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The Correlation between Metacognitive Reading Strategies and Reading Comprehension among Senior High Students

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Abstract

This study aims to determine whether there is a significant correlation between metacognitive reading strategies and students' reading comprehension. It was conducted using a quantitative correlational design at a senior high school in Gresik, involving 100 12th-grade students as participants. To collect the data, the researcher administered two instruments: a reading comprehension test and the Metacognitive Awareness of Reading Strategies Inventory (MARSI) questionnaire, which measures students' use of global, problem-solving, and support strategies. The data were tested for validity, reliability, and normality to ensure appropriate statistical procedures. A Spearman rho correlational test was then conducted to examine the relationship between the two variables. The results revealed that there is no significant correlation between metacognitive reading strategies and students' reading comprehension. This indicates that frequent use of metacognitive strategies does not necessarily lead to better reading performance. These findings suggest that other factors—such as vocabulary mastery, language proficiency, and motivation—may play a more critical role in influencing students' reading comprehension. It is possible that students may not yet have the linguistic competence needed to apply strategies effectively. Therefore, future research is recommended to use more objective tools, such as think-aloud protocols, to assess actual strategy use. Including more diverse participants and exploring the interaction between vocabulary, motivation, and strategy use may also provide deeper insights into the factors that support successful reading comprehension.

Keywords: Metacognitive strategies, Reading comprehension, Correlation, MARSI

INTRODUCTION

Reading is a vital skill in learning a second language, as it serves as a gateway to a wealth of knowledge (Kung, 2019). Proficiency in reading is crucial since it has lasting effects and significantly impacts achievement in other academic fields (Pickren et al., 2024). Having good reading skills is particularly important in the context of learning English as a Foreign Language (EFL), as it given the widespread use of English in written communication, such as textbooks, websites, and newspapers (Tsang & Yeung, 2024). Consequently, those who struggle with reading skills will inevitably face challenges in both their academic and social lives.

Further, mastering reading skills, particularly in English, not only enhances comprehension across various subjects but also provides access to an immense amount of information (Vettori et al., 2023). This ability is essential in today's information-driven world, where effective reading can unlock numerous academic and professional opportunities. However, despite its importance, many EFL students encounter significant barriers that hinder their reading comprehension.

For EFL students, reading comprehension is often considered critical yet challenging. Learners commonly struggle to grasp the meaning of texts due to a lack of authentic learning contexts (Liu et al., 2023). Moreover, reading in a foreign language also possesses students with unknown syntactic features and unfamiliar vocabulary meanings (Hu et al., 2021). Furthermore, another factor that influences students' difficulties in

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comprehending a text is because learners have a lack of motivation and are not interested in reading and analyzing English texts because they are not familiar with doing the activity in their daily routines (Nanda & Azmy, 2020).

Additionally, these challenges are also reflected in the reading performance of Indonesian students. In International Student Assessment (PISA) 2018, Indonesian students ranked 74th out of 79 participating countries in reading performance, with an average score of 371, which is far below the OECD average of 487 (OECD, 2019). Previous study conducted by Dari & Noviabahari (2018) indicated that secondary learners in Indonesia often lack effective reading habits and strategies, which contributes to their difficulties in comprehending longer and more complex English texts (Ibrahim et al., 2024; Khalif Rizqon et al., 2021; Kher, 2023; Prihatini, 2020).

Further, supporting this data, interviews with one English teacher at a school in Gresik revealed that the majority of students' scores on reading assessments fall below the Minimum Completeness Criteria. This situation raises important questions about the factors contributing to these low-performance levels, especially regarding the

role of effective reading strategies. Research shows that students who utilize appropriate reading strategies tend to perform better in reading comprehension (Kan et al., 2024; Mekuria et al., 2024; Olifant, 2024; Wu et al., 2021). However, a lack of awareness or application of these strategies may significantly hinder their abilities. Therefore, it is crucial for teachers to integrate explicit instruction on effective reading strategies into their teaching and learning process.

One promising approach to enhance learners' reading comprehension is by implementing metacognitive reading strategies. Studies reveal that Metacognitive reading strategies can improve learners' reading abilities by enhancing their vocabulary building (Hasani & Pahamzah, 2022). Further, scholars also show that Metacognitive reading strategies were a key factor in converting reading motivation into reading success (Jang & Seo, 2024). Therefore, integrating metacognitive reading strategies into teaching can significantly benefit students' reading skills, especially in higher education, where they must quickly digest complex textual information (Yapp et al., 2023). However, the application and effectiveness of these strategies may vary depending on the learners' context.

