005) claims that "comprehension occurs when the reader extracts and integrates various kinds of information from the text and combines it with what is already known" (p. 4).

Paris and Hamilton (2009, p. 32) believe that "reading comprehension is only a subset of an ill-defined larger set of knowledge that reflects the communicative interactions among the intentions of the author, the content of the text/message, the abilities and purpose of the reader, and the context/situation of the interaction (p. 32)."

Also, reading comprehension is "an active and complex process that involves understanding written text, developing and interpreting meaning, and using meaning as appropriate to type of text, purpose and situation" (p. 2) (National Assessment Governing Board, 2008).

Scholars propose many types of reading models to describe the areas of skills or knowledge that make reading ability.

1. Information Processing Models: Information processing models describe the mental operations readers engage in during text comprehension (Paris & Hamilton, 2009). Generally, the process models can be categorized into three approaches: bottom-up, top-down, and interactive approaches.

2.The Simple View of Reading: It is proposed by Gough and Tunmer (1986, pp.6-10), depends on the notion that reading is a combination of word decoding abilities (D) and comprehension ability (C). The model can be expressed in an equation: R = D C, suggesting that reading (R) is the product (or interaction) of decoding abilities (D) and comprehension abilities (C), the former being bottom-up processing and the latter being top-down.

DOI:doi.org/10.65766/alyj.2025.23.02.13

3. Schema Theory of Anderson and Pearson (1984): the reader is seen as an active participant. In other words, readers' world knowledge, previous experience, and ability to infer play very important roles in their reading comprehension (Grabe, 2009).

4. Construction–Integration Model: Proposed by Kintsch (1998), it is the most popular model of adult reading comprehension (Paris & Hamilton, 2009). Kintsch argued that while engaging in reading comprehension, readers construct two models simultaneously: a model of the literal text and a model of the situation implied by the text. The text model is based on readers' understanding of information directly from the text, whereas the situation model involves readers' integration of the information from the text and their prior knowledge.

Reading comprehension can be regarded as a constructive process in which the text, the reader, and the context interact. This characterization of constructive and interactive reading includes key principles of the top-down processing model of reading reflected in schema theory (Anderson & Pearson, 1984), bottom-up text-processing strategies emphasized by van Dijk and Kintsch (1983), and comprehension monitoring processes advocated by several notable researchers (e.g., Baker & Brown, 1984; Garner, 1987; Paris & Winograd, 1990).

1.3 Previous Studies

Many reading comprehension studies attend to the effects of different types of strategies for improving reading comprehension. For example, Sporer, Brunstein, and Kieschke (2009) investigated the effect of three strategy instructions on school students' reading comprehension ability. Experimental groups are taught four reading strategies (summarizing, questioning, clarifying, predicting) and practiced these strategies in small groups (reciprocal teaching), pairs, or strategy-based instructor-guided instruction. The result exposed that the experimental groups had higher scores in reading comprehension performance tests.

In another study, Su (2006) investigated the effect of the teaching strategies on reading skill. The findings indicated that the instruction had positive results. These strategies included guessing vocabulary from context and looking for key words (Nourdad & Asghari, 2017, p.268)

Yeh's study (2006) showed that teaching reading strategies could have positive effect on reading comprehension performance and the attitude towards such instruction. The relation of cognitive strategy use to reading performance in Iraqi preparatory settings is not investigated as far as the researcher know. That why this study is conducted.

DOI:doi.org/10.65766/alyj.2025.23.02.13

Section Two: Methodology and Materials

2.1 Sample and Research Design

The study sample consisted of 100 male sixth-grade preparatory students. These students were from the scientific branch in Diyala Governorate during the 2024-2025 academic year. The study employed a correlational research design to investigate the relationship between Iraqi EFL students' use of cognitive strategies and their reading comprehension performance.

2.2 Instruments of the study

To achieve the study aims, the researcher conducted two instruments: a cognitive strategy questionnaire and a reading comprehension performance test.

