The Mediating Role of Students' Metacognitive Awareness between Teachers' Reading Strategies and Students' Reading Performance

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Abstract

This study focused on the impact of teachers' reading strategies on students' reading performance, with a specific emphasis on the role of TOEFL reading instructors in training institutions. The primary objective was to investigate how the reading strategies employed by TOEFL teachers influence students' reading performance, and to determine the mediating effect of students' metacognitive awareness. The participants were teachers and students from TOEFL training institutions in Henan, China. A cross-sectional research design was adopted, and data were collected through questionnaires. The findings indicated that students' metacognitive awareness plays a significant mediating role between teachers' reading strategies and students' reading performance. However, this mediating effect was found to be negative, suggesting that teachers' reading strategies did not enhance students' metacognitive awareness. On the contrary, these strategies may have inadvertently hindered its development, thereby exerting an indirect negative impact on students' reading performance. These results carry important implications not only for improving TOEFL preparation but also for advancing the broader practice of English reading instruction.

Keywords: TOEFL reading, reading strategies, reading performance, metacognitive awareness, TOEFL preparation

1. Introduction

TOEFL reading plays a vital role in the overall TOEFL test (Pramesti, 2023). However, research has indicated that students encounter multiple challenges when addressing TOEFL reading tasks. For example, many students have a limited vocabulary, making it difficult for them to comprehend unfamiliar and complex words in texts (Zhang, 2022). Additionally, their lack of effective reading strategies hinders their ability to grasp content accurately and efficiently, reducing overall reading efficiency (Febriani et al., 2019). Students also often struggle with understanding lengthy complex sentences, which negatively affects their comprehension of an article's overall structure and meaning (Nuraini et al., 2022). More critically, they frequently find it challenging to extract the main ideas and logical relationships from the text, resulting in poor performance on higher-order thinking questions such as those dealing with inference and main idea (Febriani et al., 2019). This ultimately affects their TOEFL reading score improvement.

For Chinese test takers, TOEFL serves as an important criterion for assessing English proficiency and is a key determinant of whether they can successfully pursue study-abroad opportunities (Jiang, 2023). In most English-speaking universities, particularly those in the United States, the TOEFL reading section is often set with a minimum score requirement for admission, highlighting its significance in the admissions process (Li, 2022). In China, TOEFL preparation primarily relies on training institutions, and candidates typically take the test within two to three months after completing the training course (Jiang, 2023). Given TOEFL reading passages' complex structure and academic nature, the reading section places considerable demands on candidates' reading abilities (Zalha et al., 2020; Jaelani et al., 2022). Consequently, reading instruction has become a core component of TOEFL training courses. For candidates aiming for higher scores, professional guidance and strategic training are especially critical for improving test performance (Saif et al., 2021).

Reading is essentially a strategic behavior, with learners required to construct meaning from texts by using various

strategies (Par, 2020). In the context of foreign-language reading, metacognitive awareness is particularly crucial for handling tasks demanding strategic thinking, especially when addressing reading comprehension difficulties (Alkhaleefah, 2023). Metacognitive awareness typically comprises three core components: planning, monitoring, and evaluation (Cao and Lin, 2020). Enhancing this awareness requires learners to actively plan, monitor, and evaluate their cognitive processes to achieve optimal learning outcomes (Andriani and Mbato, 2021). Specifically, metacognition supports learners in constructing meaning during reading and encourages them to reflect on their cognitive processes, identify the strategies employed, and make necessary adjustments. This enables learners to flexibly apply or replace strategies based on varying reading demands, thereby effectively improving reading comprehension (Kusumawardana and Akhiriyah, 2022; Ahmad et al., 2024). Sherina Sania's (2023) empirical research further supports this theoretical framework, demonstrating that students' strategy planning before reading, monitoring during reading, and self-assessment after reading all exert a significant positive impact on their TOEFL reading comprehension performance.

In recent years, the role of metacognitive awareness as a mediating variable between various psychological and educational factors has gradually attracted academic attention and has been empirically validated across multiple domains. For example, Akcaoğlu et al. (2023) found that metacognitive awareness serves as a bridge between self-regulation and critical thinking. Similarly, Bourdeaud'hui et al. (2021), in their examination of the relationship between metacognitive awareness, listening motivation, and critical listening ability, identified its mediating role between motivation and skills—underscoring its broad regulatory function in the learning process. Furthermore, the study by Asare and Larbi (2025) demonstrated that metacognitive awareness not only directly influences mathematics performance but also mediates the relationship between emotional intelligence and academic achievement, thereby highlighting its multifaceted impact on learning outcomes. Collectively, these studies emphasize the pivotal role of metacognitive awareness in enhancing academic performance. However, existing research has yet to clarify its mediating role between teachers' reading strategies and students' TOEFL reading performance. It is therefore necessary to extend the current theoretical framework and investigate the specific mechanisms and pathways through which this mediation operates, in order to provide stronger empirical support and practical guidance for TOEFL reading instruction and strategy training. Therefore, the research questions of this study are as follows:

1. What is the relationship among TOEFL reading teachers' reading strategies, students' metacognitive awareness, and students' TOEFL reading performance?