Besides, as EFL learners, Indonesian students must navigate texts that contain a wide range of linguistic complexities. Moreover, their ability to comprehend a text also varied. In order to fully grasp the meaning of a text, it is essential for the learner to utilize specific techniques or strategies that facilitate interaction with the material, allowing for a deeper engagement and comprehension of the content presented (Khellab et al., 2022).

In recent years, there has been a growing interest in the efficacy of metacognitive reading strategies. Building on this, Metacognitive strategies refers to strategies in which learners play an active role in developing their knowledge through their experience (Flavell, 1979). Moreover, metacognitive reading awareness is a valuable strategy that enhances students' comprehension of texts. It involves a reader's ability to plan, self-evaluate, and adapt their thinking processes. Ultimately, metacognitive reading strategies foster more effective reading and learning experiences (Mokhtari & Reichard, 2004, 2002)

To better understand how these strategies relate to reading comprehension, it is useful to examine empirical studies from various countries. Previous international studies, especially those in regional Asia have explored the relationship between metacognitive reading strategies and students' reading comprehension. Research from the Philippines (Villanueva, 2022), China (Fang & Rahman, 2024), Turkey (Köse & Güneş, 2021), and Morocco (El Madani et al., 2024) showed there was a significant correlation between Metacognitive reading strategy and reading comprehension.

On the other hand, while most studies demonstrated a positive correlation, some have reported contrasting findings. Studies in Vietnam (Dang, 2024), Kazakhstan (Akhmetova & Imambayeva, 2022), Iran (Arabmofrad et al., 2021), and Saudi Arabia (Meniado, 2016) yielded different results. All of those previous studies indicated that there is no correlation between metacognitive reading strategy and reading comprehension.

Further, numerous studies conducted in Indonesia have explored the correlation between metacognitive reading strategies and students' reading comprehension. A study conducted by Pebriyanti et al.(2024) with 164 junior high students showed there is a significant correlation between Metacognitive reading strategy and students' reading comprehension.

Similarly, previous research conducted by Septiyanto et al. (2022) and Gazali & Baa (2023) in the field of eleventh graders senior high students demonstrated a strong positive relationship between metacognitive reading strategies and students' reading comprehension. Moreover, a study by Haling (2022) focusing on university-level students also reported that there is a

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strong positive correlation between metacognitive reading strategy and students' reading comprehension.

On the contrary, while previous studies demonstrated a positive correlation, studies by Wahyuni et al. (2018) and Kusumawardana & Akhiriyah (2022) in the field of undergraduate university-level students propose a wider range of results. The findings of the research indicated that there was a negative correlation between metacognitive reading strategy and students' reading comprehension. Similarly, a previous study conducted by Aini & Akhiriyah (2022) with a-third year junior high students also reported that there was a negative correlation between metacognitive reading strategy and reading comprehension.

Further, research on this topic has differing findings that highlight the necessity for further research to identify the variables influencing this relationship across diverse educational contexts. In addition, most Indonesian studies have predominantly focused only on specific populations, such as junior high students, grade 11 students, and university learners. However, none of those studies have examined grade 12 EFL learners who will encounter increasingly demanding academic reading tasks before entering higher education.

Addressing this gap is essential for understanding how these strategies influence reading comprehension among grade 12 students, particularly to prepare the

students for college where at that stage, students are expected to become more independent learners and confront increasingly complex texts.

Therefore, this study aims to provide valuable insights that will assist educators in developing targeted interventions to enhance teaching practices and improve student learning outcomes. Based on the research background, this study seeks to address the following research question: Is there a significant correlation between students' use of metacognitive reading strategies and their reading comprehension?

Based on the research questions, this study aims to seek whether there is a significant correlation between metacognitive reading strategies and students' reading comprehension.

METHODS

In order to answer the research question, a quantitative correlational research design was employed in this study. According to Creswell & Creswell (2018), a correlational design involves the researchers utilizing correlational statistics to describe and quantify the strength of the association or relationship between two or more variables or sets of scores. In other words, when variables are closely connected, it is often possible to anticipate the probability of one being present based on the presence of the others (Mackey & Gass, 2015).