2.2.1 Cognitive Strategy Questionnaire

The study adapted the cognitive strategy questionnaire from Phakiti (2006, pp. 95-96), comprising 13 items across three subscales: comprehending (5 items), memory (4 items), and retrieval strategies (4 items). The participants think over each item (strategy) and then rate them on a three level Likert-scale by ticking one of three possible answers: often, usually and never.

2.2.2 The Reading Comprehension Performance Test

The test is made up of four unseen reading texts related to different situations. Each text is followed by (5) questions with different objective tasks. The tasks are true/false; yes-no questions; multiple choice items and completion tasks. Each correct answer for a an item is given two scores and incorrect one is granted zero. It is worth mentioning that the texts of the test are adopted from the ministerial final year examinations to be more appropriate to the study context so long as the subjects of sample are sixth grade students preparing for the ministerial final year exam.

2.2.3 Face Validity

Validity is the extent to which the test measures what it is intended to measure. It is the most significant principle of language assessment (Brown, 2004, p.22).

Face validity “Is the most basic kind of validity; it is a judgment by the scientific community that the indicator really measures the construct” (Riazi, 1999:96).

As mentioned above, the questionnaire is adopted from Phakiti (2006) but the researcher has exposed it to jury members in ELT to judge on its face validity and suitability to the Iraqi preparatory context. And they found it

DOI:doi.org/10.65766/alyj.2025.23.02.13

has face validity and suitable. Though the original scale is made up of five options,

during the pilot administration, it was observed that participants struggled to consistently differentiate between the lower-frequency options (e.g., 'Rarely' vs. 'Sometimes'). To reduce ambiguity and improve response clarity, the jury members recommended condensing the instrument to a 3-point scale of 'Never', 'Sometimes', and 'Often', which the participants were able to apply more decisively**.** Therefore, the scale has the following options:

1. Often (suggests the participant recognizes the use of the strategy and he uses it several times)

2. Sometimes (indicates that the participant recognizes the use of the strategy, and he uses it on few occasions)

3. Never (implicates that the participant does not use the strategy at all).

The same jury members have been consulted to verify face validity and suitability of the test.

2.2.4 Pilot Administration of the Instruments

Pilot administration is done to finding out the efficiency of the administrative procedures, pinpoint suitable time allocations, determine issues in task specification and instructions clarity and to figure out test-takers' reaction to the test tasks. Much of the pilot testing is done with small groups and comes up with collecting qualitative feedback (Mousavi, 1999, pp. 284-285).

Before full-scale implementation, a pilot study with 30 students at Al-Khalis Preparatory School was conducted. The pilot confirmed that the test could be completed within 80 minutes and the questionnaire within 10 minutes. Minor adjustments to wording were made based on student feedback, particularly simplifying certain terms into more familiar Arabic equivalents. This step ensured the feasibility and cultural appropriateness of the instruments.

2.2.5 Statistical Analysis of the Cognitive Strategy Questionnaire

2.2.5.1 Discriminating Power of the Questionnaire Items

To calculate the discriminating power for each strategy, the top 27% of student scores (the high group) were compared against the bottom 27% (the low group). An independent samples t-test was applied to find the significance of the difference between these two groups. The calculated t-value for each item, detailed in Table 1, was then compared against the critical value of 2.00 to confirm its discriminatory power.

DOI:doi.org/10.65766/alyj.2025.23.02.13

Table 1 Discriminating Power of Cognitive Strategy Questionnaire Items

Subscale	Item No.	Low Group Mean	Low Group SD	High Group Mean	High Group SD	t-value	Significance (p < .05)
Comprehending	1	1.963	0.706	2.888	0.320	6.205	**Sig.**
	2	1.814	0.878	2.629	0.492	4.204	**Sig.**
	3	1.851	0.818	2.333	0.554	2.531	**Sig.**
	4	1.555	0.640	2.296	0.775	3.827	**Sig.**
	5	1.688	0.847	2.425	0.873	3.149	**Sig.**
Memory	6	1.972	0.642	1.481	0.564	6.972	**Sig.**
	7	2.769	0.786	1.714	0.854	2.769	**Sig.**
	8	1.957	0.506	1.444	0.629	5.957	**Sig.**
	9	2.256	0.758	2.037	0.564	3.256	**Sig.**
Retrieval	10	1.740	0.712	2.555	0.506	4.845	**Sig.**
	11	1.629	0.741	2.444	0.847	3.670	**Sig.**
	12	1.611	0.847	2.296	0.668	3.309	**Sig.**
	13	1.518	0.802	2.296	0.724	3.739	**Sig.**

