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The Correlation between Metacognitive Strategies and IELTS Reading Achievement among Chinese Students

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Abstract

This study investigates the correlation between metacognitive strategies and IELTS reading achievement among Chinese students. A sample of 242 Chinese learners preparing for the IELTS examination participated in the study. The metacognitive strategy was assessed using the Survey of Reading Strategies (SORS), and IELTS reading achievement was evaluated using Cambridge Practice Tests for IELTS. The research design employed correlational analysis, revealing a significant positive correlation between overall metacognitive strategies and IELTS reading achievement. Specifically, problem-solving strategies emerged as the most influential predictor of IELTS reading achievement. To reiterate, the findings of this study underscore the importance of incorporating problem-solving strategies into reading curricula to enhance students' reading achievement, contributing to the existing literature of language learning by highlighting the significance of metacognitive strategies in enhancing IELTS reading achievement among Chinese students and offering valuable insights for educators and curriculum developers.

Keywords

Metacognitive Strategies, IELTS Reading Achievement, Chinese Students, Correlational Analysis, Language Learning

1. Introduction

In language learning and academic achievement, the interplay between metacognitive strategies and reading comprehension is a well-established area of research (Ruipérez, 2022). However, the specific relationship between these two factors in the International English Language Testing System (IELTS) context remains a fascinating and relatively unexplored territory. Metacognitive strate-

gies, often described as "thinking about thinking," refer to individuals' conscious and deliberate processes to regulate learning experiences (Bria & Mbato, 2019). On the other hand, reading comprehension is the ability to understand and interpret written text (Elleman & Oslund, 2019). Both factors are crucial for academic success (Pradhan & Das, 2021; Khalilova, 2023).

In China, due to the emphasis on examination-oriented learning in the traditional education system, Chinese candidates often face challenges in the IELTS reading test, most of whom fail or struggle to apply relevant strategies to cope with difficulties in reading passages (Liu & Li, 2023). Moreover, in the comparative analysis, Chinese students generally perform worse in the IELTS reading than those from other countries (Zhang & Hope, 2021). Another problem lies in the fact that less focus is given by Chinese students on IELTS reading, compared with other English skills such as listening, speaking, and writing (Zhang & Hope, 2021), which might result in the incapability of overcoming further academic challenges in English-speaking countries.

This study investigates the relationship between metacognitive strategies and IELTS reading achievement among Chinese students, a topic of significant importance given the widespread use and influence of the IELTS examination. The variables involved in this study include metacognitive strategies, which can be quantified by the relevant questionnaire, and IELTS reading achievement, measured by the scores obtained in the reading section of the IELTS examination (Ren, 2023).

The rationale for combining metacognitive strategies with IELTS reading achievement in this study lies in the theoretical framework of metacognition and its impact on academic achievement. As cognitive processes, metacognitive strategies help individuals manipulate their thinking and learning (Flavell, 1979). These strategies are essential for successful reading comprehension (Aisah & Nurjamin, 2021) and have been shown to significantly predict reading achievement in various contexts (Muhid et al., 2020; Par, 2020; Kung & Aziz, 2020).

The study seeks to address several key issues. First, it aims to determine how much Chinese students utilize metacognitive strategies to prepare for the IELTS examination, which could significantly influence their reading performance. Second, it seeks to identify the correlation between metacognitive strategies and IELTS reading achievement, potentially shedding light on effective learning strategies. Third, it aims to determine which specific dimension of metacognitive strategies (i.e., global, problem-solving, and support reading strategies) is the most influential predictor of IELTS reading achievement. By addressing these issues, this study aims to contribute to the literature on metacognitive strategies and reading achievement, particularly in the context of high-level English proficiency tests.

1.1. Research Background

1.1.1. Definition of Metacognitive Strategies
Metacognitive strategies are the conscious and deliberate processes individuals

use to plan, monitor, and evaluate their learning (Padmanabha, 2020). These strategies are essential for adequate reading comprehension as they enable learners to actively engage with texts and adjust their reading strategies accordingly (Aisah & Nurjamin, 2021). Common metacognitive strategies include previewing text, asking questions, summarizing, and identifying main ideas and important details (Bouknify, 2023).

1.1.2. Past Evidence

Numerous studies have investigated the correlation between metacognitive strategies and reading comprehension. For example, Nilforoushan et al. (2023) found that students who used metacognitive strategies could better understand and retain information from texts. Similarly, Lumpkin (2020) discovered that metacognitive strategies helped students identify texts' main ideas and essential details, leading to more effective comprehension.

In addition to reading comprehension, metacognitive strategies have been linked to academic achievement in general. Specifically, Celik (2022) examined the effects of university students' metacognitive strategies on self-efficacy, motivation, and academic achievement and determined that metacognitive strategies positively influenced academic achievement. In another study (Pradhan & Das, 2021), the influence of metacognition on undergraduate students' academic achievement and learning style was investigated, which showed that metacognitive skills influence and determine academic achievement to some extent.

1.1.3. Theoretical Framework

The theoretical framework of this study is rooted in the concept of metacognition, which refers to the awareness and understanding of one's thought processes (Shea, 2020). According to Flavell (1979), metacognition involves both metacognitive knowledge (knowledge about cognitive processes) and metacognitive regulation (the ability to control cognitive processes). This study is guided by the assumption that metacognitive strategies are crucial in enhancing reading comprehension and academic achievement.

1.2. Problem Statement

Despite the existing literature on metacognitive strategies and reading achievement, several vital gaps must be urgently addressed. First, few studies have specifically examined the correlation between metacognitive strategies and reading achievement among Chinese students, a significant gap in the current research. Given Chinese learners' unique linguistic and cultural characteristics, this study aims to understand how metacognitive strategies can be effectively applied in this context, filling a crucial void in the literature.

Second, most existing research on metacognitive strategies in reading has focused on general English reading in primary schools (Divrik et al., 2020), middle schools (Güner & Erbay, 2021), or high schools (Anif et al., 2021). However, the focus of this study is on standardized English proficiency tests such as the

IELTS, a crucial aspect often overlooked in previous research. Exploring the correlation between metacognitive strategies and IELTS reading achievement holds both academic importance and practical implications for enhancing reading instruction and test preparation techniques.

Furthermore, while some studies have explored the correlation between metacognitive strategies and reading achievement (Ghaith & El-Sanyoura, 2019; Sutiyatno, 2019; Par, 2020), this study takes a novel approach. It uses multiple regression analysis, a unique and innovative method, to identify the most influential predictor among different dimensions of metacognitive strategies. This study provides a detailed understanding of how different aspects of metacognitive strategies, including global reading, problem-solving, and support strategies, contribute to IELTS reading achievement.

1.3. Research Objectives

The primary objective of this study is to investigate the correlation between the use of metacognitive strategies and IELTS reading achievement among Chinese students. Specifically, the study aims to:

1) Determine how much Chinese students utilize metacognitive strategies to prepare for the IELTS examination.

2) Examine the relationship between metacognitive strategies and IELTS reading performance.

3) Identify the specific metacognitive strategies that most strongly predict IELTS reading achievement.

These objectives were designed with a practical lens, aiming to provide a comprehensive understanding of the relationship between metacognitive strategies and IELTS reading achievement. The ultimate purpose is to equip educators, researchers, and students with insights that can be directly applied to significantly enhance teaching and learning practices in IELTS preparation programs.