2. Does students' metacognitive awareness mediate the relationship between TOEFL reading teachers' reading strategies and students' TOEFL reading performance?

2. Literature Review

This section mainly introduces the theoretical basis and hypothesis development of this study.

2.1 Theoretical Background

This section mainly introduces two theoretical foundations supporting this study: the interactive model of reading and metacognitive theory.

2.1.1 The Interactive Model of Reading

The interactive model of reading, proposed by (Rumelhart, 1977), conceptualizes reading as a complex cognitive process that underscores the dynamic interplay between top-down and bottom-up information processing. In this process, bottom-up processing hinges on the reader's ability to recognize fundamental linguistic units within the text, such as letters, words, phrases, and sentences (Nadea, 2021), while top-down processing simultaneously involves the activation of background knowledge, the application of reasoning abilities, and the guidance of reading purposes (Rami et al., 2023; Wang, 2023). Rather than functioning independently, these two processing modes interact dynamically throughout reading, collectively facilitating the construction of meaning (Ma, 2021). Challenging the traditional linear view of reading, this model not only disrupts the conventional "bottom-up one-way decoding" paradigm but also highlights that reading extends beyond mere recognition of surface textual information, ultimately emerging as the outcome of the intricate synergy between low-level linguistic processing and high-level cognitive strategies (Wong, 2020). In TOEFL reading instruction, teachers typically employ a variety of strategies to assist students in comprehending complex academic texts. While readers may initially adopt a bottom-up approach to decode textual information at the lexical and syntactic levels, they often shift to top-down strategies—drawing on inference and background knowledge to construct meaning—when confronted with unfamiliar vocabulary or

syntactically dense sentences, before returning to an integrated understanding of the text as a whole (Kakvand et al., 2022). Overall, the interactive reading model, by synthesizing both top-down and bottom-up processes, offers a more comprehensive representation of the actual cognitive mechanisms involved in reading. This model is widely recognized as the most effective approach for reading comprehension in both first and second language contexts (Yasin and Shah, 2019).

Research indicates that the interactive reading model has extensive applications in the field of reading and demonstrates significant effectiveness across various contexts. Lestari et al. (2023) found that the interactive reading model not only substantially enhanced EFL students' text comprehension but also facilitated schema activation and classroom interaction, thereby underscoring the model's pedagogical significance. Li and Pollatsek (2020) further emphasized that implementing targeted training within this framework can effectively enhance students' reading proficiency, a finding corroborated by Zewdie & Admasu (2023), whose study demonstrated that students who underwent interactive reading training outperformed those in the control group, thereby providing more robust empirical validation for the model. Moreover, Hamid et al. (2024), through empirical research, reaffirmed Rumelhart's interactive theory by revealing the strong correlation between top-down and bottom-up strategies in academic reading, further reinforcing the theoretical foundation of the interactive reading model.

In this study, the model first serves to explain the developmental process of students' reading comprehension ability, emphasizing that comprehension is not dependent on a single information processing method but rather emerges from the dynamic interaction and balance between bottom-up and top-down processing. Furthermore, the model elucidates how students employ these two reading strategies to interpret academic texts, thereby offering theoretical support for the instruction of reading strategies. The interactive reading model posits that reading comprehension results from the interaction between teacher-guided reading strategies and students' cognitive engagement (Ramsa and Rawian, 2021), offering a valuable theoretical perspective for analyzing how teachers' instruction of reading strategies influences students' reading ability and strategic awareness.

2.1.2 Metacognition Theory

Flavell (1979) defined metacognition as an individual's ability to recognize and regulate their own cognitive processes, emphasizing that it comprises three interrelated components: metacognitive knowledge, metacognitive monitoring, and metacognitive experience. Metacognitive knowledge refers to an individual's awareness of their cognitive strengths and limitations, encompassing both internal and external factors that influence cognitive processes (Flavell, 1979), which in turn enables learners to recognize their own learning characteristics and make more informed adjustments to their learning strategies. Metacognitive monitoring, on the other hand, involves the conscious supervision and regulation of cognitive activities (Rivas et al., 2022), a process that includes planning, monitoring, and evaluating cognitive tasks, thereby fostering metacognitive regulation and allowing individuals to optimize their learning by adjusting task objectives, effectively allocating study time, and selecting appropriate cognitive strategies (Kouhpayehzadeh Esfahani et al., 2022). Lastly, metacognitive experience pertains to the cognitive or affective responses individuals generate during cognitive activities (Flavell, 1979), serving as a guiding mechanism that enables learners to continuously refine their initial goals and establish new learning objectives, ultimately contributing to the ongoing optimization of the learning process (Sun et al., 2021). Overall, metacognitive knowledge, metacognitive experience, and metacognitive regulation do not function in isolation but rather interact in a dynamic and iterative manner, collectively facilitating cognitive development (Andriani and Mbato, 2021; Kouhpayehzadeh Esfahani et al., 2022).