2.2.5.2 The Item-Subscale Correlation

The researcher used the Pearson correlation coefficient to find the relationship between the item score to the score of the subscale to which it belongs for the research sample of (100) male students, and it is found that the values of the correlation coefficients are statistically significant for all items When compared with the critical value of the correlation coefficient of (0,196) and the degree of freedom (98) and at a level of significance (0.05), as is shown in table (2).

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Table (2): Item-Subscale Correlations for the Cognitive Strategy Questionnaire

Comprehending Strategies	Correlation	Memory Strategies	Correlation	Retrieval Strategies	Correlation
Item 1	0.382	Item 6	0.430	Item 10	0.305
Item 2	0.370	Item 7	0.416	Item 11	0.391
Item 3	0.422	Item 8	0.395	Item 12	0.418
Item 4	0.450	Item 9	0.366	Item 13	0.456
Item 5	0.441				

All correlation coefficients are statistically significant ($p < .05$).

2.2.5.3 Reliability of the Questionnaire

Reliability means accuracy and consistency in the performance of individuals and the stability of results over time. A reliable scale gives the same results if it is applied to the same individuals again. Also, an individual will obtain the same scores if he/ she is exposed to the same tool and under the same conditions (AERA et al., 2014).

The reliability of the questionnaire was assessed using Cronbach's Alpha for each subscale, based on the sample of 100 students. This coefficient measures the internal consistency of the items within a subscale. The reliability coefficient for the **comprehending strategies** was **0.82**, for **memory strategies** it was **0.84**, and for **retrieval strategies** it was **0.80**. These values are well above the commonly accepted threshold of 0.70, indicating a high degree of internal consistency and reliability for all three subscales.

2.2.6 Statistical analysis of the Reading Comprehension performance Test

2.2.6.1 Item Analysis

To make sure the reading comprehension test was both fair and accurate, the researcher carried out an item analysis. This meant looking closely at how difficult each question was (item facility) and how well it distinguished between stronger and weaker students (discrimination power). Following standard guidelines (Mousavi, 1999), the answers of the top 27% and the bottom 27% of students from the total sample of 100 were compared. Most questions performed

DOI:doi.org/10.65766/alyj.2025.23.02.13

well and fell within the expected ranges, while a few items that were either too easy, too difficult, or failed to separate high- and low-achievers were revised or removed. Through this process, it was ensured that the test as a whole was both reliable and valid."

2.2.6.2 Item Facility

It is the degree to which a test item is easy or difficult for definite group of testees or the proportion of examinees who correctly answered a test item (Brown, 2004, p.58). Test items should not be too easy or too difficult for the test-takers. 0.5 is the ideal facility value for a given test item (Fulcher and Davidson, 2007, p.102).

The item facility is computed for the test items and they ranged (0.26 - 0.48), which is within acceptable limits. The test items are acceptable if they range (0,80 - 0.20). As a result, all items are maintained because they fell within the aforementioned range, as shown in Table (3).

2.2.6.3 Discriminating Power

It is about the capability of examinees' responses to distinguish between higher ability and lower ability test-takers. It is an important measure for a scoring approach that claims getting more or less correct answers is bound to the related ability (Fulcher and Davidson, 2007, p.103).

There are no rules that determine the acceptability limits of this measure since the discriminating power varies owing to the test type and the test-takers' range of ability (Alderson et al,1995, p. 82).

The researcher calculated the discriminating power of each of the test items and found that the values range is (0,30 - 0,78), and thus the test items are considered good and their discriminating coefficient is acceptable as specialists regard a test item acceptable when its coefficient is (0, 20) or more. Thus, the test items are all acceptable none of them have been deleted as it is clarified in the table (4).