1.4. Research Questions

Based on the research objectives discussed above, three research questions are:

1) How much do Chinese students preparing for the IELTS examination utilize metacognitive strategies?

2) How are metacognitive strategies related to IELTS reading performance?

3) Which specific type of metacognitive strategy predicts IELTS reading achievement?

1.5. Hypotheses

This study formulated the following hypotheses, aligned with the research objectives and questions. It is crucial to emphasize that the significance level was set at .05, indicating that hypotheses will be rejected when the p-value falls below .05.

H_{01} = There is no significant relationship between metacognitive strategies and IELTS reading achievement.

H_{a1} = There is a significant relationship between metacognitive strategies and IELTS reading achievement.

2. Literature Review

2.1. IELTS Reading Achievement

The IELTS reading test evaluates candidates' English reading and comprehension abilities (Yathip & Chanyoo, 2022). Comprising three sections with different text types, the test demands careful reading and answering questions (Basnet, 2021). Scoring well in the IELTS reading test poses a challenge, especially for non-native English speakers (Luu & Luu, 2022). Success in IELTS requires more than just English proficiency. Skills at effectively using reading strategies within a time constraint are also vital (Holi et al., 2020).

2.1.1. Factors Influencing IELTS Reading Achievement

Multiple factors influence IELTS reading performance, including language proficiency, reading skills, test-taking strategies, motivation, and engagement (My et al., 2023). In detail, language proficiency encompasses vocabulary, grammar, and syntax, significantly affecting text understanding (Sadia et al., 2021). Secondly, practical reading skills, such as skimming, scanning, identifying main ideas, making inferences, and understanding implied meanings, are also critical (Sumaira et al., 2022). Thirdly, familiarity with the test format and employing strategies like time management and question prioritization can also enhance reading performance (Holi et al., 2020). Finally, motivation and engagement with reading materials also impact concentration, comprehension, and information retention, affecting test performance (Ghavamnia & Kashkouli, 2022). Understanding the challenges and factors influencing IELTS reading achievement can help educators develop interventions and strategies to support students in dealing with the IELTS examination.

2.1.2. Task Types in the IELTS Reading

The IELTS reading encompasses a range of tasks tailored to evaluate candidates' reading abilities across various question types, each targeting different aspects of comprehension. The first task type is multiple-choice questions. Candidates are presented with a passage followed by several questions, each offering three or four options. They need to select the correct answer based on the information provided in the passage (Yathip & Chanyoo, 2022). Multiple-choice questions assess candidates' capacity to locate specific information, discern implied meanings, and draw logical inferences from the text.

The second task type is matching headings, which requires candidates to match a series of headings or subheadings with corresponding text sections. Matching headings aims to evaluate candidates' ability to identify the main idea or topic of each paragraph and understand the overall structure of the passage

(Zhang & Hope, 2021).

The third task type is True/False/Not Given questions, which prompt candidates to determine the accuracy of statements based on the information provided in the passage (Starkova, 2021). This task assesses candidates' ability to differentiate between factual information, opinions, and information not explicitly stated in the text.

The fourth task type is matching information, which entails candidates matching information from the text with a list of items or statements (Baghaei et al., 2020). Matching information evaluates candidates' proficiency in identifying specific details and understanding the relationships between different pieces of information within the passage.

Other question types featured in the IELTS reading include sentence completion, summary completion, diagram, flowchart, or table completion (Baghaei et al., 2020). These tasks require candidates to fill in sentences, summaries, or diagrams using information from the passage.

2.1.3. Critique of Existing Literature on IELTS Reading

Past literature effectively underscores the multifaceted nature of IELTS reading achievement, highlighting the significance of factors beyond language proficiency, such as effective reading strategies and motivation. Furthermore, the discussion of diverse task types in the IELTS reading section underscores the thoroughness of the assessment in evaluating candidates' reading abilities across different genres and topics.

However, previous studies need a deeper analysis of the specific impact of different reading strategies, especially in metacognition, on IELTS reading performance. Additionally, while much literature mentioned the significance of language proficiency, reading skills, and test-taking strategies, further exploration of how these factors can be cultivated and leveraged to enhance reading scores is still needed.

2.2. Metacognitive Strategies

Metacognition, a potent tool for academic triumph, particularly in reading comprehension (Flavell, 1979), bestows individuals with metacognitive strategies. These strategies, such as previewing text, asking questions, and summarizing, are conscious and deliberate processes that individuals can employ to regulate their learning process (Padmanabha, 2020). In language learning and reading comprehension, metacognitive strategies equip learners to actively interact with the text, assess their understanding, and adapt their reading approaches as needed (Aisah & Nurjamin, 2021), thereby empowering them to take charge of their learning journey.

2.2.1. Enhancing Comprehension through Metacognitive Strategies

One of the aspects in which metacognitive strategies contribute to reading achievement is their role in enhancing comprehension. When students use me-

tacognitive strategies, they can better understand and retain information from the text (Nilforoushan et al., 2023). Additionally, metacognitive strategies help students identify a text's main ideas and important details, which are essential for adequate comprehension (Lumpkin, 2020).

Moreover, metacognitive strategies play a crucial role in helping students overcome comprehension challenges. For example, when students encounter difficult vocabulary or complex sentence structures, they can utilize metacognitive strategies such as re-reading, context clues, or sentence breakdown to enhance understanding (Kusumawardana & Akhiriyah, 2022). This ability to adapt and overcome obstacles through metacognitive strategies fosters resilience and improves reading achievement, thereby instilling a sense of resilience in the learners.

Furthermore, metacognitive strategies are particularly beneficial for second language (L2) learners. L2 learners often encounter additional hurdles in reading comprehension due to their limited vocabulary and grammatical knowledge (Khan et al., 2020). Research has demonstrated that L2 learners who employ metacognitive strategies can better comprehend and retain information from L2 texts (Teng, 2020). By utilizing metacognitive strategies, L2 learners can compensate for linguistic limitations and enhance reading achievement in L2 (Lin et al., 2021), thereby fostering a sense of hope and optimism in language learning.

2.2.2. Previous Studies on Metacognitive Strategies

Research has consistently shown a positive correlation between using metacognitive strategies and reading achievement. For example, Muhid et al. (2020) conducted a study to investigate whether there was any significant difference in students' reading comprehension achievement scores by using metacognitive strategies. Recruiting students in the eleventh grade of senior high school as participants, they found that metacognitive strategies positively impacted students' reading achievement.

Similarly, Par (2020) conducted research to discover the relationship between metacognitive strategies and reading achievement among EFL students in Indonesia. The results revealed a significant correlation between the overall use of metacognitive strategies and the student's reading achievement.

In another case, action research was conducted by Kung and Aziz (2020) to investigate the effects of metacognitive reading strategies on students' reading comprehension. Participants in this study were 13-year-olds from a secondary school in Kuala Lumpur. The results implied that the instruction of metacognitive reading strategies has merit and could have a place in the English language classroom, as it facilitates students' reading comprehension.

Furthermore, Halim et al. (2020) conducted a study to investigate how metacognitive reading strategies and peer tutoring improved year seven students' reading comprehension at a home-school center in Malaysia. Results indicated that metacognitive reading strategies assisted students in using suitable techniques to comprehend the reading text and answer the reading comprehension

questions.