Soto et al. (2019) applied metacognitive theory to reading and defined metacognitive processes as reader-controlled strategies, including identifying and focusing on key sections of a text, selecting effective retrieval cues, and evaluating one's readiness for assessments. In recent years, numerous studies (e.g., Muhid et al., 2020; Hou & Deng, 2021) have demonstrated that applying metacognitive theory in reading instruction can significantly enhance students' reading comprehension. Grounded in this theory, the present study explores students' metacognitive awareness of the reading strategies taught by their teachers. Specifically, it investigates how students identify, monitor, and regulate the strategies they use while completing TOEFL reading tasks, thereby assessing the role of metacognitive abilities in the overall reading comprehension process.

In summary, this study, grounded in the interactive reading model, investigates how TOEFL reading teachers' instructional strategies facilitate students' reading comprehension. Simultaneously, drawing on metacognitive theory, it analyzes students' perception and regulation of these strategies throughout the reading process, further examining their mediating role in reading performance. By integrating these perspectives, the study aims to provide both theoretical support and empirical evidence for the refinement and optimization of TOEFL reading instruction.

3. Hypothesis Development

This section outlines the four hypotheses of the study, with Figure 1 providing a detailed representation of the research framework.

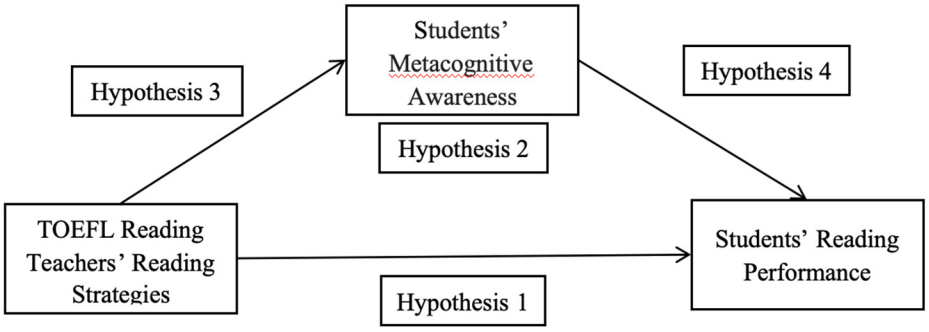

Figure 1. Research Framework

3.1 Relationship between TOEFL Reading Teachers' Reading Strategies and Students' Reading Performance

Reading strategies encompass the various ways in which readers engage with texts, emphasizing how they evaluate, plan, and modify their reading behaviors to enhance comprehension (Kamil, 2020). In the context of TOEFL instruction, the reading strategies employed by teachers specifically refer to the techniques, methods, or approaches they implement to improve students' TOEFL reading comprehension. Given the significance of reading strategies in shaping reading outcomes, Adora et al. (2024) defined reading performance as the ability to effectively decode, comprehend, and interpret written texts, a process that relies on various cognitive factors, including phonological awareness, vocabulary knowledge, and reading fluency. Existing studies have shown that the reading strategies taught by teachers are not always fully adopted by students. Azman et al. (2020) found in Malaysia that a gap exists between the reading strategies taught by teachers and those actually employed by students. This phenomenon was further confirmed in Sieo et al.'s (2022) study, which highlighted the challenges faced by teachers in Malaysian EFL classrooms when teaching reading strategies. Although teachers employed various strategies to enhance students' reading abilities, students did not fully adopt or effectively apply these strategies in actual reading contexts. This disconnect may stem from inconsistencies between teachers' and students' perceptions of reading strategies or from students' difficulties in flexibly applying learned strategies in real-world reading situations, ultimately impacting their reading performance.

H0: There is no correlation between TOEFL reading teachers' reading strategies and students' reading performance.

H1: There is a positive correlation between TOEFL reading teachers' reading strategies and students' reading performance.

3.2 The Mediating Role of Students' Metacognitive Awareness

Metacognitive awareness encompasses an individual's capacity to actively monitor and regulate their own cognitive processes, which involves not only recognizing and evaluating their own behaviors but also understanding the underlying reasons for those behaviors and strategically determining how to apply appropriate learning strategies across diverse contexts to enhance learning effectiveness (Mondal, 2023). Empirical research has consistently validated the mediating role of metacognitive awareness across multiple domains. In the realm of cognitive ability, it moderates the relationship between self-regulation and critical thinking (Akcaoğlu et al., 2023) and serves as a mediator between listening motivation and critical listening skills (Bourdeaud'hui et al., 2021). Within the domain of academic achievement, metacognitive awareness not only mediates the relationship between mathematical attitude and mathematical reasoning ability (Tak et al., 2025) as well as between emotional intelligence and mathematics performance (Asare and Larbi, 2025), but also plays a crucial role in linking parental involvement to academic success (Veas et al., 2019). Furthermore, in the context of examinations, it influences the relationship between test anxiety, listening anxiety, and listening performance (Zhang & Xu, 2025). Beyond academic performance, its significance extends to mental health, where it mediates the relationship between educational stress and school burnout (Sarıçam et al., 2021) and between neurocognition and functional ability (Davies and Greenwood, 2020). In addition, within reading comprehension and critical thinking, it serves as a bridge between reading attitude and