Table (4): Item Analysis for the Reading Comprehension Test

Passage	Item No.	Item Facility	Discrimination Index
First Passage	1	0.61	0.41
	2	0.70	0.44
	3	0.72	0.48
	4	0.65	0.70

DOI:doi.org/10.65766/alyj.2025.23.02.13

Passage	Item No.	Item Facility	Discrimination Index
	5	0.56	0.37
Second Passage	6	0.57	0.41
	7	0.67	0.44
	8	0.61	0.78
	9	0.72	0.56
	10	0.70	0.37
Third Passage	11	0.67	0.30
	12	0.68	0.48
	13	0.52	0.67
	14	0.72	0.48
	15	0.67	0.67
Fourth Passage	16	0.59	0.74
	17	0.72	0.41
	18	0.74	0.52
	19	0.61	0.70
	20	0.67	0.52

The calculated facility and discrimination values are acceptable and well-reported

2.2.6.4 Item-Total Correlation

In order to find the correlation between scores of the test items and the total test score, the researcher used the Point-biserial correlation Coefficient formula because the scores have binary values. All the resulting coefficient scores are statistically significant at (0.196) critical value and (0.05) level of significance and (98) degree of freedom**.** See table (5) hereunder**.**

Table (5): Point- biserial correlation coefficients between the score of each test and the total score of the test

Test item	Correlation coefficient		Correlation coefficient
1.	**0.476**	**11.**	**0.453**
2.	**0.398**	**12.**	**0.467**
3.	**0.411**	**13.**	**0.410**
4.	**0.479**	**14.**	**0.390**
5.	**0.328**	**15.**	**0.387**

DOI:doi.org/10.65766/alyj.2025.23.02.13

6.	**0.405**	**16.**	**0.438**
7.	**0.378**	**17.**	**0.370**
8.	**0.345**	**18.**	**0.495**
9.	**0.423**	**19.**	**0.403**
10.	**0.365**	**20.**	**0.392**

2.2.7 Test Reliability

The test reliability coefficient is the statistical indicator of the accuracy of the test and is good and high whenever its value approaches the correct one "(Abu Allam, 2013: 490); to calculate the reliability of the achievement test, the researcher used the **Kuder-Richardson** Formula **20** as follows:

Kuder-Richardson Formula **20**

The researcher adopted the method of internal consistency in finding the reliability of the test, which is a method that depends on the correlation between the test items with each other within the test. One of the popular equations to find the internal reliability of the test is the **Kuder-Richardson** Formula **20** (Abdel-Rahman, 2008: 184).

After applying this statistical method, the researcher found that the test's stability value is (0.84) and thus it is considered appropriate. Consequently, the test is reliable.

Section Three: Results and Discussions

3.1.1. Results Related to the First aim: Cognitive Strategy Use

In order to achieve the first aim of the study which is to investigate the cognitive reading strategies employed by the Iraqi EFL preparatory students, the researcher administered the cognitive strategy use questionnaire to the (100) participants study sample. Then, the mean and standard deviation is extracted for each strategy. The one sample t-test formula is used to uncover the statistical differences if any**.** The results are shown in table (6)**.**

Table (6): Descriptive Statistics and One-Sample T-Test for Strategy Use

Cognitive Strategy Subscale	**N**	**Mean**	**SD**	**Hypothetical Mean***	**t-value**	**Significance (p < .05)**
Comprehending	100	10.61	1.75	10	3.48	**Significant**
Memory	100	8.16	1.46	8	1.10	**Not Significant**
Retrieval	100	8.54	1.57	8	3.43	**Significant**

DOI:doi.org/10.65766/alyj.2025.23.02.13

Cognitive Strategy Subscale	N	Mean	SD	Hypothetical Mean*	t-value	Significance (p < .05)
The hypothetical mean represents the midpoint of the possible score range for each subscale.						

The results of the one-sample t-test show that

1. With respect to the subscale of comprehending strategies, the mean of the participants is (10.610), the standard deviation is (1.752) and the hypothetical mean is (10). While the computed t-test value is (3.482) which is higher than the table value (1.98) at (0.05) level of significance and (99) degree of freedom. This indicates the sample subjects heavily use these set of strategies.