Further, this present study aims to explore the relationship between the use of metacognitive strategies and students' reading comprehension. For this reason, applying a quantitative correlational research design is effective since this design enables the researcher to delve into the relationships between metacognitive reading strategies and students' reading comprehension (Ary et al., 2014). Moreover, by using correlational statistics, this study offers valuable information regarding the relationship, strength, and direction of Metacognitive reading strategy and reading comprehension.

The primary source of data for this research was derived from two main instruments: the MARSI questionnaire (Mokhtari & Reichard, 2002) and a reading comprehension test. The MARSI questionnaire was served to evaluate students' self-reported use of metacognitive reading strategies, including knowledge of reading processes, planning, monitoring, and evaluating comprehension. The second source of data was the students' performance on a reading comprehension test. This test provided a quantitative measure of the students' reading comprehension abilities and served as a benchmark for analyzing correlations with the metacognitive strategies reported in the MARSI questionnaire.

The participants in this study were 100 twelve-grade students from one of the senior high schools in Gresik. Students were selected because they were taught by the same English teacher using identical instructional materials and assessment practices. The participants for this study were selected using purposive sampling, a technique where researchers choose specific individuals based on their judgment that these individuals represent the population well (Cohen et al., 2015).

In this case, to select the participants, the researcher collaborated with one of the English teachers in determining which classes met the criteria for this research. The criteria were 12th grader students who were taught by the same teacher with the identical instructional material, assessments practices, and agreed to participate in this study. Thus, the purposive sampling method employed in this study ensures that the selected participants were relevant and representative of the specific educational context being examined.

To gather the data, the researcher then utilized The Metacognitive Awareness of Reading Strategy Inventory (MARSI) questionnaire (Mokhtari & Reichard, 2002) to

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assess students' awareness and application of various metacognitive reading strategies. This questionnaire was distributed via goggle form and features a 4-point likert-scale, ranging from 1 (I never do this) to 4 (I always do this). Additionally, the questionnaire consists of 30 items that measure three broad categories of strategies as summarized in Table 3.1 below.

Table 1
Overview of MARSI Questionnaire

Strategy	Items	Description
Global Reading Strategies (GLOB)	13	General techniques that prepare students for reading, such as setting a purpose, previewing the text, and making predictions.
Problem-Solving Strategies (PROB)	8	Specific strategies used to address difficulties in understanding the text, such as checking comprehension when faced with conflicting information or re-reading for clarity.
Support Reading Strategies (SUP)	9	Strategies that utilize resources and tools to enhance engagement with the text, such as dictionaries and other supportive systems.

Besides, a reading comprehension test was administered to measure students' comprehension skills. This test was adapted from Britishcouncil.org website which provides CEFR-aligned English reading materials. The selected passages corresponded to approximately B1–B2 proficiency levels, making them appropriate for Grade 12 Indonesian EFL students who are expected to have reached an intermediate level of English proficiency. The test consisted of three passages and included 30 multiple-choice questions. Additionally, the test was conducted in a controlled pen paper-based format to avoid cheating, minimize distractions, and ensure a conducive testing environment. Moreover, reading comprehension test score was calculated using this formula

$$\textbf{Reading Comprehension } \frac{N\ Correct\ Answers}{N\ Questions} \textbf{ X 100}$$

Further, the results of the reading test was categorized based on CEFR (Common European Framework of Reference of Languages) levels as outlined by BritishCouncil.org, as presented below

Table 2
CEFR Proficiency Level

Score Range	CEFR Level	Level Description
90–100	C1–C2	Advanced to Proficient
75–89	B2	Upper Intermediate
60–74	B1	Intermediate
45–59	A2	Elementary
≤44	A1–Below A1	Beginner

Prior to data collection, permission to conduct the study was obtained from the school principal and the English teacher. Participants were informed about the purpose of the study and that their participation was entirely voluntary. They were assured that their responses would remain confidential and would be used solely for research purposes. No personally identifiable information was collected, and all data was analyzed anonymously.

