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A Systematic Review on the Relationship between Metacognitive Reading Strategies and English Reading Performance

Liuyang Fan, Abu Bakar Razali* and Nooreen Noordin
Faculty of Educational Studies, Universiti Putra Malaysia (UPM)
Selangor, Malaysia

Abstract. Metacognitive reading strategies (MRS) are commonly used in ESL/EFL contexts to refer to the strategies students utilize to plan, monitor, and control their reading process. MRS are widely acknowledged as a significant factor impacting English reading performance. However, although numerous studies have been conducted on this topic, research findings remain inconsistent. Existing reviews have not yet fully synthesized the evidence regarding the relationship between MRS and English reading performance, nor the evidence on interventions, within the ESL/EFL context over the past decade. In contrast to previous reviews, this study integrates evidence from both MRS correlational studies and intervention studies, and updates research findings from the past decade. As such, this study conducted a systematic review of 50 studies published in peer-reviewed journals between 2016 and 2026, covering ESL/EFL learners at various educational levels, to comprehensively analyze the relationship between MRS and English reading performance and to evaluate the impact of relevant interventions on English reading performance. Most studies report an overall positive relationship between MRS and English reading performance. Among the three dimensions of strategies, problem-solving strategies are frequently found to be associated with better English reading performance. Furthermore, intervention studies have shown that both instructional classroom strategies and technological support interventions have a positive impact on the reading performance of ESL/EFL learners. These findings support the more systematic integration of explicit MRS into English reading teaching and suggest that future research should focus further on samples from different educational stages, as well as on the design of longitudinal interventions.

Keywords: Metacognitive reading strategies; English reading performance; English as a foreign language; English as a second language; systematic review

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*Corresponding author: Abu Bakar Razali; *abmr_bakar@upm.edu.my*

1. Introduction

In English as a Second Language (ESL) and English as a Foreign Language (EFL), reading is widely recognized as a fundamental component of English language acquisition. English reading ability is not only related to reading comprehension itself but also exhibits an enormous effect on learners' English reading performance and academic achievements (Leighton & Gierl, 2011; Novita Sari & Fauziyyah, 2026). Moreover, outside of a native English context, written texts are the main input channel for ESL and EFL learners to learn English. In the process of foreign language learning, limited vocabulary, intricate sentence structures, and insufficient background knowledge are prevalent obstacles that hinder learners' reading ability (Anggita Nasution et al., 2026; Tang et al., 2025).

Consequently, reading strategies that enable ESL/EFL learners to plan, monitor, and regulate their reading process have increasingly gained attention in research. Metacognitive reading strategies (MRS), which enhance learners' ability to manage the reading process, have gradually emerged as a key concept in English reading research. Mokhtari and Sheorey (2002) define metacognitive reading strategies as the strategic behaviors learners engage in to monitor and regulate their reading activities during the reading process. Unlike cognitive strategies, which focus more on the direct manipulation of textual information, MRS focus more on planning, monitoring, and regulating the reading comprehension process.

From a theoretical perspective, MRS are grounded in Flavell's (1976) theory of metacognition which emphasizes individuals' awareness, monitoring, and regulation of their own cognitive processes. In English reading, learners regulate and manage their reading process through planning, monitoring, and evaluating. Therefore, discussing the relationship between MRS and English reading performance provides insight into its role in the reading process. Meanwhile, schema theory emphasizes that reading comprehension depends on the integration of prior background knowledge and textual information whereby learners are required to combine them to understand what they read. This theory provides a complementary perspective for explaining how relevant interventions may influence reading performance.

In reading, MRS typically manifest as the learner’s planning and text prediction before reading, which establishes an initial framework for understanding the text while during reading they monitor their comprehension and choose appropriate strategies to cope with obstacles. After reading, learners evaluate their overall reading performance and the effectiveness of their strategies, helping them to make more effective strategy choices and improve their understanding of textual information in subsequent readings (Oxford, 1990). The prediction, monitoring, diagnosis, adjustment and evaluation cycle that learners engage in during the reading process effectively promotes the processing and integration of the information in the reading text, further enhancing their English reading proficiency. Mokhtari and Sheorey (2002) further categorized MRS into global, problem-solving, and support strategies. As this framework has been widely

adopted in existing research, this study primarily relies on this classification to interpret and discuss MRS.

Previous research has extensively examined the relationship between metacognitive reading strategies and English reading, with many studies using questionnaires to measure learners' MRS level with a large sample (Alshehri et al., 2025; Domingo & Casanova, 2022; Moradi et al., 2023; Novita Sari & Fauziyyah, 2026; Sarbazi et al., 2021). However, existing research has not been entirely consistent in its choice of MRS measurement instruments, for instance, using MARSI, SORS, and various adapted versions of these scales. These measurement differences may affect the reliability and comparability of research results.

Overall, while these past studies have generally shown a positive correlation between MRS and English reading, there are also inconsistencies. These differences may be related to variations in learner populations and educational levels, the extent of instructional support, and differences in research design and measurement methods. Some studies have found a weak or even negative correlation, while others have reported no significant association between MRS and English reading comprehension (Alshehri et al., 2025; Carcamo, 2023; Dang, 2024; Domingo & Casanova, 2022).

In addition, some studies have reported that the relationship between the overall MRS and English reading are unrelated, but a specific sub-dimension is related to English reading and significantly predicts English reading comprehension achievement (Rianto, 2022). This indicates that measuring MRS at the overall level may neglect the differential effects of strategies across different dimensions, whereas a particular subdimension may have a significant or opposite effect on predicting English reading performance. Additionally, other studies have shown that MRS do not always have a straightforward impact on English reading performance but may have an indirect impact through factors such as self-regulation (Amini et al., 2020). This indicates that the relationship between MRS and English reading performance may not be a simply linear one, as it could be influenced by other mediating variables.