2. Related to the memory strategies, the mean score of the participants is (8.160), the standard deviation is (1.461) and the hypothetical mean is (8). Whereas the computed t-test value is (1.095) which is lower than the tabulated value (1.98) at (0.05) level of significance and (99) degree of freedom. This implies the sample participants moderately employ these group of strategies.

3. With regard to the retrieval set of strategies, the mean score of the participants is (8.540), the standard deviation is (1.572) and the hypothetical mean is (8). Whereas the computed t-test value is (3.434) which is higher than the tabulated value (1.98) at (0.05) level of significance and (99) degree of freedom. This illustrates that the study sample uses these group of strategies to a great extent.

So as to find out which subscale strategies is most used by the sample of participants, the researcher transfigured the total score of each subscale strategies into percentage scores. Then, the mean and the standard deviation values are calculated as table (7) indicates.

Table (7): The Percentage and the mean scores of the Subscale Strategies

Cognitive strategy	Mean	S. D
Comprehending	0,707	0,117
memory	0,680	0,122
Retrieval	0,712	0,131

DOI:doi.org/10.65766/alyj.2025.23.02.13

Further, the researcher used the one-Way Analysis of Variance (ANOVA) to find out the statistical differences in using the strategies as is shown in table (8).

Table (8): Results of ANOVA for the variance between the subscales

Source of Variance	Sum of squires	Degree of Freedom	Mean of squires	f-value	significance
Between subscales	0,059	2	0,029	1,937	0,05
Inside subscales	4,519	2.97	0,015		
Total	4,578	2.99			

It becomes clear from the table above that there is no statistically significant difference in using the three sets of strategies because the computed f-value (1.937) is lower than the tabulated one (3.00) at level of significance of (0.5) and (2.297) degree of freedom.

3.1.2. *Results Related to the Second Aim: Reading Comprehension Performance*

To assess the reading comprehension level of the 100 participants, their scores on the 20-item test were analysed. Each item was worth two points, for a maximum possible score of 40. The results show that the mean score (M) for the sample was **28.90** with a standard deviation (SD) of **8.03**. This mean score is equivalent to an average of 72.3% on the test, indicating a proficient level of reading comprehension among the participants. A one-sample t-test confirmed that this mean score was statistically significantly higher than the test's midpoint of 20 ($t(99) = 11.080$, $p < .05$) as table (9) explains.

Table (9): The mean, the standard deviation and t-test values for the Reading comprehension Test

The variable	Sample	Mean	S.D	H.M	T-Value		Sig.
					Comp.	Table	
Reading Comprehension level of performance	100	28,900	8,032	20	11,080	1,98	Sig.

DOI:doi.org/10.65766/alyj.2025.23.02.13

3.1.3. Results Related to the Third Aim: Correlation Between Strategy Use and Performance

To identify the correlational relationship between cognitive strategies, use and the reading comprehension performance of preparatory school students, the answers of the research sample to the scale of cognitive strategies and their answers to the reading comprehension test are gathered and recorded, then the researcher used the Pearson correlation coefficient to calculate the correlation. The results are shown in Table (6).

Table (6): The relationship between cognitive strategy use and reading comprehension performance

Cognitive strategy	No. of partici.	The correlation between Cognitive strategy use and reading com. performance	T-Value		Sig.
			Comp.	Table	
Comprehending	100	0,475	5,337	1,98	Sig.
memory	100	0,295	3,073	1,98	sig.
Retrieval	100	0,388	4,172	1,98	Sig.

From the table above, the following can be stated:

1. The correlation coefficient value between the comprehending subscale strategies and reading comprehension performance is (0.475). And in order to find out the significance of the relationship, the researcher used the T-test formula. The calculated t-value is found to be (5,337), which is greater than the tabular value of (1.98) at (0.05) level of significance (0.05) and (98) degree of freedom. The result shows that the relationship between the comprehending subscale strategies and reading comprehension performance is a statistically significant direct relationship. That's to say the more the individual uses the comprehending strategies significantly, the better his reading comprehension performance improves.