Finally, Teng et al. (2023) conducted research to evaluate the interrelationship among metacognitive strategies, language learning motivation, self-efficacy belief, and English learning achievement. Experimenting on 590 Chinese university students, the study revealed that metacognitive strategies predict English learning achievement, demonstrating the potential of enhancing online English learning achievement by facilitating learners' self-efficacy belief, motivation, and metacognitive strategies.

In conclusion, past research supports the idea that metacognitive strategies positively correlate with reading achievement, which includes not only comprehension but also reading speed, vocabulary acquisition, and critical thinking skills. By actively engaging in metacognitive processes, students can improve comprehension, overcome difficulties, and enhance their reading achievement, particularly in second-language contexts.

2.2.3. Construct of Metacognitive Strategies

The construct of metacognitive strategies in this study is based on the research by Mokhtari and Sheorey (2002), who designed the Survey of Reading Strategies (SORS). SORS is a valuable instrument in assessing individuals' employment of metacognitive strategies. Through its structured format, SORS enables researchers to gain insights into the multifaceted nature of readers' strategic behaviors, thus facilitating a nuanced understanding of reading comprehension processes (Yasin & Shah, 2019). SORS comprises three subscales that align with metacognitive strategies: global reading strategies, problem-solving strategies, and support reading strategies. Details are as follows:

1) Global Reading Strategies

Global reading strategies refer to the techniques learners employ to oversee their general cognitive strategies (Mokhtari & Sheorey, 2002). This category encompasses thirteen items, including statements like "I consider my existing knowledge to aid my comprehension of the text," "I adopt a holistic approach to the text to grasp its overall content before delving into it," and "I verify new information when encountered."

2) Problem Solving Strategies

Problem-solving strategies represent corrective measures undertaken when understanding textual content is challenging (Mokhtari & Sheorey, 2002). This category encompasses eight items, including statements such as "I read with deliberate slowness and precision to ensure comprehension," "When confronted with challenging text, I engage in re-reading to enhance my understanding," and "In instances of complex text, I intensify my focus on the material."

3) Support Reading Strategies

Support reading strategies are mechanisms that facilitate the retention of information derived from reading (Mokhtari & Sheorey, 2002). This category encompasses nine items, including statements like "While reading, I engage in the translation of content from English into my native language," "I mark or high-

light information in the text to aid in recall," and "I navigate back and forth within the text to identify connections among its ideas."

2.2.4. Critique of Existing Literature on Metacognitive Strategies

Past literature provides a comprehensive overview of the role of metacognitive strategies in reading comprehension, encompassing various aspects such as enhancing comprehension, overcoming challenges, and benefiting second language learners. Supported by numerous empirical studies that demonstrate a positive correlation between metacognitive strategies and reading achievement, the review provides a robust foundation for the research area, clearly defining and explaining the construct of metacognitive strategies.

However, the literature could benefit from a more critical analysis of potential limitations or gaps in existing research. First, it is crucial to note that previous research focuses broadly on reading achievement in general, ignoring the unique challenges and requirements of the IELTS examination. This limitation highlights a significant gap in the literature regarding applying metacognitive strategies, specifically within the context of IELTS preparation and performance.

Second, studies in the past primarily concentrate on empirical studies and could greatly benefit from incorporating theoretical perspectives, such as Vygotsky's sociocultural theory (Vygotsky & Cole, 1978) or Flavell's Theory of Metacognition (Flavell, 1979), that underpin the understanding of metacognitive strategies. This integration could provide a more holistic view of the topic, offering new insights and a deeper understanding for experts in the field of reading comprehension and metacognitive strategies.

Third, previous research reviewed has merely employed correlational analyses to examine the relationship between metacognitive strategies and reading achievement, limiting the ability to identify specific dimensions of metacognitive strategies that are most predictive of reading achievement. Therefore, this study proposed an innovative approach to assess metacognitive strategies by employing multiple regression analysis. This novel method promises to investigate the specific dimension that mostly predicts IELTS reading achievement, thereby enhancing the methodological rigor of research in this area.

3. Method

3.1. Research Design

This study utilized a correlational research design to examine the relationship between metacognitive strategies and IELTS reading achievement among Chinese students. Additionally, multiple regression analysis was employed to evaluate the predictive power of metacognitive strategy subscales (global reading strategies, problem-solving strategies, and support reading strategies) on IELTS reading achievement.

3.2. Statistical Analysis

To address research objective I, the study employed a robust quantitative survey

method. This approach, which involves asking participants to rate their frequency of using various metacognitive strategies on a Likert scale, will yield quantitative data. This data will be instrumental in determining the level of metacognitive strategy utilization among Chinese students preparing for the IELTS examination.

Pearson's correlation coefficient was employed to address research objective II, which is to identify the correlation between metacognitive strategies and IELTS reading achievement. This statistical test is appropriate as it measures the strength and direction of the linear relationship between two variables (Cohen et al., 2009), in this case, the metacognitive strategies and the IELTS reading scores. A significant positive correlation would indicate that higher metacognitive strategies are associated with higher IELTS reading achievement scores.

Multiple regression analysis was utilized to address research objective III, determining the most influential predictor among dimensions of metacognitive strategies toward IELTS reading achievement. This analysis not only allows researchers to examine the unique contribution of each dimension of metacognitive strategies (global reading strategies, problem-solving strategies, and support reading strategies) in predicting IELTS reading achievement but also provides practical insights that can be applied in educational settings to enhance students' reading achievement.

Two robust statistical tests, Pearson's correlation coefficient and multiple regression analysis, were meticulously chosen to align with research objectives. This systematic and rigorous approach ensures the validity of findings and provides valuable insights into the role of metacognitive strategies in enhancing reading achievement in the context of the IELTS examination.

3.3. Population and Sample

The target population comprised 600 Chinese learners actively preparing for the IELTS examination in a city located in southwest China, enrolled in 12 IELTS training institutions across the city. A sample size 242 was determined using Krejcie and Morgan's standard for determining sample size in quantitative research (Krejcie & Morgan, 1970), ensuring the sample represented the total population.

Random sampling was chosen to enhance the impartiality and generalizability of the study findings, affording every eligible respondent an equitable opportunity to participate, irrespective of their training institution (McEwan, 2020). To perform random sampling, a predetermined number of participants were randomly chosen from 12 IELTS training institutions to be included in the study. Specifically, 20 students were selected from each of the 11 institutions, except for the 12th institution, where 22 students were selected, to ensure proportionality and adequate representation. The target sample participants were selected based on their enrolment in IELTS training institutions and their willingness to participate in the study.

The city researched was selected because it represents urban areas in China

with a substantial population of IELTS test-takers and a strong demand for English language proficiency. Its accessibility and concentration of IELTS training institutions made it a practical location for research. Additionally, the city's unique educational environment and cultural context may influence students' motivation, learning strategies, and performance on the IELTS reading test, adding relevance to the study.