The variability and complexity of these results suggest that relying solely on individual empirical studies may not provide a comprehensive understanding of the overall trends in the relationship between MRS and English reading performance. Therefore, it is necessary to conduct a systematic review to comprehensively analyze the evidence regarding the relationship between metacognitive reading strategies and English reading. Additionally, it is crucial to further investigate the overall trends between these two variables and the reasons for inconsistent findings, based on the results of correlation studies and evidence from intervention studies.

Existing reviews have examined the relationship between metacognitive reading strategies and English reading from various perspectives (Kan et al., 2024; Wongdaeng & Higgins, 2022; Yulita & Napitupulu, 2023). Kan et al. (2024) highlight the positive impact of MRS on improving English reading

comprehension and point out the significant influence of problem-solving strategies while Wongdaeng and Higgins (2022) focused on the effectiveness of metacognitive reading interventions in ESL/EFL, summarizing the positive effects of these interventions on English reading and Yulita and Napitupulu (2023) summarized the research topics related to MRS, measurement methods, and usage characteristics among different learners within the broader context of EFL. However, these reviews focus on specific types of evidence, specific educational stages, or broad topics and neither comprehensively integrate relevant evidence and intervention evidence from the past decade in the context of ESL/EFL nor systematically compare the overall trends and differences between the two.

Therefore, this study systematically reviews relevant research published in peer-reviewed journals between 2016 and 2026 to examine the relationship between metacognitive reading strategies and English reading performance in ESL/EFL contexts, and to evaluate the effectiveness of related interventions. Compared to previous reviews, this study integrates both correlational evidence and intervention research evidence from the past decade in the context of ESL/EFL, focusing on the overall trends and differences in the relationship between the two, thereby filling a gap in this field. This study provides systematic evidence for educators and researchers and highlights the overall trends and variations in research in this field.

It furthermore provides recommendations for instructional strategies in EFL/ESL reading teaching as well as directions for future research. This review paper focuses on answering the following questions: a) What is the relationship between metacognitive reading strategies and English reading performance? b) In intervention studies, do interventions related to metacognitive reading strategies improve the English reading performance of ESL/EFL learners?

2. Methodology

This review follows the 2020 framework "Preferred Reporting Items for Systematic Reviews and Meta-Analyses" (PRISMA) (Page et al., 2021) guidelines to ensure that no relevant literature is omitted and to guarantee process transparency and reproducibility. The collection of relevant literature is based on the main steps of PRISMA: identification, screening, eligibility, data included.

This study searched for relevant literature from 2016 to 2026 using three academic databases: Web of Science (WOS), Scopus, and Educational Resources Information Center (ERIC). The literature search was conducted in January 2026with the selected literature limited to peer-reviewed journals published in English. The core search string was: ("metacognitive reading strategies" OR "metacognitive strategies" OR "MARSI" OR "SORS") AND ("English reading" OR "reading comprehension outcome" OR "reading performance" OR "reading achievement"). When conducting a specific search, it is necessary to make appropriate adjustments based on the search requirements of each database.

The inclusion criteria for this review were: 1) the research location was in an EFL or ESL environment; 2) the research topic focused on English reading rather than the other three English skills; 3) the research emphasis was on the relationship between metacognitive reading strategies and English reading performance or intervention studies. The inclusion and exclusion criteria for data collection are presented in Table 1.

Table 1: Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Time range	2016-2026	Before 2016
Language	English article	Not English article
Methodology	Empirical, peer-reviewed, and indexed journal articles	Thesis, review article, conference proceedings, editorial, meta-analysis paper
Study result	Research data or results are clearly reported	Research data or results are not clearly reported
Topic	ESL/EFL English reading	Not ESL/EFL English reading
Content	Regarding the relationship between MRS and English reading performance, or related MRS interventions	Not related to MRS or English reading performance

Furthermore, correlational and interventional studies have slightly different inclusion criteria, which are clarified below. Correlational studies should include measurements of learners' levels of MRS and use reading assessment tools to evaluate English reading performance, while reporting the relationship between the two. Questionnaire measurement tools are not limited to one fixed MRS scale (e.g., MARSI, SORS, etc.), rather they may include complete scales, adapted scales, or versions with selected items. In intervention studies, teaching, training or technical interventions related to metacognitive reading strategies must be included, and the measurement of English reading performance should also be reported.

After setting the time limit (from 2016 to 2026), language (English), and text type (articles), a total of 1156 records were retrieved from three databases. Specifically, 228 records were obtained from Web of Science, 148 from Scopus, and 780 from ERIC. After merging the three databases, using the EndNote (2021) tool, 595 duplicate records were eliminated. The remaining 561 records then moved on to the next step of title and abstract review. At this stage, a total of 416 records were excluded, and 145 studies proceeded to the full-text review stage. After a full-text assessment based on the inclusion and exclusion criteria, a total of 95 studies were excluded, and 50 empirical studies were ultimately included.

During the title and abstract screening phase, we primarily excluded studies conducted outside of ESL/EFL contexts, non-English reading texts, non-empirical studies, participants who were not ESL/EFL learners, and studies unrelated to English reading performance. During the full-text evaluation stage, studies that didn't utilize MRS assessment instruments, didn't report learners' level of MRS,

didn't measure English reading performance, or didn't examine the relationship between the two were excluded. Moreover, interventional studies that did not clearly report the English reading performance were also excluded. Figure 1 illustrates the detailed process.