critical thinking tendency (Dinçer and Çilek, 2022), further reinforcing its essential role in shaping learning and cognitive processes.

H2: Metacognitive awareness is a mediating variable between TOEFL reading teachers' reading strategies and students' reading performance.

3.3 Relationship between TOEFL Reading Teachers' Reading Strategies and Students' Metacognitive Awareness

The key role of teachers in reading instruction lies in their ability to support students in developing metacognitive awareness (Mofreh et al., 2024) Research indicates that through systematic metacognitive strategy training, teachers can effectively enhance EFL learners' metacognitive reading strategy awareness, thereby improving their reading comprehension ability (Kallio et al., 2021). Moreover, Nordin and Yunus (2020) emphasized that teachers should deliberately incorporate metacognitive strategies into reading instruction to help students monitor and adjust their understanding during the reading process, thus optimizing their use of reading strategies. Similarly, Do and Le Thu Phan (2021) highlighted that integrating various reading strategies, particularly holistic and supportive approaches, can further enhance students' metacognitive awareness. Further empirical research underscores the positive impact of teacher-instructed reading strategies on students' reading performance. For instance, Muhid et al. (2020) found that when teachers guide students in applying metacognitive strategies, their reading performance improves. Similarly, Haling (2022) demonstrated that students with greater awareness of metacognitive reading strategies tend to achieve better reading outcomes, highlighting the critical role of explicit metacognitive strategy instruction in fostering students' reading abilities.

H3: There is a positive correlation between TOEFL reading teachers' reading strategies and students' metacognitive awareness.

3.4 Relationship between Students' Metacognitive Awareness and Students' Reading Performance

Metacognitive awareness is widely recognized as a key factor influencing reading comprehension (Do and Le Thu Phan, 2021). Researchers generally agree that it plays a crucial role in guiding students to effectively employ reading strategies, thereby enhancing their overall reading performance (Burin et al., 2020; ; Kusumawardana and Akhiriyah, 2022; Alkhaleefah, 2023). Empirical studies provide substantial support for this perspective. (Rosnaeni et al, 2020) identified a significant positive relationship between students' metacognitive awareness and their comprehension of narrative texts. Similarly, Bagci and Unveren (2020) found that among middle school students, metacognitive awareness facilitates the effective use of reading strategies, ultimately improving reading comprehension. In the context of foreign language reading, Alkhaleefah (2023) emphasized that metacognitive awareness is particularly critical for tasks requiring strategic processing to overcome comprehension difficulties. This finding was further reinforced by Sherina Sania (2023), whose study on Indonesian EFL learners demonstrated that students with higher metacognitive awareness achieved better results in the TOEFL reading comprehension section.

H4: Students' metacognitive awareness is positively correlated with their reading performance.

4. Materials and Methods

4.1 Research Design

This study employed a cross-sectional research design and collected data through questionnaire surveys.

4.2 Participants

TOEFL reading teachers and students from fifty TOEFL training institutions in Henan Province participated in this study. The teacher sample consisted of 339 TOEFL reading teachers, and an equal number of TOEFL test takers were included in the student sample. The basic information of TOEFL reading teachers and students is shown in Tables 1 and 2. The table 1 shows that the gender ratio among TOEFL reading teachers is fairly balanced. Regarding English teaching experience, the largest proportion of teachers have 3-5 years of experience, while the smallest proportion have over 10 years. Similarly, when it comes to teaching TOEFL courses, the highest percentage of teachers have 1-3 years of experience, whereas those with more than 7 years make up the smallest group.

Table 1. Basic Information of TOEFL Reading Teachers

		Frequency	Percentage	Valid percentage
Gender	Male	185	54.4	54.6
	Female	154	45.3	45.4
English teaching experience	Less than 3 years	89	26.2	26.3
	3-5 years	126	37.1	37.2
	6-10 years	80	23.5	23.6
	More than 10 years	44	12.9	13
Teaching TOEFL courses	Less than one year	79	23.2	23.3
	1-3 years	140	41.2	41.3
	4-6 years	66	19.4	19.5
	More than 7 years	54	15.9	15.9

As shown in the table 2, there is little variation in the proportion of students by gender. Regarding years of English learning, 1-3 years has the highest proportion, while more than 7 years has the lowest. When it comes to the TOEFL test, the percentage of students who have taken it is slightly higher than those who have not. In terms of weekly study time, 3-6 hours is the most common, whereas more than 10 hours is the least frequent.