In addition, the data were collected during regular school hours in coordination with the English teacher through the following procedures. First, the researcher was administered the reading comprehension test. Students should complete the test in 30 minutes. Before starting the test, the researcher introduced themselves and explained the purpose of the study. Subsequently, the researcher clarified the procedures for completing the test. During the test, participants were asked to keep their phones to minimize the risk of cheating, thereby ensuring their results are more objective.

After completing the reading comprehension test, the researcher then administered the MARSI questionnaire to the participants. The participants have 15 minutes to fill out the questionnaire. The questionnaire is provided via Google Forms. While completing the questionnaire, participants were encouraged to answer honestly to ensure the accuracy of their responses.

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In analyzing the data, the researcher conducted a validity and a reliability test. After that, the researcher then conducted a normality test to determine the distribution and whether the researcher will use a parametric test or non- parameter test to analyze the correlation between metacognitive reading strategy and students' reading comprehension. If the data were distributed normally the researcher will use a parametric test. However, if the data were not distributed normally, the researcher then will use a non-parametric test to analyze the data.

To check the validity, both reading comprehension test and questionnaire were reviewed and validated by one English lecturer and an English teacher with this criteria.

English Lecturer

1. Hold at least a Bachelor's degree in English education.
2. Has experience in teaching courses related to reading and is an expert in the field of reading assessment.

English Teacher

1. Hold a Bachelor's degree in English education.
2. Active practitioner.
3. Having experience in teaching senior high students.

Further, the selected validator in this study was an English lecturer who holds a Master's degree (S2) in English Education and an expert in reading assessment who has taught reading-related courses in tertiary education. Moreover, the English teacher in this study is an active practitioner who has taught senior students for fifteen years and already holds a Bachelor's degree in English education.

The validators evaluated the MARSI questionnaire and the reading comprehension test using a validation form. The evaluation covered several aspects, including the relevance of the instrument to the research objectives, the appropriateness of the contents, the clarity of the instructions, the accuracy and comprehensibility of the language, the suitability of the items for the participants' level of English proficiency, and the overall organization of the instruments.

Based on the validation results, both validators agreed that the instruments were appropriate for use in the study. They also provided several suggestions to improve the quality of the instruments, particularly regarding the wording of several instructions and the formatting of the reading comprehension test to enhance clarity and readability. These suggestions were incorporated into the final version of the instruments before they were administered to the participants. Therefore, the validated instruments were considered appropriate for collecting the research data.

Moreover, in terms of consistency, the researcher conducted a pilot testing where the reading comprehension test and the MARSI questionnaire was distributed to 10 respondents who are outside the sample of this study.

The results of the test were analyzed using Cronbach's alpha. The first instrument that is MARSI Questionnaire is considered to be reliable since the reliability score is 0.935 which is greater than then 0.70.

Table 3
Reliability of MARSI

Reliability Statistics	
Cronbach's Alpha	**N of items**
.935	30

Further, the reading comprehension test is also considered as reliable since the Cronbach's alpha is 0.799 which is also greater than 0.70.

Table 4
Reliability of Reading Test

Reliability Statistics	
Cronbach's Alpha	**N of items**
.799	30

RESULTS AND DISCUSSION

Before conducting a correlation test, the researcher first performed a normality test to check whether both the data were normally distributed. A normality test was conducted using the Shapiro–Wilk test to determine whether the data met the assumption of normal distribution. If the significance level (p-value.) is > 0.05 then the data will be considered to be normal, however if the significance level (p-value.) is < 0,05 then the data will not be considered to be normal.

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Table 5
A Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk	
	Statistic	**df**	**Sig.**	**Statistic**	**df**
Reading Test	.106	100	.008	.951	100
MARSI	.092	100	.037	.987	100

Based on the table, the significance level (p-value) for reading comprehension tests is 0.001, which is less than 0.05. This indicates that the data is not normally distributed. However, the data for the MARSI questionnaire shows a significance level of 0.410, which is greater than 0.05. Therefore, it can be concluded that this data is normally distributed. Given the difference in results between the two variables, the researcher will use a non-parametric test to analyze the relationship between the variable—Spearman's rho coefficient (ρ) to check if there was a correlation between metacognitive reading strategies and students' reading comprehension. Spearman's rho (ρ) ranging between -1.00 and +1.00). If (ρ) is +1.00 it means that there is a positive correlation between the two variables (if one variable increases then the other variable will increase). However, if (ρ) is -1.00 it means that when one variable increases, the other variable decreases. Furthermore, if the result is around 0. It means that there is no or little correlation between the two variables.