2. The value of the correlation coefficient between the memory strategies subscale and reading comprehension performance amounted to (0.295). In order to find out the significance of the relationship, the researcher used the T-test formula. The calculated t-value is (3.073), which is greater than the tabular value of (1.98) at the level of significance (0.05) and the degree of freedom (98). This means that the relationship between the memory strategies subscale and reading comprehension performance is a direct,

DOI:doi.org/10.65766/alyj.2025.23.02.13

statistically significant relationship. More use of this type strategies can significantly better reading comprehension performance, but at a level less than the comprehending strategies.

3. The value of the correlation coefficient between the retrieval strategies subset and the reading comprehension performance is (0,388). To uncover the significance of the relationship, the researcher used the T-test formula. The computed T value is (4,172), which is greater than the tabular value of (1.98) at the level of significance (0.05) and the degree of freedom (98). The result suggests that the relationship between the retrieval strategies and the reading comprehension performance is a statistically significant positive relationship. The more the individual uses the retrieval strategies significantly, the better his/her reading comprehension performance will be, but at a lesser level than the strategies of Comprehending and more than the memory strategies subset.

3.2 Discussion of Results

The results of this study, which highlight significant correlations between Iraqi EFL preparatory students' use of cognitive strategies and their reading comprehension performance, align with a broad body of international research that has consistently demonstrated the pivotal role of cognitive strategy use in second and foreign language reading contexts.

Studies from East Asia confirm the present findings. For example, Zhang (2018) investigated Chinese EFL learners and reported that frequent use of cognitive strategies such as inferencing, summarizing, and rereading was strongly associated with higher levels of reading comprehension. Similarly, Phakiti (2003) found that Thai university students who employed cognitive and metacognitive strategies more frequently achieved significantly better outcomes on academic reading tasks. These findings mirror the Iraqi context, underscoring that the relationship between strategy use and comprehension is not geographically bound but rather universal across EFL settings.

Research in neighboring contexts also shows converging evidence. In Iran, Nourdad and Asghari (2017) demonstrated that cognitive strategy training (e.g., guessing vocabulary from context, focusing on main ideas) improved high school students' comprehension performance, findings that resonate with the strong correlations between comprehension strategies and reading outcomes in the current study. Likewise, Mokhtari and Reichard (2002), working with bilingual learners in the United States, emphasized that successful readers across cultural

DOI:doi.org/10.65766/alyj.2025.23.02.13

contexts actively monitor and adjust their strategy use — a pattern echoed in the Iraqi students' significant reliance on comprehending and retrieval strategies.

Western contexts also reveal parallels. Sporer, Brunstein, and Kieschke (2009) in Germany showed that explicit teaching of summarizing, questioning, and predicting strategies led to improved reading comprehension performance among school students. These results suggest that even in L1 environments, cognitive strategies act as universal facilitators of comprehension, thus reinforcing the broader applicability of the Iraqi findings. Furthermore, Pressley and Afflerbach (1995) documented that skilled readers in the United States consistently engage in cognitive strategies such as planning, predicting, and evaluating during reading, which aligns with the strategies most frequently used by Iraqi students.

Taken together, these international comparisons demonstrate that while sociocultural and educational systems differ, the fundamental relationship between cognitive strategy use and reading comprehension appears consistent across contexts. This convergence suggests that Iraqi learners' reliance on comprehending and retrieval strategies reflects a global pattern of successful reading behavior in both EFL and L1 environments. However, what distinguishes the Iraqi context is the moderate use of memory strategies, which may be tied to the exam-driven nature of local education systems.

From a cross-cultural standpoint, these results highlight the need for Iraqi educators to adopt global best practices by explicitly integrating cognitive strategy instruction into EFL curricula, as has been successfully implemented in Asian and European contexts. Doing so may further bridge the performance gap between Iraqi learners and their international peers, enhancing both strategy awareness and reading outcomes.

3.3 Conclusions

1. The Iraqi EFL preparatory school students in this study demonstrated a

proficient level of reading comprehension, with a mean score of 72.3% on the administered test. This suggests that the students, on average, performed significantly above the test's midpoint.

2. The students reported a **high frequency of use for comprehending and retrieval strategies**. In contrast, **memory strategies were used more moderately**. However, the overall use among the three strategy sub-types was not statistically different, suggesting a balanced application of these cognitive processes during reading tasks.