Table 2. Basic Information of Students

		Frequency	Percentage	Valid percentage
Gender	Male	177	52.2	52.2
	Female	162	47.8	47.8
Years of Learning English	Less than one year	88	26	26
	1-3 years	100	29.5	29.5
	4-6 years	82	24.2	24.2
	More than 7 years	69	20.4	20.4
Taken the TOEFL Exam	Yes	195	57.5	57.5
	No	144	42.5	42.5
	Total	339	100	100
Time Spent Learning English Per Week	Less than three hours	93	27.4	27.4
	3-6 hours	95	28	28
	7-10hours	82	24.2	24.2
	More than 10 hours	69	20.4	20.4

4.3 Instrument Development

This study employed three key measurement tools: the TOEFL reading teachers' reading strategy scale, the students' reading performance scale, and the metacognitive awareness scale. The instruments were adapted from established studies by Bezic (1998), Mokhtari & Sheorey (2002), and Cotteral (1991) respectively. Reliability analysis and Confirmatory Factor Analysis (CFA) were conducted on the collected questionnaire data. As demonstrated in the CFA results (Figure 2), the measurement model showed good construct validity.

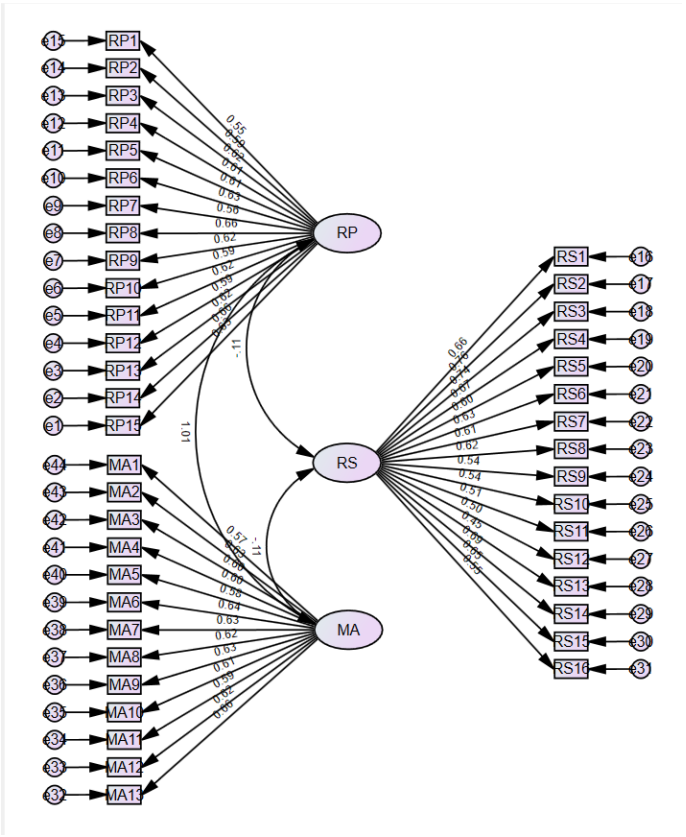

Figure 2. Confirmatory Factor Analysis (CFA)

(Note: RS represents TOEFL reading teachers' reading strategies; RP represents students' reading performance; MA represents students' metacognitive awareness.)

And model fit indices (Table 3) established standards (Hu and Bentler, 1999). In terms of absolute fit, the model achieved a CMIN/DF value of 1.813, which is below the ideal threshold of 3, and an RMSEA of 0.042, indicating excellent fit. Regarding incremental fit, both the CFI (0.878) and IFI (0.880) approached the commonly accepted benchmark of 0.9, suggesting a reasonably good fit. Furthermore, the parsimony fit indices—RFI (0.743) and TLI (0.866)—exceeded the recommended minimum threshold of 0.5, further confirming the adequacy of the model.

Table 3. Model Fit Indices

Model Fit Indices			
Common Indices	Criteria	Statistical value	Goodness of fit
CMIN	-	1629.987	-
DF	-	899	-
CMIN/DF	<3 Ideal, <5 Acceptable	1.813	Very Good
RMSEA	<0.05 Ideal, <0.08 Acceptable	0.042	Very Good
NFI	>0.9 Ideal, >0.8 Acceptable	0.776	Fair
RFI	>0.9 Ideal, >0.8 Acceptable	0.743	Fair
IFI	>0.9 Ideal, >0.8 Acceptable	0.880	Fair
TLI	>0.9 Ideal, >0.8 Acceptable	0.866	Fair
CFI	>0.9 Ideal, >0.8 Acceptable	0.878	Fair