3.4. Instruments

3.4.1. Survey of Reading Strategies (SORS)

Respondents' utilization of metacognitive strategies was assessed using the Survey of Reading Strategies (SORS) developed by Mokhtari and Sheorey (2002). This survey evaluates readers' cognitive and metacognitive strategies during the reading process, providing insights into how individuals approach and comprehend written texts. The SORS includes various reading strategies, such as global reading strategies, problem-solving strategies, and support reading strategies.

It is worth noting that this study applied adapted SORS, sourced from Zhang and Zheng (2020). Adapted SORS has 16 items in total. Specifically, items No.1 to No.9 represent global reading strategies; items No.10 to No.13 represent problem-solving strategies; and items No.14 to No.16 represent support reading strategies. Each item was assessed using a five-point Likert-type scale. Details are shown in Table 1.

3.4.2. IELTS Reading Test

Respondents' performance in the IELTS reading test, utilized as the metric for the dependent variable in this study, was assessed using the Cambridge Practice Tests for IELTS drawn from the IELTS 18 Academic Student's Book. The reading evaluation encompassed three passages, with a total of 40 questions. Each accurate response to a question was assigned a single point, and the resulting scores, out of a maximum of 40, were subsequently transformed into the IELTS nine-point scale.

3.5. Validity and Reliability

In terms of validity and reliability in this study, items of adapted SORS employed to quantify metacognitive strategies underwent validation by an expert and an educator in English education. The expert, who works as a lecturer, possesses 10 years of English teaching experience, and the educator specializes in IELTS teaching within an IELTS training institution, with a master's degree in English education. Both of whom were tasked with evaluating items' appropriateness for IELTS students, based on their extensive knowledge and experience in the field. The conclusion from the expert and the educator is that items within adapted SORS have met the appropriateness for this study.

3.6. Pilot Study

A pilot study was initiated with a face-to-face introduction to respondents, during

Table 1. Adapted SORS.

No.	Items
1	I reflect on my existing knowledge to aid in my comprehension of the material.
2	While reading, I make choices about what to scrutinize closely and what to disregard.
3	I leverage tables, figures, and pictures within the text to enhance my comprehension.
4	I rely on context clues to assist me in gaining a better understanding of the content I'm reading.
5	I utilize typographical features such as boldface and italics to pinpoint key information.
6	I verify my comprehension when encountering new information.
7	I make an effort to speculate on the content's subject matter as I read.
8	In instances of challenging text, I engage in rereading to enhance my understanding.
9	I verify the accuracy of my assumptions about the text to determine if they are correct or incorrect.
10	I make an effort to regain focus when my concentration wavers.
11	In the face of challenging text, I intensify my focus on the material to enhance comprehension.
12	Periodically, I pause and contemplate the content I am reading.
13	During my reading, I make educated guesses about the meanings of unfamiliar words or phrases.
14	I mark or encircle information in the text as a memory aid.
15	I rephrase ideas in Chinese as a way to enhance my understanding of the text.
16	I navigate back and forth within the text to identify relationships among the ideas presented.

which students were briefed on the purpose of data collection through adapted SORS and IELTS reading tests, aiming to assess the reliability of research instruments. A total of 30 IELTS candidates willingly participated in the pilot study. Each respondent was provided with adapted SORS to gather data concerning metacognitive strategies. Additionally, respondents were requested to complete an IELTS reading test to collect information on IELTS reading achievement. Following data collection for the pilot study, a reliability test for the research instruments was conducted, and Cronbach's alpha coefficient was calculated to assess reliability levels. Alpha values indicate the instrument's reliability, with higher values suggesting greater internal consistency among items (Taber, 2018). Details are shown in Table 2.

Table 3 shows the reliability test results for instruments in this study. For adapted SORS, $\alpha = .87$. For the IELTS reading test, $\alpha = .83$. Overall, the pilot study results demonstrated that the instruments in this study were all within the range of being good.

Table 2. The Cronbach's alpha level of reliability (Tavakol & Dennick, 2011).

Cronbach's Alpha	Internal Consistency
α ≥ .9	Excellent
.9 > α ≥ .8	Good
.8 > α ≥ .7	Acceptable
.7 > α ≥ .6	Questionable
.6 > α ≥ .5	Poor
.5 > α	Unacceptable

Table 3. Cronbach's alpha coefficients for internal reliability.

Instrument	Number of Items	Alpha Coefficients
Adapted SORS	16	.87
IELTS Reading Test	40	.83

4. Findings

4.1. Analysis of Research Question I

The first research question explores how much metacognitive strategies are utilized by Chinese students preparing for the IELTS examination. In examining students' strategy use in terms of the Likert scale that ranges from 1 to 5, this study employed three levels of usage, as suggested by Oxford and Burry-Stock (1995) for strategy use in language learning, that is, high (mean of 3.5 or higher), moderate (mean of 2.5 to 3.4), and low (mean of 2.4 or lower).

According to Table 4, the mean score for overall metacognitive strategies is 11.45, with a standard deviation of 2.07. This indicates that students are utilizing these metacognitive strategies with high frequency on average.

On the other hand, the mean score for global reading strategies is 3.67, with a standard deviation of .85. This robust score suggests that students are using global reading strategies to a great extent, demonstrating their proficiency in this area.

Moreover, the mean score for problem-solving strategies is 3.72, with a standard deviation of .93, indicating that students also broadly use problem-solving strategies. This not only shows their adaptability in handling challenges, but also their confidence in their problem-solving abilities.

Finally, the mean score for support reading strategies is 4.06, with a standard deviation of .88. This suggests that students use support reading strategies to a greater extent than global reading and problem-solving strategies, with moderate variability in their responses.

Overall, students utilize support reading strategies more than global reading and problem-solving strategies. However, all three types of metacognitive strategies are frequently used. These findings suggest that students preparing for the IELTS examination are employing a variety of metacognitive strategies, particularly support reading strategies. This not only underscores the importance of

Table 4. Descriptive statistics.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Overall Metacognitive Strategies	242	3.80	14.78	11.4473	2.07111
Global Reading Strategies	242	1.11	5.00	3.6679	.85358
Problem Solving Strategies	242	1.00	5.00	3.7169	.93066
Support Reading Strategies	242	1.00	5.00	4.0624	.87561
Valid N (listwise)	242				

incorporating these strategies into language learning and test preparation programs but also provides a clear direction for educators and policymakers to enhance students' reading achievement.

4.2. Analysis of Research Question II

The second research question examines the relationship between metacognitive strategies and IELTS reading achievement. This question involves metacognitive strategies as the independent variable and IELTS reading scores as the dependent variable. Two hypotheses, H_{01} and H_{a1}, were formulated. H_{01} posits that there is no significant relationship between metacognitive strategies and IELTS reading achievement. Conversely, H_{a1} suggests a significant relationship between metacognitive strategies and IELTS reading achievement. Hypotheses were statistically tested at a significance level of .05, implying that H_{01} would be rejected if the p-value was less than .05.

4.2.1. Assumptions for Pearson Correlation
1) Linear Relationship
Based on the scatter plot in Figure 1, it can be concluded that the linear relationship between metacognitive strategies and IELTS reading scores is positive; as the value of metacognitive strategies increases, so does the value of IELTS reading scores.
2) Bivariate Normality
Based on the histograms in Figure 2 and Figure 3, which show two bell shapes, it can be concluded that data regarding IELTS reading scores and metacognitive reading strategies was normally distributed for all participants.