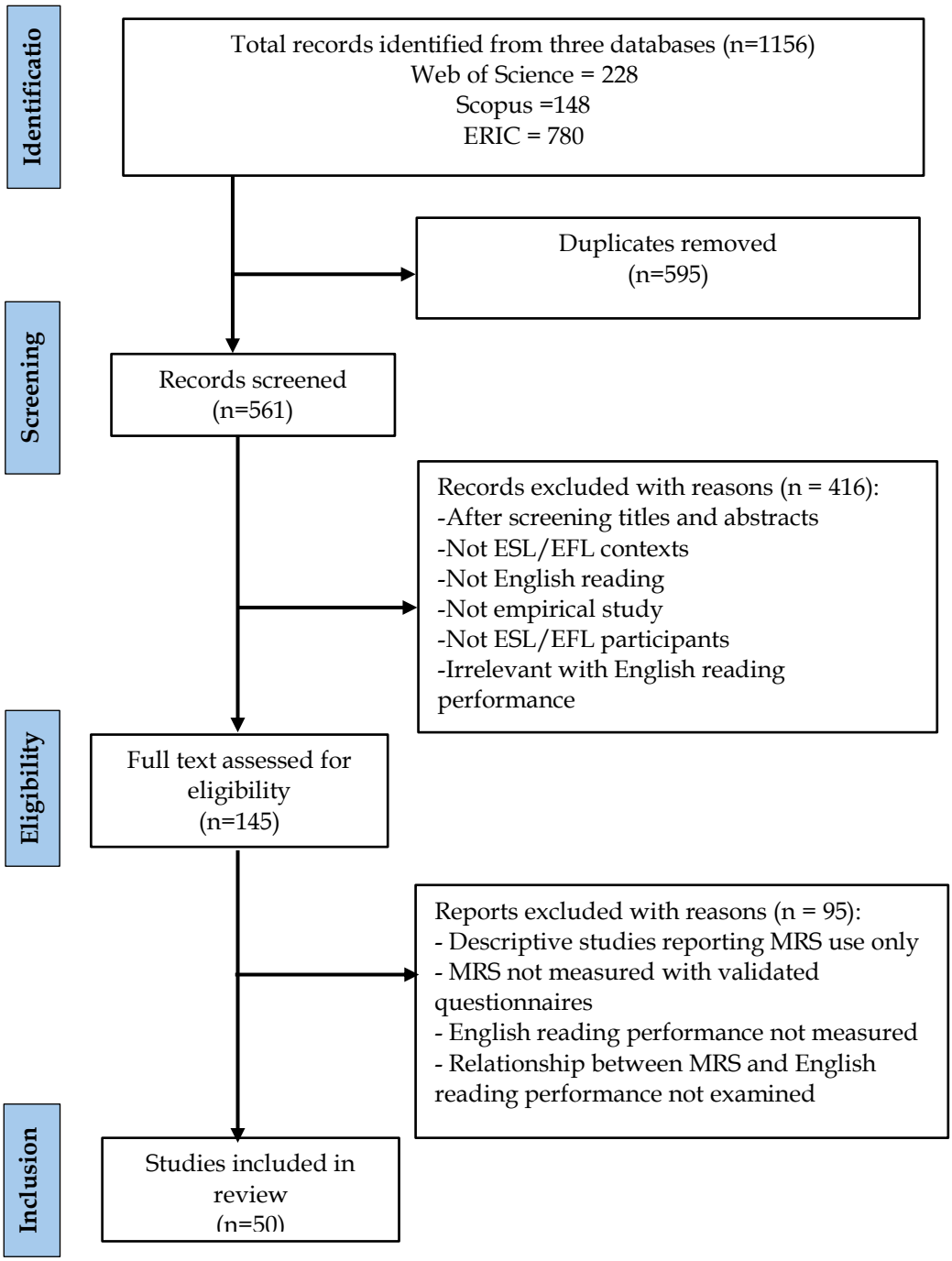

Figure 1: Flowchart of the systematic review process

After completing the screening process, this paper extracted and analyzed the basic information and key findings of the studies ultimately included in the

analysis. English reading performance is the core outcome variable in this review, encompassing English reading comprehension, reading outcome, and reading achievement, and is typically measured using standardized or self-administered reading tests. The extracted content includes the research context, learner types, educational level, research design, MRS assessment tools, methods for measuring English reading performance, types of intervention and key findings. Correlational studies primarily summarize the direction, significance, and sub-dimension differences in the relationship between MRS and English reading performance, while intervention studies summarize the types of interventions, their duration, and their effects. This review is primarily based on the three-category framework proposed by Mokhtari and Sheorey (2002), which includes global strategies, problem-solving strategies, and support strategies.

3. Results

As many as 1156 records were retrieved from three databases: Web of Science (WOS), Scopus, and Education Resources Information Centre (ERIC). Finally, 50 articles in full text from various academic journals were included in this review. This section begins by outlining the fundamental characteristics of the included research articles and then presents the analysis on the relationship between metacognitive reading strategies (MRS) and English reading performance, as well as the evidence analysis on the effect of intervention studies of MRS on English reading performance, respectively.

3.1 Background Information on Selected Studies

Table 2 displays the fundamental characteristics of the included articles and shows that, between 2016 and 2026, research articles examining the relationship between MRS and English reading performance among ESL/EFL learners were roughly balanced between correlational studies (n=27) and intervention studies (n=23). This indicates that research in this field focuses on both the relationship between MRS and English reading and the effects of strategies instruction or intervention training related to MRS on English reading performance.

From the perspective of the study population, the included studies primarily focused on learners at the university stage (n=34), with relatively few studies involving senior high school (n=6), junior high school (n=5), and elementary school (n=2) learners, indicating that the current evidence largely reflects the situation of ESL/EFL learners in higher grades. Regarding the measurement of reading outcomes, most studies employed standardized tests such as IELTS, TOEFL, GEPT, and FCE, although a significant number also utilized self-developed reading tests. Generally, existing research primarily focuses on learners in higher grades and employs both standardized instruments and self-developed tests to measure reading outcomes.

Table 2: Basic Characteristics of the Overall Selected Studies (N=50)

Items	Type	N
Research Type	Relational	27
	Intervention	23
Research subjects	Primary School	2
	Junior High School	5
	High School	6
	University	34
	Others	3
Reading Test Types	Standardized	30
	Non-standardized	20

3.2 Main Findings

By examining the 50 relevant studies included, the following characteristics are presented: the diversity of the relationship between metacognitive reading strategies and English reading performance. The results of the intervention studies are generally consistent in direction.