Table 4. Factor Loading Coefficient

Item	Factor	**Estimate**	**S.E.**	**C.R.**	**P**	CR	AVE
RP15	RP	1				0.99	0.87
RP14	RP	1.099	0.103	10.651	***		
RP13	RP	1.051	0.104	10.085	***		
RP12	RP	0.938	0.098	9.596	***		
RP11	RP	1.034	0.102	10.132	***		
RP10	RP	0.919	0.095	9.694	***		
RP9	RP	0.967	0.097	10.01	***		
RP8	RP	1.09	0.102	10.641	***		
RP7	RP	0.873	0.095	9.234	***		
RP6	RP	1.02	0.099	10.266	***		
RP5	RP	0.998	0.101	9.904	***		
RP4	RP	0.995	0.1	9.963	***		
RP3	RP	0.999	0.1	10.007	***		
RP2	RP	0.951	0.098	9.694	***		
RP1	RP	0.894	0.098	9.112	***		
RS1	RS	1					
RS2	RS	1.23	0.101	12.191	***		
RS3	RS	0.939	0.079	11.849	***		
RS4	RS	1	0.092	10.9	***		
RS5	RS	0.817	0.082	9.927	***		
RS6	RS	0.92	0.088	10.403	***		
RS7	RS	0.964	0.096	10.042	***		
RS8	RS	0.886	0.087	10.237	***		
RS9	RS	0.791	0.087	9.059	***		
RS10	RS	0.724	0.081	8.993	***		
RS11	RS	0.707	0.082	8.62	***		
RS12	RS	0.696	0.083	8.438	***		
RS13	RS	0.624	0.082	7.642	***		
RS14	RS	1.122	0.1	11.222	***		
RS15	RS	0.866	0.082	10.595	***		
RS16	RS	0.694	0.075	9.216	***		
MA13	MA	1					
MA12	MA	0.958	0.092	10.408	***		
MA11	MA	0.915	0.091	10.092	***		
MA10	MA	0.969	0.093	10.388	***		
MA9	MA	0.946	0.089	10.57	***		
MA8	MA	0.932	0.089	10.508	***		
MA7	MA	0.932	0.087	10.658	***		
MA6	MA	0.968	0.09	10.731	***		
MA5	MA	0.879	0.089	9.831	***		
MA4	MA	0.911	0.089	10.239	***		
MA3	MA	0.907	0.09	10.118	***		
MA2	MA	1.026	0.096	10.631	***		
MA1	MA	0.871	0.089	9.736	***		

(Note: RS represents TOEFL reading teachers' reading strategies; RP represents students' reading performance; MA represents students' metacognitive awareness.)

The reliability analysis revealed strong internal consistency across all constructs, with composite reliability (CR) values exceeding the recommended threshold of 0.7 (Table 4). Convergent validity was also established, as all average variance extracted (AVE) values were above 0.5, in line with Fornell and Larcker's (1981) criteria. Additionally, all factor loadings were statistically significant ($p < 0.001$) and exceeded 0.6, indicating strong relationships between items and their respective latent factors (Table 2). These results confirm that the measurement model possesses adequate psychometric properties for examining the hypothesized relationships among teachers' reading strategies, students' metacognitive awareness, and reading performance. Key findings from the instrument validation further reinforce this conclusion: the reading performance scale demonstrated particularly high reliability (CR = 0.99, AVE = 0.87), all 15 items in the metacognitive awareness scale showed strong factor loadings above 0.87, and the 16 items of the reading strategy scale exhibited consistent factor patterns. Overall, these findings are consistent with contemporary test validation standards (Awang, 2012) and affirm the suitability of the instruments for investigating the mediation model proposed in Figure 2.

4.4 Data Collection

The researcher first obtained the contact information of the managers of fifty TOEFL training institutions through their official websites. Subsequently, the researcher contacted each manager individually, explaining in detail the purpose of the study and the specific data required. The managers expressed their willingness to support the research and conveyed the relevant information to their institutions' TOEFL reading teachers and students. According to the managers' feedback, both teachers and students expressed their willingness to participate in the study. The researcher then sent the questionnaires via email to the fifty managers, who in turn forwarded them to the participating teachers and students at their respective institutions. To ensure participant privacy, all questionnaires were completed anonymously. After completing the questionnaires, teachers and students submitted them to their respective institution managers, who then compiled and returned the data to the researcher.

4.5 Data Analysis

SPSS 24.0 and AMOS 26.0 were employed for data analysis. First, correlation analysis was conducted to explore the interrelationships among the variables. Then, the Process method was used to examine the mediating effect of metacognitive awareness.