4.2.2. Statistical Significance for Metacognitive Strategies
According to statistical results provided in Table 5, the p-value for the correlation between overall metacognitive strategies and IELTS reading scores is less than .05. Therefore, the null hypothesis of H_{01} was rejected, and it can be concluded that a noteworthy correlation exists between overall metacognitive strategies and IELTS reading achievement.

According to statistical results provided in Table 6, the p-value for the correlation between global reading strategies and IELTS reading scores is less than .05.
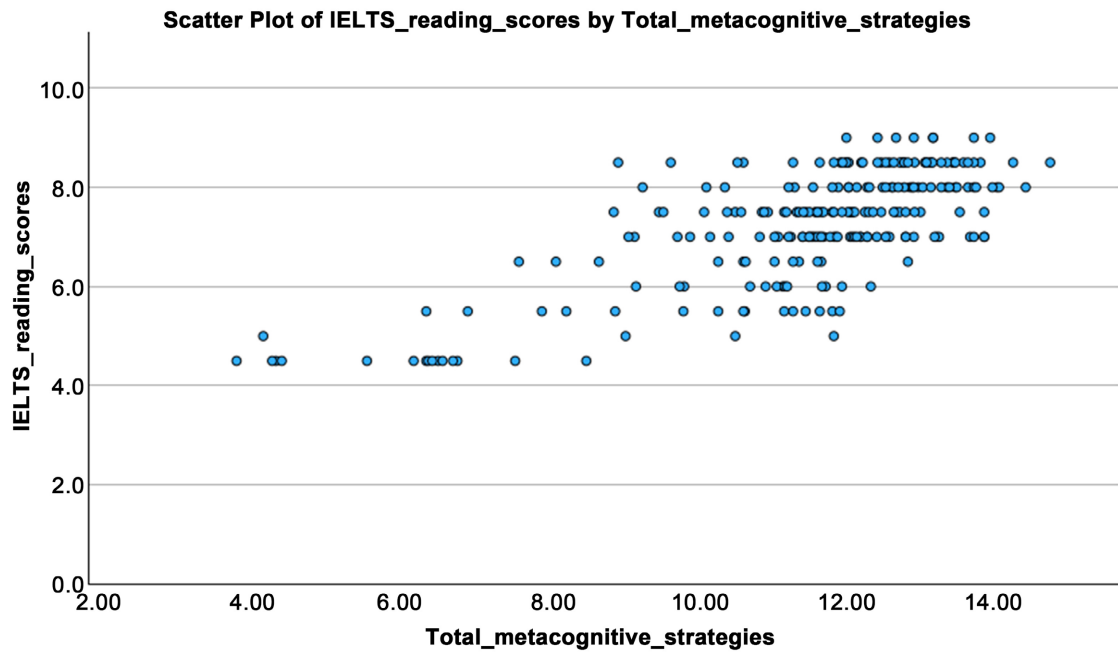
Figure 1. Linear relationship between metacognitive strategies and IELTS reading scores.
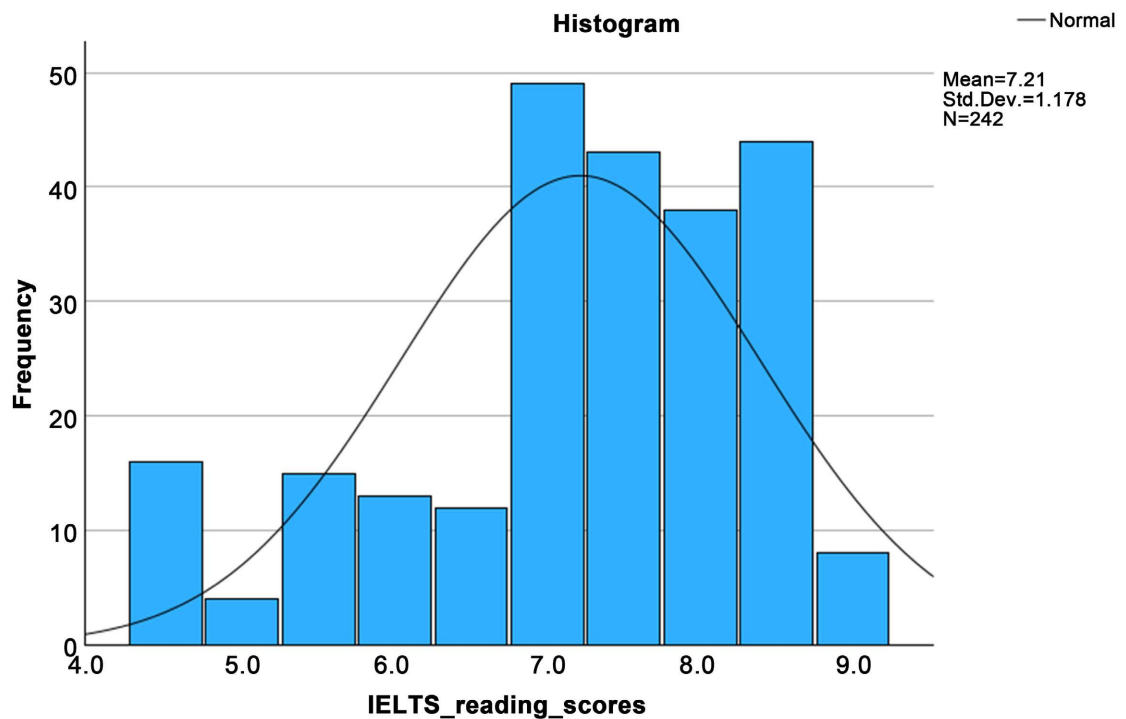

Figure 2. Normality test for IELTS reading scores.

Therefore, the null hypothesis of H_{01} was rejected, and it can be concluded that a noteworthy correlation exists between global reading strategies and IELTS reading achievement.

According to statistical results provided in Table 7, the *p*-value for the correlation between problem-solving strategies and IELTS reading scores is less than
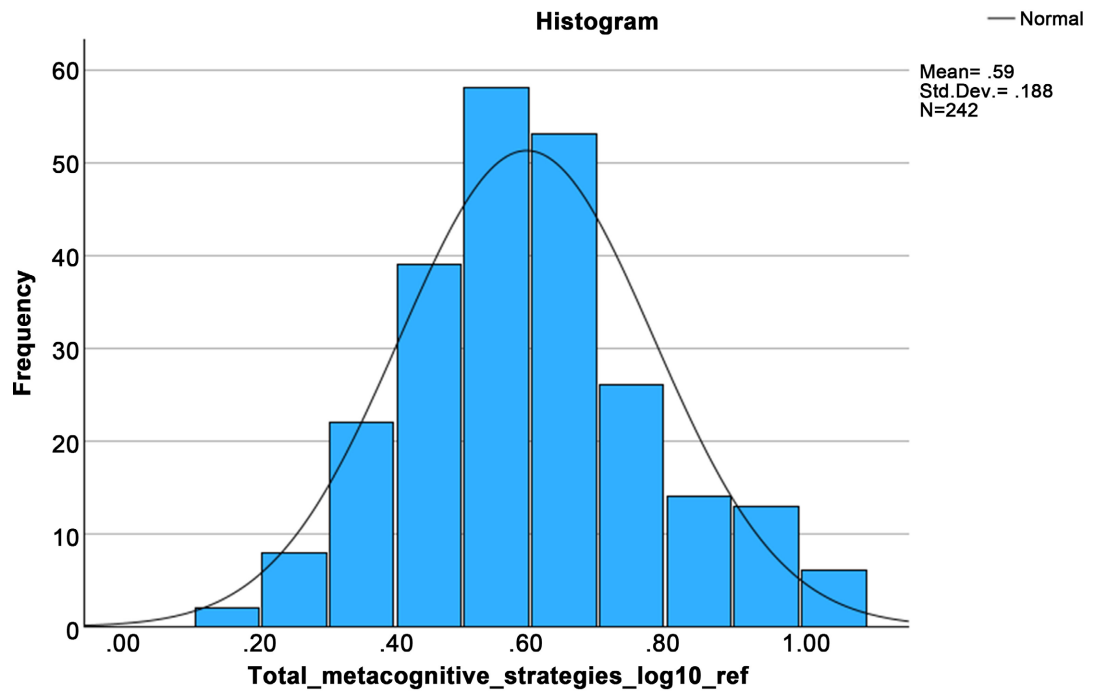
Figure 3. Normality test for metacognitive strategies.