3.2.1 MRS Scale Types

This subsection first summarizes the MRS measurement tools used in relational studies within this review to provide an overall understanding of MRS measurement tool types. Subsequently, it describes the distribution of the relationship directions between MRS and English reading performance.

Table 3 presents the statistical results of the number of MRS scale types. Among the 27 relational studies, English reading performance primarily encompassed English reading achievement, outcome, and comprehension. Twenty studies employed the classic MRS scale, such as the Metacognitive Awareness of Reading Strategies Inventory (MARSI) developed by Mokhtari and Reichard (2002); the Metacognitive Awareness of Reading Strategies Inventory-Revised (MARSI-R) (Mokhtari et al., 2018); the Survey of Reading Strategies (SORS) developed by Mokhtari and Reichard (2002); and the Online Survey of Reading Strategies (OSORS) adapted from SORS by Anderson (2003). Items within these four instruments (MARSI, MARSI-R, SORS, OSORS) typically measure metacognitive awareness across three dimensions: global strategies, problem-solving strategies, and support strategies.

In addition to the commonly used scales mentioned above, other studies employed adapted or self-developed questionnaires. Specifically, one study utilized the Metacognitive Reading Strategy Questionnaire (MRSQ) revised by Abu-Rabia (2018) based on Mokhtari and Sheorey's (2002) Survey of Reading Strategies (SORS.) Two studies didn't use complete scales, instead selecting only some items from the planning, monitoring, and evaluation dimensions for measurement. Additionally, two studies developed their own questionnaire tools based on previous metacognitive reading strategies-related questionnaires, drawing from those developed by Phakiti (2006) and Zhang and Seppho (2013). One study employed the Metacognitive Reading Strategies Questionnaire (MRSQ) (Taraban et al., 2004), while another utilized the Metacognitive and Cognitive

Strategy Use Questionnaire (MCSUQ), which incorporates a metacognitive reading strategies dimension (Zhang et al., 2014).

Although the MRS-related questionnaire tools used across the 27 studies varied slightly in terms of item count and wording, the core components of all questionnaires focused on the behavioral aspects of monitoring and regulation strategies in English reading. Furthermore, all studies reported the directional relationship between specific metacognitive reading strategies and English reading performance.

Table 3: Types of Metacognitive Reading Strategies Questionnaire

Items	Type	N
Metacognitive Reading Strategies Questionnaire	MARSI	6
	MARSI-R	2
	SORS	9
	OSORS	3
	Others	7

3.2.2 RQ1: What is the relationship between metacognitive reading strategies and English *reading performance?*

A comprehensive analysis of the included studies indicates a positive correlation between metacognitive reading strategies and English reading performance. Nevertheless, not all these studies' results are consistent. A few demonstrate that the relationship between the two is not significant, and others indicate that the relationship between different dimensions and MRS varies. In addition, some research findings suggest that the impact of MRS on English reading performance may be mediated by variables such as reading motivation or self-regulation. This shows that MRS generally has a positive effect on English reading performance, but the strength of this effect may vary depending on the study participants, the dimensions of the strategies, the measurement tools, and the mediating variables.

In the research that found positive relationships between metacognitive reading strategies (MRS) and English reading performance, 12 studies investigated the correlation between learners' overall MRS scores and English reading performance. In general, learners with higher overall MRS level demonstrate better English reading performance, whether at the secondary or higher education level. This trend remains relatively consistent in both ESL and EFL contexts. For instance, Muche et al. (2023) found that overall MRS level significantly correlated with TOEFL reading scores among 150 EFL students in Ethiopian middle schools. Alshehri et al. (2025) also reported a positive correlation between IELTS reading scores and strategy use among EFL undergraduate learners in Saudi Arabia while other investigations yielded comparable findings (Aryadoust & Zhang, 2016; Domingo & Casanova, 2022; Guo, 2018; Moradi et al., 2023; Razkane et al., 2023; Sarbazi et al., 2021; Satori, 2025; Shang, 2017; Shen & Park, 2018; Weng, 2025).

Regarding strategy dimensions, the results for supporting strategies are comparatively poor, while the positive relationship between global strategies and problem-solving strategies and English reading performance is more constant. Some studies found that only global strategies or problem-solving strategies

significantly predicted English reading comprehension whereas others found that these two dimensions are both significantly associated with reading performance (Ghaith, 2020; Ghaith & El-Sanyoura, 2019; Lindholm & Tengberg, 2019; Seng, 2025; Yoshikawa & Leung, 2020). In contrast, only a few studies have reported a positive but weak correlation between supporting strategies and English reading comprehension (Seng, 2025).

While metacognitive reading strategies have been found to have a direct correlation with English reading performance, the relationship between the two may also be indirect. MRS may exert a positive influence on English reading performance indirectly through self-regulation, creative skills, and motivation (Amini et al., 2020; Aziz & Rawian, 2022; Shang, 2016b). For instance, in a study of 108 Saudi Arabia undergraduate students, Alamer and Alsagoafi (2023) reported that MRS have an intermediate beneficial effect on reading ability through the intensity of motivation. This type of research indicates that the relationship between MRS and English reading performance is not always direct but may be influenced by other mediating variables.

Although many studies have reported positive results, a few have shown inconsistent results. The inconsistencies are mainly reflected in two aspects. On the one hand, the directions of the different strategy dimensions are not aligned, and some studies have found that certain dimensions of MRS have a positive impact on English reading performance, while other dimensions have shown the opposite or no significant effect. For example, Liao and Lee (2024) found that problem-solving strategies were significantly positively correlated with English reading ability, whereas support strategies showed an inverse relationship.