5. Results

5.1 The Relationship among TOEFL Reading Teachers' Reading Strategies, Students' Metacognitive Awareness, and Students' TOEFL Reading Performance

The correlation analysis (Table 5) presents the correlation coefficients among the three variables: reading strategies, reading performance, and metacognitive awareness. The correlation coefficient between reading strategies and reading performance is -0.106, suggesting a weak negative relationship; however, this correlation is not statistically significant. In general, a correlation coefficient with an absolute value greater than 0.3 is considered indicative of a moderate to strong relationship. In contrast, the correlation between reading performance and metacognitive awareness is 0.906**, indicating a very strong and statistically significant positive correlation at the 0.01 level. The correlation coefficient between reading strategies and metacognitive awareness is -0.115, also reflecting a weak negative and non-significant association. While these results provide a preliminary understanding of the relationships among the variables, correlation analysis alone is insufficient to determine whether metacognitive awareness functions as a mediating variable. To examine the mediating role of metacognitive awareness, a formal mediation analysis is required to assess whether reading strategies influence reading performance indirectly through metacognitive awareness.

Table 5. Correlation Analysis

Dimension	Reading Strategies	Reading Performance	Metacognitive Awareness
Reading Strategies	1		
Reading Performance	-0.106	1	
Metacognitive Awareness	-0.115	.906**	1

(Note: RS represents TOEFL reading teachers' reading strategies; RP represents students' reading performance; MA represents students' metacognitive awareness.)

5.2 The Mediating Role of Students' Metacognitive Awareness between TOEFL Reading Teachers' Reading Strategies and Students' Reading Performance

Based on the mediation analysis (Table 6) results presented above, the following conclusions can be drawn:

The total effect of reading strategies on reading performance (c) was negative and approached statistical significance (B = -0.1073, p = 0.0517), suggesting a potential indirect relationship. However, the direct effect of reading strategies on reading performance (c′) was not significant (B = -0.0014, p = 0.9534), indicating that when metacognitive awareness was included in the model, the direct influence of reading strategies on performance diminished almost entirely. In contrast, the indirect effect of reading strategies on reading performance through metacognitive awareness was significant (a × b = -0.1059, 95% CI = \[-0.1965, -0.0146]). Since the confidence interval does not include zero, this confirms the presence of a significant mediation effect. The fully standardized indirect effect (β = -0.1044) further supports this conclusion. In addition, the regression coefficient for the path from reading strategies to metacognitive awareness (a) was significant (B = -0.1178, p = 0.0339), and the path from metacognitive awareness to reading performance (b) was strongly positive and highly significant (B = 0.8992, p < 0.001). These results indicate that metacognitive awareness fully mediates the relationship between reading strategies and reading performance. In summary, although reading strategies do not directly influence TOEFL reading performance, they exert a significant indirect effect through metacognitive awareness, highlighting the critical role of students' metacognitive development in enhancing reading outcomes.

Table 6. Mediation Effect Analysis

Variable	Model	Regression Coefficient (B)	Standard Error (SE)	t	p	95% Confidence Interval	Standardized Coefficient (β)
MA	MA = a × RS + c'	-0.1178	0.0553	-2.1302	0.0339	[-0.2265, -0.0090]	-0.1153
RP	RP = b × MA + c'	0.8992	0.0231	38.9936	0	[0.8538, 0.9446]	0.906
RP	Total Effect Model (c)	-0.1073	0.0549	-1.9528	0.0517	[-0.2153, 0.0008]	-0.1058
RP	Direct Effect (c')	-0.0014	0.0236	-0.0584	0.9534	[-0.0477, 0.0450]	-0.0014

Effect Type	Effect Value	Bootstrap Standard Error	95% Confidence Interval	Significance
Total Effect (c)	-0.1073	-	[-0.2153, 0.0008]	Approaching significance (p = 0.0517)
Direct Effect (c')	-0.0014	-	[-0.0477, 0.0450]	Not significant (p = 0.9534)
Indirect Effect (a × b)	-0.1059	0.0458	[-0.1965, -0.0146]	Significant (confidence interval does not include 0)
Fully Standardized Indirect Effect	-0.1044	0.0449	[-0.1924, -0.0145]	Significant (confidence interval does not include 0)

6. Discussion

Based on the interactive reading model and metacognitive theory, this study explored the relationship between TOEFL reading teachers' reading strategies, students' metacognitive awareness, and students' reading performance. The results revealed a complex interaction among the three variables. In particular, the way in which strategy instruction translates into students' actual performance appears to diverge from traditional assumptions.

Firstly, although reading strategies are theoretically assumed to enhance reading comprehension (Lestari et al., 2023; Li and Pollatsek, 2020; Kamil, 2020), the results suggest that strategies taught by teachers do not necessarily translate into improved student performance. Consistent with previous studies, such as Azman et al. (2020) and Sieo

et al. (2022), this study confirms a gap between the strategies taught and those actually used by students. Factors such as students' limited understanding, cognitive differences between teachers and students, and time pressure in exams may contribute to this disconnect. Therefore, simply teaching reading strategies may not directly improve reading performance without also fostering metacognitive awareness.