Table 5. Correlation between overall metacognitive strategies and IELTS reading scores.

Correlations		Overall Metacognitive Strategies	IELTS Reading Scores
Overall Metacognitive Strategies	Pearson Correlation	1	.693**
	Sig. (2-tailed)		<.001
	N	242	242
IELTS Reading Scores	Pearson Correlation	.693**	
	Sig. (2-tailed)	<.001	
	N	242	242

**. Correlation is significant at the .01 level (2-tailed).

Table 6. Correlation between global reading strategies and IELTS reading scores.

Correlations		Global Reading Strategies	IELTS Reading Scores
Global Reading Strategies	Pearson Correlation	1	.424**
	Sig. (2-tailed)		<.001
	N	242	242
IELTS Reading Scores	Pearson Correlation	.424**	
	Sig. (2-tailed)	<.001	
	N	242	242

**. Correlation is significant at the .01 level (2-tailed).

.05. Therefore, the null hypothesis of H_{01} was rejected, and it can be concluded that a noteworthy correlation exists between problem-solving strategies and IELTS reading achievement.

According to statistical results provided in Table 8, the *p*-value for the correlation between support reading strategies and IELTS reading scores is less than .05. Therefore, the null hypothesis of H_{01} was rejected, and it can be concluded that a noteworthy correlation exists between support reading strategies and IELTS reading achievement.

4.2.3. Correlation Coefficient for Metacognitive Strategies

This study, as evidenced by the data in Table 5, has revealed a significant and robust positive correlation between overall metacognitive strategies and IELTS reading scores. This correlation, with a coefficient of r (240) = .693, *p* < .001, is not only statistically significant but also accounts for a substantial 48% of the variance in IELTS reading scores.

With the data from Table 6, it can be concluded that a moderate positive correlation, statistically significant, was found between global reading strategies and IELTS reading scores, r (240) = .424, *p* < .001. These results, which explain 18%

Table 7. Correlation between problem solving strategies and IELTS reading scores.

Correlations			
		Problem Solving Strategies	IELTS Reading Scores
Problem Solving Strategies	Pearson Correlation	1	.592**
	Sig. (2-tailed)		<.001
	N	242	242
IELTS Reading Scores	Pearson Correlation	.592**	
	Sig. (2-tailed)	<.001	
	N	242	242

**. Correlation is significant at the .01 level (2-tailed).

Table 8. Correlation between support reading strategies and IELTs reading scores.

Correlations			
		Support Reading Strategies	IELTS Reading Scores
Support Reading Strategies	Pearson Correlation	1	.595**
	Sig. (2-tailed)		<.001
	N	242	242
IELTS Reading Scores	Pearson Correlation	.595**	
	Sig. (2-tailed)	<.001	
	N	242	242

**. Correlation is significant at the .01 level (2-tailed).

of the variance in IELTS reading scores, are a reliable indicator of the impact of global reading strategies.

Table 7 reveals a strong positive correlation, statistically significant, between problem-solving strategies and IELTS reading scores, r (240) = .592, *p* < .001. These findings, which explain 35% of the variance in IELTS Reading Scores, have significant implications for the teaching and learning of IELTS reading.

According to the data presented in Table 8, it can be concluded that a strong positive correlation, statistically significant, was noted between support reading strategies and IELTS reading scores, r (240) = .595, *p* < .001. Support reading strategies accounted for 35% of the variance in IELTS reading scores.

4.3. Analysis of Research Question III

The third research question aims to determine the most influential predictor among three metacognitive sub-constructs, namely global reading strategies, problem-solving strategies, and support reading strategies, regarding IELTS reading achievement. The independent variable is metacognitive strategies, and the dependent variable is IELTS reading scores.

4.3.1. Assumptions for Standard Multiple Regression
1) Independence of Observations
According to the findings presented in Table 9, it is reasonable to conclude that residuals are independent, given the Durbin-Watson statistic of 1.891.
2) Normality Test
Based on the histogram in Figure 4 and the P-P plot in Figure 5, it can be concluded that the standardized residuals exhibit characteristics indicative of a normal distribution.

4.3.2. Evaluating Goodness of Fit for the Model
1) Multiple Correlation Coefficient
Table 9 indicates that the multiple correlation coefficient (R) for metacognitive strategies is .71. This value suggests a moderate to intense association between metacognitive strategies and IELTS reading achievement.
2) Total Variation Explained
In Table 9, the coefficient of determination (R square) is .504, and the adjusted R square is 49.7%, indicating that including all independent variables in the regression model accounts for 50.4% of the variability in the dependent variable, IELTS reading achievement.

Table 9. Model summary for multiple regression of metacognitive strategies.

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.710[a]	.504	.497	.8351	1.891