On the other hand, the results show differences between different groups of learners. Rianto (2022) found that MRS was significantly positively correlated with reading performance only among students majoring in languages, and only the global strategy reached statistical significance. For students in other majors, however, MRS was not significantly associated with English reading scores, either overall or across individual dimensions. Furthermore, three studies reported no significant correlation between the two (Arabmofrad et al., 2020; Dang, 2024; Meniado, 2016).

After conducting a comprehensive review of previous studies, the authors found that the findings generally support a positive relationship between metacognitive reading strategies and English reading performance. However, this relationship exhibits variations depending on the learner group, educational level, and research context. Specifically, the positive relationship between global strategies and problem-solving strategies and English reading performance is relatively stable, whereas the role of support strategies in English reading performance is more complex. In summary, these inconsistent findings indicate that the relationship between MRS and English reading performance may be affected by strategy dimensions as well as differences in learner backgrounds.

3.2.3 RQ2: In intervention studies, do interventions related to metacognitive reading strategies enhance English reading performance for ESL/EFL learners?

This section addresses research question 2 based on 23 intervention studies. To provide a clearer overview of the intervention methods, duration, study subjects, sample sizes, and result differences, the key characteristics of these 23 intervention studies are summarized in Table 4. Overall, most intervention studies have reported positive results, but there are differences among various types of interventions in terms of the specific measures used, duration, study participants, and consistency of results. Therefore, based on Table 4, this section classifies the various types of interventions and subsequently analyzes and compares the intervention outcomes across studies according to this classification.

Results from 21 studies indicate that interventions focusing on MRS for ESL/EFL learners significantly and positively enhance their English reading comprehension. Two studies reported non-significant effects. This indicates that MRS interventions have a significant positive effect on English reading performance. Regarding the types of interventions, 18 studies utilized explicit instructional interventions, four employed technical interventions, and one used task-mediated interventions, indicating that the interventions predominantly featured teacher-directed explicit strategy instruction. Concerning research design, most studies employed a control design involving group comparisons, with few using pre- and post-tests; only one study utilized a multi-group design.

According to the different methods of intervention, the intervention studies in this review fall into three categories. First, the explicit explanation and teaching intervention of metacognitive reading strategies (in the classroom are classified as strategy teaching; second, the intervention methods that are mainly guided by technological means, digital tools, or platform functions (e.g., 12-week eye movement training using RSVP technology, online scaffolding tools (Meta-S), and MALL-delivered) belong to technical intervention; then, the intervention using online reading texts is classified as task-mediated. Based on this classification, the following section further compares the effectiveness of different types of interventions.

3.3 Explicit Metacognitive Strategy Instruction Intervention

Among the three types of intervention studies, the research evidence for explicit metacognitive reading strategies is the most extensive with the overall trend in the relevant research findings being consistent and positive. The results of several studies indicate that the experimental group's English reading comprehension was significantly better than those of the control group or their pre-test levels following intervention with explicit metacognitive guidance strategies. This indicates that instructional interventions focused on explicit metacognitive strategies are among the most consistent and robust forms of intervention in existing literature.

For example, Noipa and Phusawisot (2025) found that, among 145 Thailand EFL undergraduates, the experimental group's English reading comprehension significantly outperformed that of the control group following 13 weeks of metacognitive strategy instruction. Most other studies employing explicit

metacognitive reading instruction interventions have also reported positive results.

In terms of the participants' educational stages, significant positive effects after the intervention were observed in primary school, junior high school, senior high school, and university samples. This suggests that such interventions have broad applicability. However, existing research has primarily focused on secondary and higher education, with relatively little evidence available for the elementary school level. For example, Teng (2020) conducted a process-oriented reading program for fifth-grade ESL learners at an international school in Hong Kong, which demonstrated significant improvements in both reading comprehension and strategic awareness among the learners.

Similarly, explicit instruction in problem-solving strategies for Moroccan middle school students also significantly improved their reading comprehension skills (Hassan et al., 2025). During senior high school, learners' reading abilities improved significantly following instruction in explicit metacognitive strategies, although the extent of improvement varied across individual strategy dimensions (Muhid et al., 2020; Pahamzah,2022; Seedanont & Pookcharoen, 2019). In summary, teaching interventions involving explicit metacognitive strategies have been reported to have positive effects across various educational stages, though most of the existing evidence focuses on secondary education and beyond.

Regarding intervention duration, explicit metacognitive teaching interventions vary slightly in terms of duration and instructional models. Existing research includes short-term training programs lasting four to ten weeks, as well as systematic guidance spanning an entire semester or multiple courses. Although different studies employed different interventions, most reported positive outcomes. This indicates that explicit instruction is effective across a variety of teaching contexts. For example, after undergoing 14 intervention sessions, Malaysian international undergraduate students demonstrated a strong improvement in their metacognitive reading awareness (Babashamasi et al., 2022). Similarly, in an explicit instructional intervention embedded within PBL that centered on metacognitive strategies, the experimental group of college students demonstrated significantly better reading attitudes and reading comprehension scores than the control group (Berenji, 2021). Similar findings have been reported in other studies (Bai et al., 2025; Mijušković & Simović, 2016; Shukri & Albazi, 2016).

From the perspective of specific instructional models, explicit strategies based on the CALLA (Cognitive Academic Language Learning Approach) model, interactive teaching methods, and literary circles have also been widely reported to show positive results. For instance, Libyan undergraduate EFL learners who participated in the explicit teaching of MRS intervention using the CALLA model saw a significant improvement in their English reading scores (Khellab et al., 2022). Similar findings were also observed in studies involving Iranian undergraduate students (Mohseni et al., 2020; Tavakoli & Koosha, 2016). Additionally, teaching models such as the reciprocal teaching method and literary circles have also

shown positive effects with research finding that learners' reading comprehension skills and use of reading strategies improved following the intervention (Bilici & Subaşı, 2022; Chou, 2021; Mohamed, 2023).