Secondly, this research result aligns with previous research emphasizing the mediating role of metacognitive awareness in learning processes, such as its mediation between self-regulation and critical thinking, intelligence and academic achievement, and test anxiety and test performance (Akcaoğlu et al., 2023; Asare and Larbi, 2025; Zhang and Xu, 2025). In reading comprehension, metacognitive awareness enables learners to actively regulate their cognitive activities, bridging the gap between reading attitude and critical thinking (Dincer and Çilek, 2022) and connecting teachers' strategy instruction with students' performance. As conceptualized by Flavell (1979) and later supported by Andriani and Mbato (2021), Rivas et al. (2022), and Kouhpayehzadeh Esfahani et al. (2022), the dynamic interaction of metacognitive knowledge, monitoring, and experience allows learners to adjust strategy use in real time. Therefore, in TOEFL reading instruction, simply teaching strategies is insufficient; systematic training in metacognitive skills is crucial. Instruction should focus on developing students' self-regulation abilities, encouraging reflection, goal setting, and strategy optimization, to support both immediate TOEFL success and long-term academic reading development.

Additionally, the influence of teachers' strategy instruction on students' metacognitive awareness reveals a concerning pattern. While previous research emphasizes the role of teachers in fostering metacognitive awareness through systematic strategy training (Kallio et al., 2020; Muhid et al., 2020; Do and Le Thu Phan, 2021), this study suggests that reading strategy instruction may not achieve this goal in practice and may even have a negative impact. This could be linked to the TOEFL reading test's structure, which mainly uses multiple-choice questions, allowing students to answer correctly without deep comprehension, often relying on test-taking strategies or strategic guessing (Wathoni et al., 2022). As a result, students may focus more on problem-solving techniques than on developing effective reading strategies, reducing their strategic flexibility in real-world reading situations (Wang and Leng, 2023; Liu and Li, 2023). Thus, overreliance on teacher-delivered strategies may not improve students' metacognitive awareness. Teachers should instead adopt more interactive methods that encourage students to reflect on their reading processes and develop self-monitoring and self-regulation skills.

Finally, the results of this study are consistent with the academic consensus that metacognitive awareness enables students to effectively apply reading strategies and optimize the reading process (Burin et al., 2020; Kusumawardana and Akhiriyah, 2022; Alkhaleefah, 2023; Shah et al., 2024), a view that has been supported by numerous empirical studies (e.g., Rosnaeni et al., 2020; Bagci and Unveren, 2020; Alkhaleefah, 2023). In the context of the high-pressure, time-limited TOEFL reading test, where flexible strategy use is crucial, metacognitive awareness becomes a key factor. Students with higher metacognitive awareness are better able to monitor their comprehension, adjust strategies based on question types, optimize reading speed, and correct errors, thus improving both efficiency and accuracy (Sherina Sania, 2023).

In general, the findings of this study reveal that the relationship between strategy instruction, metacognitive awareness, and reading performance in TOEFL reading instruction is more complex than initially anticipated, as teachers' reading strategies are not always effectively internalized and applied by students. Particularly within an exam-oriented learning environment, where students tend to prioritize problem-solving techniques over a genuine mastery of reading strategies, the development of metacognitive awareness may be constrained. Rather than merely focusing on the direct instruction of reading skills, fostering students' metacognitive awareness—enabling them to actively monitor, adjust, and refine their strategy use—may prove to be a more effective pedagogical approach. Consequently, TOEFL reading instruction should transcend the traditional model of strategy transmission and instead emphasize the cultivation of students' self-regulation abilities, guiding them to engage in reflective thinking about the reading process, establish learning objectives, and optimize strategy selection, thereby ensuring not only short-term benefits during test preparation but also the long-term capacity to flexibly apply these skills in academic reading contexts, ultimately fostering sustained reading development and autonomous learning enhancement.

7. Conclusion

According to the core findings of this study, there are complex interrelationships among teachers' strategy use, students' metacognitive awareness, and students' reading performance in TOEFL reading instruction. Although traditional teaching theories generally posit that reading strategies can enhance students' reading comprehension, the results of this study indicate that relying solely on teacher-taught strategies is insufficient to directly translate into

improved student performance. On the contrary, metacognitive awareness plays a crucial bridging role in how students understand, select, and adjust strategies. In the current test-oriented teaching context, teachers should not only focus on imparting strategies but also emphasize the cultivation of students' metacognitive abilities, such as self-monitoring, reflection, and regulation. Moreover, this study highlights the importance of aligning strategy instruction with students' actual cognitive levels and learning contexts. Instruction should be more personalized and interactive to help students truly internalize the strategies and transform them into long-term reading competencies. Therefore, this study holds significant theoretical and practical implications for optimizing TOEFL preparation, improving the quality of English reading instruction, and supporting teachers' professional development. Future research could further explore the specific mechanisms by which different types of reading strategies affect students' metacognitive awareness across various instructional contexts, with particular attention to how instructional design can be refined to effectively promote students' metacognitive growth.

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