a. Predictors: (Constant), Support Reading Strategies, Problem Solving Strategies, Global Reading Strategies; b. Dependent Variable: IELTS Reading Scores.
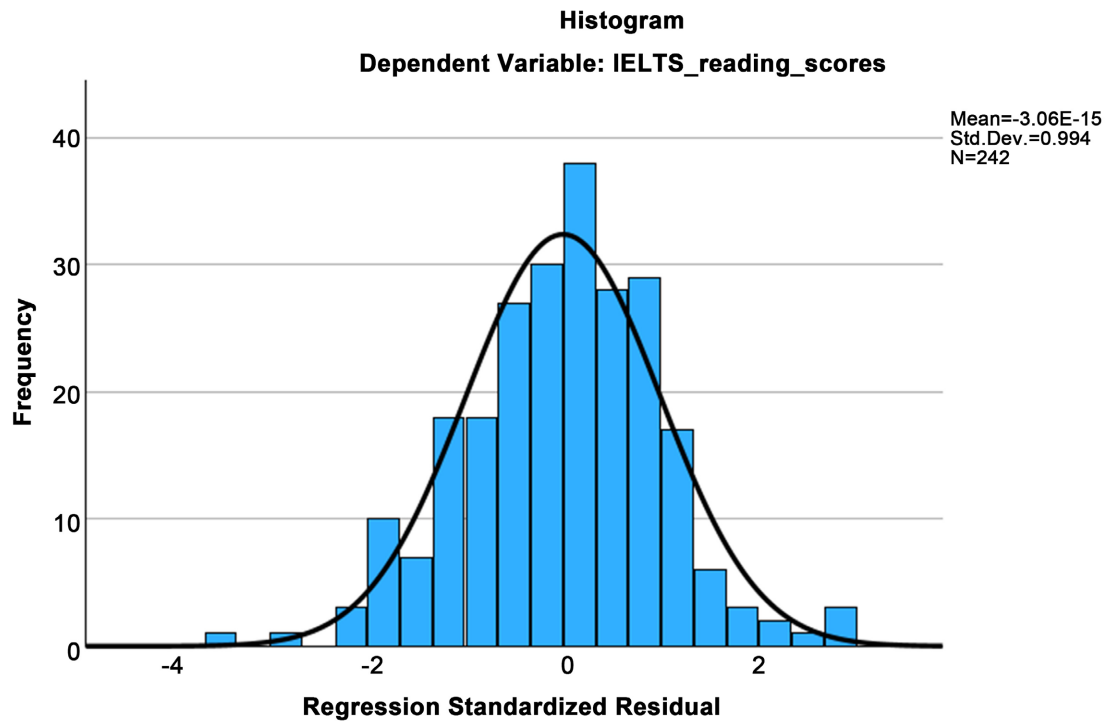
Histogram

Dependent Variable: IELTS_reading_scores

Mean=-3.06E-15
Std.Dev.=0.994
N=242

Figure 4. Histogram of regression standardized residual.

Normal P-P Plot of Regression Standardized Residual
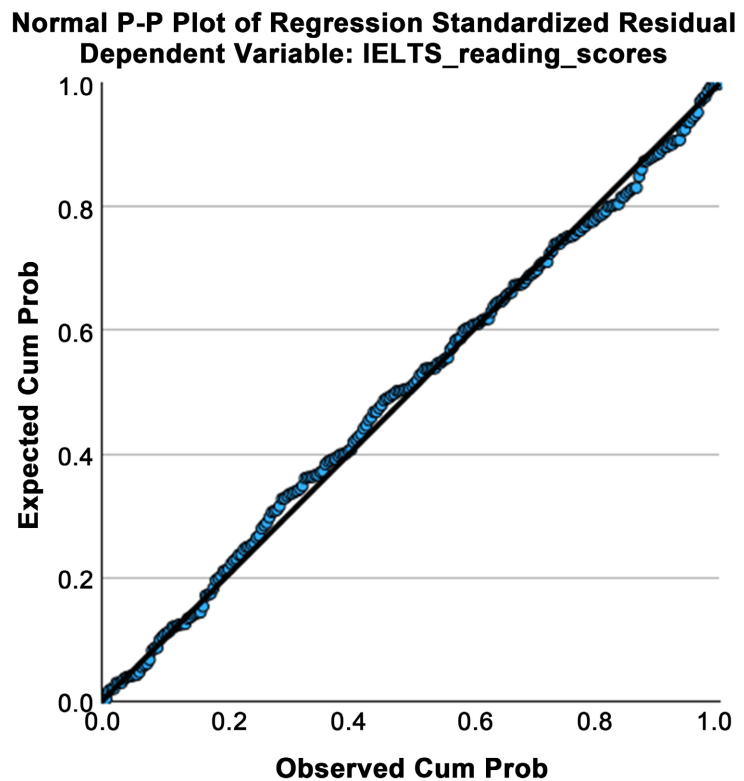**Dependent Variable: IELTS_reading_scores**

Figure 5. Normal P-P plot of regression standardized residual.

3) Statistical Significance of the Model

According to Table 10, the value is less than .001. Since $p < .001$ satisfies p

< .05, it can be inferred that including all independent variables results in a significantly superior model at predicting the dependent variable compared to the mean Model. Furthermore, it can be concluded that global reading, problem-solving, and support reading strategies significantly predicted IELTS reading scores, as indicated by F (3, 238) = 80.470, p < .001.

4.3.3. Analyzing Coefficients

Based on the data presented in Table 11, p-values for all three independent variables are less than .05. Consequently, a linear relationship exists in the population, and the slope coefficient is statistically significant.

Moreover, considering that the slope coefficient signifies the change in the dependent variable for a one-unit change in the independent variable (Green & Schwab, 2022), the following conclusions can be drawn:

1) The coefficient for global reading strategies is .171, indicating that an increase in global reading strategies is associated with a .171 increase in IELTS reading scores.

2) The coefficient for problem-solving strategies is .499, suggesting that an increase in problem-solving strategies is associated with a .499 increase in IELTS reading scores.

3) The coefficient for support reading strategies is .492, indicating that an increase in support reading strategies is associated with a .492 increase in IELTS reading scores.

In addition, based on the constant number in each factor from Table 11, the

Table 10. ANOVA for multiple regression of metacognitive strategies.

ANOVA[a]					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	168.353	3	56.118	80.470	<.001[b]
Residual	165.974	238	.697		
Total	334.326	241			

a. Dependent Variable: IELTS Reading Scores; b. Predictors: (Constant), Support Reading Strategies, Problem Solving Strategies, Global Reading Strategies.

Table 11. Coefficients for multiple regression of metacognitive strategies.

Coefficients[a]						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B
	B	Std. Error	Beta			Lower Bound
(Constant)	2.737	.303		9.040	<.001	2.141
Global Reading Strategies	.171	.072	.124	2.356	.019	.028
Problem Solving Strategies	.499	.065	.394	7.694	<.001	.371
Support Reading Strategies	.492	.074	.366	6.627	<.001	.346

model equation for multiple regression of metacognitive strategies is IELTS Reading Scores = 2.737 + .171 (Global Reading Strategies) + .499 (Problem-Solving Strategies) + .492 (Support Reading Strategies).

Given that the coefficient for problem-solving strategies is the largest among the three metacognitive subscales, the conclusion was drawn that problem-solving strategies are the best predictors of IELTS reading achievement.

5. Discussion

5.1. Discussion of Findings

In the context of this study, the independent variable, namely metacognitive strategies, was subjected to analysis to address three research questions:

1) How much do Chinese students preparing for the IELTS examination utilize metacognitive strategies?

2) How do metacognitive strategies related to IELTS reading performance?

3) Which specific type of metacognitive strategy predicts IELTS reading achievement?

5.1.1. Discussion of Research Question I

For research question I, statistical outcomes reveal the following:

1) All three types of metacognitive strategies are frequently used.

2) Students use support reading strategies more than global and problem-solving strategies.

The findings of research question I are consistent with the research done by Alkhaleefah (2023), who discovered that learners in the low-proficiency group reportedly used support strategies more often than the other two metacognitive strategies. Findings also align with the study carried out by Brdarevic et al. (2021), who found that global and support strategies are the two most frequent reading strategies among students in the field of psychology. However, most prior studies concluded that problem-solving strategies are used the most frequently by participants (Dangin, 2020; Riki, 2021; Do & Le Thu Phan, 2021; Tedjo et al., 2022; Hartanti et al., 2023; Nisrina, 2023), and other research also reported that global reading strategies are the most frequently used ones (Rabadi et al., 2020).