In addition, to determine the strength of the relationship of two variables, researchers use the degree of correlation coefficient by Cohen (2018).

Table 6
Degree of Correlation Coefficient

0.20 - 0.35	Low
0.35 - 0.65	Moderate
0.65 - 0.85	High
> 0.85	Very high

After that, the researcher then analyzed the correlation between metacognitive reading strategy and students' reading comprehension.

Table 7
Correlational Test

Spearman's rho		Reading Comprehensive on Test	MARSI
Reading Comprehension Test	Correlation Coefficient nt	1.000	–.070
	Sig. (2-tailed)	.	.487
	N	100	100
MARSI	Correlation Coefficient nt	–.070	1.000
	Sig. (2-tailed)	.487	.
	N	100	100

The data analysis illustrated that there is no significant correlation between metacognitive reading strategies and students' reading comprehension. The analysis result shows that the significance level (p-value) is .487 which is higher than 0.05. In addition, the correlation coefficient (ρ) shows -.070 which there is no significant correlation with a negligible negative direction. Furthermore, the result of the test showed that the students' range score was between 40 and 97 with an average score of 75.62. According to CEFR benchmarks, scores within this range typically fall between B1 (intermediate) and B2 (upper-intermediate) levels. However, given the wide score distribution, it is reasonable to infer that many participants, especially those scoring below 60, remain within the A2–B1 range, which reflects elementary to lower-intermediate proficiency.

Table 8
Average Students' Reading Score

	N	Minimum	Maximum	Mean	Std. Deviation
RC-Score	100	40	97	75.62	13.650
Valid N (listwise)	100				

Moreover, the descriptive statistics of the MARSI questionnaire results show that students are aware with metacognitive strategies and are reported different levels

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of use across the three subscales of metacognitive reading strategies. The highest mean score was found in the Problem-Solving Strategy subscale (M = 2.94, SD = 0.62), indicating that students are more likely to apply strategies such as rereading or adjusting their reading speed when facing difficulties. This is followed by the Global Reading Strategy (M = 2.70, SD = 0.57), which reflects students' use of planning and monitoring strategies. The lowest mean score appeared in the Support Reading Strategy (M= 2.56, SD = 0.54), such as underlining or using reference materials.

Table 9
The Frequency Use of MARSI

Subscale	N	Mean	Standard Deviation
GLOB	100	2.70	0.57
PROB	100	2.94	0.62
SUP	100	2.56	0.54

However, there was a weak negative correlation with a value of ρ = -0.070, indicating a very small inverse relationship between the two variables. This means that although the correlation was not strong, students who reported using more metacognitive reading strategies tended to have slightly lower reading comprehension results.

Further, the results of this study contradict the theoretical viewpoint presented by Mokhtari & Reichard (2002) which stated that metacognitive reading strategies are effective for improving students' reading comprehension. Their theory suggests that planning, monitoring, and evaluating one's understanding during reading can enhance comprehension. In contrast, this study's findings reveal a weak negative correlation between the use of metacognitive strategies and students' reading comprehension, indicating that employing these strategies did not result in better reading performance.
Some potential factors that may contribute to the result of this study are the ineffective use of metacognitive reading strategy by the students. Students were reported using metacognitive strategies, however they may not be using them effectively. For example, students with low reading comprehension may think they are already applying strategies such as summarizing or monitoring their comprehension, but in practice, they are not applying them in a way that can improve their comprehension. This suggests that metacognitive awareness does not always translate into effective action.

In addition, Pressley & Afflerbach (1995) point out that the ability to reflect on strategies is not always directly related to the ability to apply them in actual reading contexts. According to Meniado (2016) metacognitive strategies are most effective when students have achieved a certain level of proficiency. In lower-proficiency learners, these strategies may not yield the intended impact due to their limited vocabulary, grammar knowledge, or background knowledge.