Technical Support Intervention

Technology-supported methods have received less research attention than teacher-directed, explicit method instruction. However, existing research data continues to point to positive impacts. Existing research shows that combining technology support and instructional guidance improves English reading proficiency. Peng et al. (2025) discovered that after using the MALL technique, the experimental group scored higher than the control group While Uçak and Kartal (2022) discovered that online scaffolding tools (Meta-S) increased learners' reading comprehension and strategy awareness and Babaei and Rahimi (2021) found that a 12-week RSVP technology training program increased reading speed and comprehension.

Although most intervention studies show positive trends, a few studies have not found significant results. The insignificance of the results shows that the effectiveness of MRS-related interventions is not entirely consistent across all research contexts. For instance, Supramaniam et al. (2020) found that that some seventh-grade students demonstrated improved text comprehension after 12 weeks of MRS training, but the overall effect of the intervention was not significant. Similarly, a 6-week online reading tasks program did not produce significant outcomes compared to traditional print reading (Altay & Altay, 2017). Ultimately, the research presented above indicates that the effectiveness of various interventions may still be influenced by the study population, the type of intervention, and the method of implementation.

Table 4: Summary of MRS intervention studies

Author, year of publication	Participants	Intervention type	Period	Direction of effect	Main result
Noipa and Phusawisot (2025)	145 EFL university students	Explicit instruction (MRS training)	13 weeks	Positive	Improved reading performance
Teng (2020)	25 ESL primary students	Explicit instruction (process-oriented reading)	10 sessions	Positive	Improved reading performance
Hassan et al. (2025)	31 EFL junior secondary students	Explicit instruction (PROBs)	1 semester	Positive	Improved reading performance
Muhid et al. (2020)	50 EFL senior secondary students	Explicit instruction (MRS training)	2 months	Positive	Improved reading performance
Seedanont and Pookcharoen	43 EFL senior secondary	Explicit instruction (MRS training)	10 weeks	Positive	Improved reading performance

(2019)	students				
Hasani and Pahamzah (2022)	60 EFL senior secondary students	Explicit instruction (MRS training)	4 weeks	Positive	Improved reading performance
Babashamasi et al. (2022)	70 EFL university students	Explicit instruction (CALLA-based MRS training)	14 sessions	Positive	Improved reading performance
Mijušković and Simović (2016)	65 EFL university students	Explicit instruction (MRS training)	Not specifie d	Positive	Improved reading performance
Shukri and Albazi (2016)	14 EFL foundation year students	Explicit instruction (MRS training)	9 sessions	Positive	Improved reading performance
Bai et al. (2025)	80 EFL university students	Explicit instruction (Think-aloud based) MRS training)	8 weeks	Positive	Improved reading performance
Berenji (2021)	80 EFL university students	Explicit instruction (PBL-embedded MRS training)	6 sessions	Positive	Improved reading performance
Khellab et al. (2022)	60 EFL university students	Explicit instruction (CALLA-based MRS training)	8 weeks	Positive	Improved reading performance
Mohseni et al. (2020)	54 Intermediat e EFL learners	Explicit instruction (CALLA-based MRS training)	36 sessions	Positive	Improved reading performance
Tavakoli and Koosha (2016)	100 EFL university students	Explicit instruction (CALLA-based MRS training)	12 weeks	Positive	Improved reading performance
Mohamed (2023)	64 EFL university students	Explicit instruction (Reciprocal teaching)	14 weeks	Positive	Improved reading performance
Bilici and Subaşı (2022)	23 EFL university students	Explicit instruction (Reciprocal teaching)	6 weeks	Positive	Improved reading performance
Chou (2021)	60 EFL university students	Explicit instruction (Literature Circles)	8 weeks	Positive	Improved reading performance
Monika and Devi (2022)	112 ESL university	Technical support (Android	Not specifie	Positive	Improved reading

	students	application)	d		performance
Peng et al. (2025)	62 EFL university students	Technical support (MALL-delivered)	13 weeks	Positive	Improved reading performance
Uçak and Kartal (2022)	87 EFL university students	Technical support (Online scaffolding tool (Meta-S))	5 weeks	Positive	Improved reading performance
Babaei and Rahimi (2021)	72 EFL university students	Technical support (RSVP technique training)	12 weeks	Positive	Improved reading performance
Supramaniam et al. (2020)	20 ESL junior secondary students	Explicit instruction (MRS training and peer tutoring)	12 weeks	No significant difference	No significant improvement
Altay and Altay (2017)	51 EFL foundation year students	Oline reading tasks	6 weeks	No significant difference	No significant improvement

In summary, the findings of intervention studies largely support the notion that MRS-related interventions can improve English reading performance. However, differences remain among various intervention types in terms of the number of studies, duration, educational level, and consistency of results. Among these, explicit strategy training has the most evidence, followed by technology-supported interventions, while task-mediated interventions have the least. These differences in results may be related to variations in learner background, assessment tools, as well as intervention methods, duration, and study designs.

4. Discussion

This section discusses two key aspects. Firstly, in regard to the relationship between metacognitive reading strategies (MRS) and English reading performance, the relationship between the two is generally positive, but it is not always consistent. Secondly, the authors discuss the evidence regarding the effectiveness of MRS intervention studies on English reading performance. MRS-related interventions have shown positive outcomes in most studies, but there are differences among various types of interventions across different studies. This review synthesizes 50 studies and, drawing on metacognitive and schema theories, further discusses the relationship between MRS and English reading performance, as well as the effectiveness of interventions.