5.1.2. Discussion of Research Question II

For research question II, statistical outcomes reveal the following:

1) A statistically significant, strong positive correlation exists between overall metacognitive strategies and IELTS reading scores.

2) A statistically significant, moderate positive correlation exists between global reading strategies and IELTS reading scores.

3) A statistically significant, strong positive correlation exists between problem-solving strategies and IELTS reading scores.

4) A statistically significant, strong positive correlation exists between support reading strategies and IELTS reading scores.

The findings of research question II are consistent with conclusions drawn from prior studies. For example, Muhid et al. (2020) conducted a study examining the impact of metacognitive strategies on students' reading comprehension achievement scores and identified positive effects on reading achievement. Similarly, Halim et al. (2020) investigated using metacognitive strategies and peer tutoring to enhance students' reading comprehension, noting improvements in students' ability to comprehend and answer questions about reading texts.

Meanwhile, Khellab et al. (2022) investigated the impact of teaching metacognitive reading strategies on the reading comprehension of engineering students, indicating that explicit instruction effectively improves Libyan EST students' metacognitive awareness and produces statistically significant gains in reading comprehension.

Furthermore, Kung and Aziz (2020), in an action research study on metacognitive reading strategies instruction, suggested that such instruction could benefit English language classrooms by improving students' reading comprehension.

Additionally, Mohseni et al. (2020) conducted a quasi-experimental study comparing the effects of metacognitive strategy training and critical thinking awareness-raising on EFL learners' reading comprehension across different text types, concluding that both interventions significantly improved general reading comprehension from pre-test to post-test.

Finally, Saukah (2020) explored students' metacognitive knowledge in reading classes, finding that successful readers exhibit higher levels of metacognitive knowledge than less successful readers. This suggests that students' cognitive processes are crucial in developing metacognitive knowledge and enhancing EFL reading skills.

5.1.3. Discussion of Research Question III

For research question III, statistical outcomes revealed the following:

1) The multiple regression model significantly predicted IELTS reading achievement.

2) All three subscales of metacognitive strategies (global reading strategies, problem-solving strategies, and support reading strategies) contributed statistically significantly to the prediction.

3) Problem-solving strategies emerge as the most effective predictor of IELTS reading achievement.

The findings of research question III are consistent with conclusions drawn from prior studies. For example, Ghaith (2020) explored the direct and indirect impacts of metacognitive strategies on reading comprehension among EFL learners. The correlational analysis revealed the positive association between problem-solving strategies and reading comprehension, underscoring the necessity of integrating instruction on problem-solving strategies into EFL reading pedagogy to bolster comprehension.

Meanwhile, Al-Qahtani (2021) examined the potential relationship between reading comprehension and applying metacognitive strategies. This demon-

strated a significant positive correlation between problem-solving strategies and reading comprehension in the ESL group. Finally, Villanueva (2022) conducted a study that revealed that the utilization of problem-solving metacognitive strategies showed a significant correlation with students' reading comprehension performance.

5.1.4. Explanation of Research Findings

To further elaborate on research findings, it is crucial to consider the cognitive processes underpinning reading comprehension. When students employ metacognitive reading strategies, they utilize higher-order thinking skills to monitor and regulate their understanding of texts (Moir et al., 2020). Metacognition encompasses an awareness of one's thinking processes and the capacity to control and adjust these processes as necessary (Rivas et al., 2022). Problem-solving strategies, in particular, facilitate deciphering complex information by prompting students to seek solutions to comprehension challenges actively. This active engagement with texts enhances comprehension and nurtures a deeper level of understanding and retention of information.

Additionally, the efficacy of metacognitive reading strategies can be attributed to their capacity to bridge the gap between surface-level reading and critical analysis (Mohseni et al., 2020). These strategies foster a more comprehensive and thoughtful reading approach by prompting students to contemplate their reading processes and make necessary adjustments. For instance, when encountering challenging vocabulary or complex sentence structures, students can employ metacognitive strategies like self-questioning or summarization to enhance their comprehension, resulting in enhanced comprehension and retention of information.

Furthermore, beyond mere reading comprehension, metacognitive reading strategies are also pivotal in cultivating students' academic skills (Eskandari et al., 2020). These strategies encourage active involvement with texts, a skill vital for success in diverse academic endeavors such as writing, research, and critical analysis. By refining metacognitive skills, students can evolve into more autonomous learners, skilled at comprehending intricate academic materials more easily (Werdiningsih et al., 2022).

5.2. Discussion of Implications

5.2.1. Implications on IELTS Instruction

Insights derived from this study have valuable implications for IELTS instruction. In detail, the research found that IELTS students actively employed metacognitive reading strategies, thus underscoring the importance for instructors to cultivate environments that foster the application of such strategies when engaging with academic texts (Halim et al., 2020). In addition, since problem-solving strategies were found to be the most predictive factor for increasing IELTS reading achievement, encouraging the application of problem-solving strategies among students is recommended for enhancing comprehension

(Amini et al., 2020). Instructors are encouraged to train students to infer unknown words, adjust reading speed based on text difficulty, visualize information for enhanced comprehension, and strategically review content while reading (Marboot et al., 2020). They are also encouraged to aid learners in recognizing their current metacognitive strategies and offer strategies to facilitate practical implementation (Tamin & Büyükahıska, 2020).

5.2.2. Implications on Theories

For theoretical implications, the findings of this study align with existing theories on metacognition and language learning. For instance, Flavell's (1979) metacognition theory posits that metacognitive knowledge and regulation are essential components of cognitive development. The strong positive correlation between metacognitive strategies and IELTS reading scores supports Flavell's theory by demonstrating the importance of metacognitive regulation in academic tasks such as reading comprehension.

Additionally, the findings corroborate Vygotsky & Cole's (1978) sociocultural theory, which emphasizes the role of social interaction in cognitive development. The positive effects of metacognitive strategies on reading achievement found in this study are consistent with Vygotsky's notion that learning occurs through social interaction and is mediated by cultural tools such as language. By employing metacognitive strategies, students engage in active, socially mediated processes that enhance their reading comprehension skills.

5.3. Discussion of Research Limitations

5.3.1. Self-Report Measures

While self-report measures like SORS are valuable for understanding participants' perceptions, they are susceptible to social desirability bias and potential inaccuracies. This could affect the validity of metacognitive strategy measurements, as participants may provide responses that they believe are expected rather than reflective of their actual behaviors. Future research could consider incorporating objective measures or triangulating data from multiple sources to enhance the validity of the findings.

5.3.2. Context Specificity

This study focuses on Chinese students preparing for the IELTS examination, which limits the generalizability of the findings to other populations or settings. Cultural, regional, and institutional factors inherent in this context may influence the results and not apply to students from different backgrounds. Future research could explore the effects of metacognitive strategies on reading achievement in diverse populations to enhance the generalizability of the findings.

5.3.3. Absence of Demographic Information

This study lacks general demographic information, such as age and gender, in the collected data, limiting the ability to conduct a comparative analysis, which

could have provided a broader perspective on the applicability and robustness of the results. Future research in this area could focus on collecting data that includes demographic information, allowing for a comparative analysis to enhance the understanding of how metacognitive strategies impact reading achievement in different educational contexts or with different age groups of learners.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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