DOI:doi.org/10.65766/alyj.2025.23.02.13

3. A **statistically significant positive correlation** was found between the use of all three cognitive strategy subscales (comprehending, retrieval, and memory) and reading comprehension performance. This indicates that students who reported using these strategies more frequently tended to achieve higher scores on the reading test.

4. **Comprehending strategies showed the strongest association with reading performance (r = .475)**, followed by retrieval strategies (r = .388) and memory strategies (r = .295). This suggests that while all strategies are beneficial, those directly related to understanding and processing meaning are most closely linked to success in comprehension tasks.

5. The findings suggest an **interdependent relationship among the strategies**. In a test-taking context, the ability to effectively retrieve information (retrieval strategies) appears to support higher-order comprehension strategies. The moderate use of memory strategies may imply that in a timed test, students prioritize actively processing and retrieving information over deep memorization, which could be a more product-oriented approach to demonstrating understanding.

In the light of the above results and conclusions, the following recommendations are proposed for educators and curriculum designers:

1. **Integrate Explicit Strategy Instruction**: Teachers should explicitly teach cognitive reading strategies in the classroom. Since

comprehending strategies have the strongest link to performance, direct instruction on skills like finding main ideas, making inferences, and summarizing should be prioritized.

2. **Develop Retrieval Skills for Test-Taking**: Given that effective information retrieval supports comprehension in testing contexts, teachers should design activities that help students practice locating and using information from texts efficiently. This includes training in scanning, using keywords, and understanding question types.

3. **Balance Strategy Instruction**: While memory strategies had the weakest correlation, they are still a significant component of learning. Teachers should provide targeted practice on using memory strategies (e.g., underlining, note-taking) as a tool to support the more critical comprehending and retrieval processes.

4. Enhance Curriculum Design: Curriculum designers for Iraqi EFL programs are encouraged to embed tasks and activities that naturally promote the use of a wide range of cognitive strategies. Reading materials and their accompanying tasks should be designed to move students beyond literal recall and encourage deeper cognitive engagement.

DOI:doi.org/10.65766/alyj.2025.23.02.13

Conflict of Interest

The author declares that there is no potential conflict of interest with respect to the research, authorship, or publication of this article. The study was conducted independently without any financial, personal, or professional relationships that could be perceived as influencing the results or interpretation of the findings.

- Acknowledgement section overly personal for a journal article.

Acknowledgements

I would like to extend my sincere gratitude to my colleagues and the academic staff at Al-Yarmouk University College, Diyala. Their supportive environment and insightful discussions were invaluable to the formation of this paper. My thanks are also due to the editorial staff and reviewers at the *Al-Yarmouk Journal* for their guidance and encouragement throughout the publication process. Finally, I am indebted to the many mentors who have guided my academic journey.

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Appendix A The cognitive and metacognitive strategy questionnaire

Name-Surname: _____ Student ID: _____

Today's date: _____

Directions: A number of statements which people use to describe themselves when they ae taking a reading test are given below. Read each statement and indicate how you thought during the test. Choose 1 (never), 2 (Sometimes), 3 (Often),

THE Cognitive STRATEGIES	Often	sometimes	Never
1. I translated the reading texts and tasks into Arabic.			
2. I used pictures or titles of the texts to help comprehend reading tasks.			
3.I tried to understand the texts and questions regardless of my vocabulary knowledge.			
4. I tried to find topics and main ideas by scanning and skimming..			
5. I attempted to identify main points of the given reading texts and tasks			
6.I read the texts and questions several times to better understand them.			

DOI:doi.org/10.65766/alyj.2025.23.02.13

7. I made short notes or underlined main ideas during the test.			
8.I spent more time on difficult questions..			
9. I tried to understand the questions adequately before attempting to find the answers			
10. I used my own English structure knowledge to comprehend the text.			
11. I used my prior knowledge to help understand the reading test. .			
12.I used multiple thinking strategies to help answer the test questions.			
13.I selected relevant information to help me understand the reading texts and answer the test questions.			