Among these studies, 27 investigated the relationship between MRS and English reading performance (Alamer & Alsagoafi, 2023; Amini et al., 2020; Arabmofrad et al., 2020; Aryadoust & Zhang, 2016; Alshehri et al., 2025; Aziz & Rawian, 2022; Dang, 2024; Domingo & Casanova, 2022; Ghaith, 2020; Ghaith & El-Sanyoura, 2019; Guo, 2018; Liao & Lee, 2024; Lindholm & Tengberg, 2019; Meniado, 2016; Moradi et al., 2023; Muche et al., 2023; Razkane et al., 2023; Rianto, 2022; Sarbazi et al., 2021; Satori, 2025; Seng, 2025; Shang, 2016a, 2016b, 2017; Shen & Park, 2018;

Weng, 2025; Yoshikawa & Leung, 2020), while 23 investigated intervention effects (Altay & Altay, 2017; Babaei & Rahimi, 2021; Babashamasi et al., 2022; Bai et al., 2025; Berenji, 2021; Bilici & Subaşı, 2022; Chou, 2021; Hasani & Pahamzah, 2022; Hassan et al., 2025; Khellab et al., 2022; Mijušković & Simović, 2016; Mohamed, 2023; Mohseni et al., 2020; Monika & Devi, 2022; Muhid et al., 2020; Noipa & Phusawisot, 2025; Peng et al., 2025; Seedanont & Pookcharoen, 2019; Shukri & Albazi , 2016; Supramaniam et al., 2020; Tavakoli & Koosha, 2016; Teng, 2020; Uçak & Kartal, 2022). While most relational studies demonstrate a predominantly positive relationship between MRS and English reading performance, some studies report non-significant findings or dimensional differentiation (Arabmofrad et al., 2020; Aziz & Rawian, 2022; Razkane et al., 2023; Satori, 2025; Yoshikawa & Leung, 2020).

Intervention studies generally indicate that both strategy instruction and technology interventions positively impact English reading comprehension (Babaei & Rahimi, 2021; Babashamasi et al., 2022; Bai et al., 2025; Berenji, 2021; Bilici & Subaşı, 2022; Chou, 2021; Hasani & Pahamzah, 2022; Hassan et al., 2025; Khellab et al., 2022; Mijušković & Simović, 2016; Mohamed, 2023; Mohseni et al., 2020; Monika & Devi, 2022; Muhid et al., 2020; Noipa & Phusawisot, 2025; Seedanont & Pookcharoen, 2019; Shukri & Albazi, 2016; Tavakoli & Koosha, 2016; Teng, 2020; Uçak & Kartal, 2022). However, a small number of studies report no significant effects (Altay & Altay, 2017; Supramaniam et al., 2020).

4.1 Relationship Between Metacognitive Reading Strategies and English Reading Performance

Metacognitive theory focuses on planning, monitoring, and evaluation during reading (Flavell, 1979); meanwhile schema theory emphasizes activating prior knowledge and integrating it with new textual information to comprehend new content (Rumelhart, 1980). The preview, monitoring, contextual connection, speculation and other strategies in MRS help effectively combine relevant schemas and complete the construction of new text meaning. This demonstrates that when learners can make predictions before reading, continuously monitor their comprehension during reading, and adjust their understanding based on context, metacognitive regulation and schema activation can facilitate their overall comprehension and construction of the text, thereby leading to improved English reading comprehension and academic performance.

In some related studies, it was reported that there was actually no discernible correlation between overall metacognitive reading strategies (MRS) and English reading, but specific dimensions showed a correlation (Ghaith, 2020; Ghaith & El-Sanyoura, 2019; Lindholm & Tengberg, 2019; Seng, 2025; Yoshikawa & Leung, 2020). This phenomenon may be related to the functional differences of the three dimensions of MRS strategies in the reading process.

Lindholm and Tengberg (2019) discovered a substantial positive correlation between global strategies and reading comprehension with Ghaith (2020) coming to the same finding. Global strategies focus more on pre-reading planning and monitoring and thus have a more immediate impact in the early stages of reading; problem-solving strategies, on the other hand, focus on addressing difficulties and

correcting misunderstandings during the reading process, and are therefore more likely to directly improve answer accuracy when comprehension barriers arise. Thus, in multiple studies, it has been reported that problem-solving strategies are positively correlated with English reading comprehension (Ghaith, 2020; Ghaith & El-Sanyoura, 2019). The support strategies are reflected in annotations, note-taking, dictionary lookup, etc. They are more like the way learners rely on external tools to enhance their understanding of the text. The frequency of using external tools may, however, be affected by the situation where reading tasks need to be completed within a limited time. Therefore, excessive use of support strategies may have a negative impact on English reading comprehension (Liao & Lee, 2024).

Although numerous studies report a positive correlation MRS and English reading comprehension, a small number find no significant relationship between the two. This discrepancy may stem from learners' insufficient reading vocabulary. Babashamasi et al. (2022) indicate that students commonly perceive limited vocabulary as a primary factor hindering reading comprehension. Although participants can employ strategies, limited vocabulary may hinder learners' ability to identify, infer, and integrate key information, thereby affecting reading comprehension scores. In other words, the effective use of MRS requires a certain foundation of linguistic knowledge to function optimally.

Secondly, the insignificant results might be related to the quality of strategy usage. Although students reported using moderate level of metacognitive strategies (such as problem-solving strategies), their reading comprehension scores were still below the average level (Meniado, 2016). Learners with low reading proficiency may frequently employ the same strategies (backtracking, consulting dictionaries, annotating, adjusting reading speed) when encountering reading difficulties, but high frequency of use does not equate to effective use. If strategy selection lacks specificity, repeated use of strategies that fail to demonstrably enhance reading comprehension may not directly translate into improved reading comprehension scores. This does not, however, imply that MRS are without value.

Meanwhile, some studies have found that MRS have no direct significant impact on English reading comprehension but can influence English reading through indirect means such as motivation intensity and self-regulation (Alamer & Alsagoafi, 2023; Amini et al., 2020). MRS may work by first improving the reading process. While not necessarily directly improving reading scores, it helps learners better plan, regulate, and engage in reading, which in turn leads to improved reading performance.