Other possible reasons that may affect the results of this study is students with low reading comprehension may report that they use metacognitive strategies more often than they actually do. This could be due to their tendency to estimate strategy use higher than it actually is, in the hope that the use of these strategies will improve their comprehension. This bias is known as self-report bias, which is a common problem in metacognitive measurement. Additionally, measurements that rely on self-report, such as the use of the MARSI questionnaire in this study, often face potential bias (Mackey & Gass, 2015) . This factor may arise due to the possibility that students are not fully aware of the reading strategies they apply or tend to give answers that are more positive than their actual condition. Further, these findings also aligned with the previous study conducted by Kusumawardana & Akhiriyah (2022) and Wahyuni et al. (2018). The result of those studies stated that the high scores on metacognitive questionnaires and the low reading test scores of students could be one predictor that may influence the absence of a relationship between metacognitive reading strategies and students' reading comprehension.

Furthermore, other factors that are possible are students with lower reading ability use strategies that are inappropriate or more complex than necessary for their ability level. For example, they may be more likely to use more complicated metacognitive strategies (such as comprehension monitoring) rather than more basic strategies (such as mind mapping or summarizing), which may lead to their confusion and lower their reading comprehension. Alderson (2000), points out that lower reading comprehension is often related to difficulties in applying more complex strategies, especially if students do not have the basic skills needed to understand the text in depth. Further, this issue may also occur because students are not sufficiently familiar with the various reading strategies (Aini & Akhiriyah, 2022) and tend to use strategies that are already embedded in their minds (Dang, 2024) rather than applying a strategy that suits their abilities. Thus, the misunderstanding between strategy selection and students' reading ability may affect

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their comprehension which may further lead to a negative correlation in this study.

Moreover, the findings of this study is not in line with the previous study conducted by Villanueva (2022), Gazali & Baa (2023), Pebriyanti et al.(2024), Haling (2022), and Septiyanto et al (2022). Several factors may account for the differences observed in the findings of this study. For instance, Pebriyanti et al. (2024) and Villanueva (2022) have a larger sample size than this study (164 and 446 participants). Moreover, the participants in the previous study conducted by Haling (2022) are university level students who are more experienced in using metacognitive strategies. Further, the instruments used in research conducted by Gazali & Baa (2023), and Septiyanto et al. (2022) also differed from those used in this research, as both employed the Survey of Reading Strategies (SORS) questionnaire. Therefore, it can be concluded that variations in sample size, educational background, and the research instruments used may have significantly influenced the findings of this study.

In contrast, Aini & Akhiriyah (2020), Dang (2024), Kusumawardana & Akhiriyah (2022), Wahyuni et al (2018), and Meniado (2016) found more varied results. Those studies reported that although students' metacognitive awareness was high, there was not always a significant correlation with reading comprehension. This research is in line with the result found in this study, which suggests that other factors such as vocabulary, knowledge of reading strategies, and motivation may be more dominant in influencing reading comprehension. A significant difference between this study and previous research lies in the instruments used. Kusumawardana & Akhiriyah (2022) used the MARSI-R instrument which is the latest version of the MARSI questionnaire. In addition, a study by Aini & Akhiriyah (2022) utilized a SORS questionnaire. In addition, Dang (2024), Wahyuni et al. (2018), and Meniado (2016) focused on university students who had a different level of education from the respondents in this study. Therefore, the difference in instruments and the level of education of the respondents may eventually affect the results of the study.

CONCLUSION

Based on the data analysis, it is indicated that metacognitive reading strategies were not significantly associated with reading comprehension among Grade 12 Indonesian EFL students. Although the correlation coefficient showed a negligible negative direction ($\rho = -0.070$), the relationship was not statistically significant ($p = .487$). Therefore, the findings suggest that students' reported use of metacognitive reading strategies was not significantly related to their reading comprehension performance.

Several factors may help explain these findings. including students' tendency to use metacognitive strategies ineffectively, overestimation of their strategy use, and the tendency to apply reading strategies that do not match with students' actual reading abilities. Further, the findings in this study do not support the previous studies. Instead, the lack of significant correlation suggests that other factors, such as language proficiency, vocabulary size, and familiarity with reading strategies, may suggest a dominant role in students' reading success at this educational level.

Based on the result of this study, it is suggested for future research to apply think-aloud protocols or observational methods that could possibly provide a more accurate picture of how students actually use metacognitive strategies during the reading process. Moreover, involving larger and more diverse samples could also portray the factors that influence the correlation between metacognitive strategies and reading comprehension. Finally, future research should focus more on the interaction between vocabulary, motivation, and the use of metacognitive strategies to improve reading comprehension.

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