4.2 Intervention Study on Metacognitive Reading Strategies and English Reading Performance

In intervention studies, multiple research reports indicate that learners' English reading comprehension significantly improved following the implementation of teaching and technical interventions related to metacognitive reading strategies (MRS) (Babaei & Rahimi, 2021; Babashamasi et al., 2022; Bai et al., 2025; Berenji, 2021; Bilici & Subaşı, 2022; Chou, 2021; Hasani & Pahamzah, 2022; Hassan et al., 2025; Khellab et al., 2022; Mijušković & Simović, 2016; Mohamed, 2023; Mohseni

et al., 2020; Monika & Devi, 2022; Muhid et al., 2020; Noipa & Phusawisot, 2025; Peng et al., 2025; Seedanont & Pookcharoen, 2019; Shukri & Albazi, 2016; Tavakoli & Koosha, 2016; Teng, 2020; Uçak & Kartal, 2022). This finding suggests that MRS, through systematic training or guidance, can yield relative short-term gains that translate into enhanced English reading comprehension scores. Theoretically, this is largely consistent with the core tenets of metacognitive theory. Explicit training in planning, monitoring, and evaluation can help learners improve their reading skills.

Among the intervention studies reviewed in this literature review, those employing explicit metacognitive reading strategies were most prevalent, and the overall effectiveness of these interventions is relatively more consistent. Their common features included teachers explaining the purpose of learning MRS strategies, integrating strategy instruction or demonstration into daily teaching, and learners engaging in deliberate practice and independent application during reading tasks (Mohamed, 2023; Noipa & Phusawisot, 2025; Shukri & Albazi, 2016). The process of explanation-demonstration-application transforms abstract MRS theory into practical skills that enhance English reading comprehension. This process aligns with metacognitive theory, which emphasizes that learners can become aware of their own cognitive processes and develop the ability to regulate them. Intervention studies typically involve longer-term experiments, giving students more opportunities to master strategies. When strategy training is combined with reading tasks, it is also more likely to directly improve reading performance.

The overall effect of the technical intervention is positive. This may be attributed to the integration of metacognitive reading strategies across various stages into the reading process through technological support. Uçak and Kartal (2022) found that the online scaffolding tool Meta-s is comparable in effectiveness to teachers' guided strategy training, but both are more effective than traditional instruction and better promote English reading comprehension. This indicates that technology-supported approaches may provide learners with more sustained opportunities for metacognitive regulation. Meta-S's visual demonstrations of the strategy application process also help learners activate prior knowledge and integrate textual information, which aligns with the core tenets of schema theory.

The portability, instant feedback, and personalized features of MALL allow MRS's planning, monitoring, and evaluating strategies to be more directly integrated into the reading process, enabling learners to continuously adjust their strategy application through practice and thereby improve their English reading comprehension (Peng et al., 2025). RSVP eye-tracking training enhances learners' reading speed and fluency, thereby promoting metacognitive reading strategies utilization and ultimately improving English reading comprehension (Babaei & Rahimi, 2021). From the perspective of metacognitive theory, technological support may not directly improve English reading comprehension, but it can provide learners with more sustained opportunities for planning, monitoring, and evaluating by integrating strategies such as instruction, demonstration, feedback, and repeated practice into the reading process. Therefore, technological support

enhances learners' reading comprehension not by directly boosting reading ability, but by strengthening metacognitive regulation during the reading process.

Two studies in this review showed insignificant intervention effects. Altay and Altay (2017) found that when the reading medium was changed from paper to online, the results showed that this did not improve learners' English reading. Another intervention study of seventh-grade students in Malaysia also came to a similar conclusion (Supramaniam et al., 2020). The sample size of this study is, however, relatively small. These methods may help to understand the text, but they may not really improve learners' reading ability. In the above intervention studies, MRS training is not really added to the reading process, thus only changing the reading medium or providing additional understanding assistance may not have a significant effect.

This section provides a further discussion of the review findings, focusing on two aspects. On the one hand, the results of the relationship studies show MRS in most studies have a positive correlation with English reading, but the research conclusions are not entirely consistent. Different studies show variations in the significance of the relationship between the two, the strength of their effects, and the dimensions of the strategies (Dang, 2024; Moradi et al., 2023; Rianto, 2022). This suggests that the application of MRS may need to be combined with other factors, such as self-regulation strategies, reading motivation, and intervention methods. On the other hand, intervention studies provide stronger evidence that MRS can enhance learners' comprehension and application of MRS through explicit instruction or technological interventions, thereby facilitating improvements in English reading comprehension (Babaei & Rahimi, 2021; Khellab et al., 2022; Mohamed, 2023).

This suggests that when MRS are integrated into reading tasks and combined with consistent practice and feedback, the positive impact on reading comprehension is more likely to be sustained. However, a few studies report insignificant intervention effects (Altay & Altay, 2017; Supramaniam et al., 2020). The consistency of effects varies across different types of interventions, delivery methods, and study conditions. Therefore, this review not only examines the relationship between metacognitive reading strategies and English reading performance, as well as the effectiveness of interventions, but also explores the reasons behind the differences in findings across studies.

5. Implications

Based on the findings of this review, metacognitive reading strategies (MRS) are not only associated with English reading performance but are also a reading skill that can be developed through instruction. Interventional studies suggest that the dominant teaching of the MRS is more effective. This result reveals that teacher training, curriculum design and classroom teaching should focus more on cultivating learners' MRS. While paying attention to reading scores, teachers should also pay attention to the cultivation of students' strategic awareness and strategic ability. In actual classroom teaching, teachers can help students understand the concept of reading strategies and their operating mechanisms, and

clearly demonstrate how to apply these strategies before, during and after reading. Teachers should also use diversified texts and tasks to provide learners with continuous practice opportunities and give timely feedback. This helps to cultivate learners' ability to continuously self-monitor and apply strategies.

6. Recommendations

Future research can continue to focus on technical support interventions. especially those digital or AI tools that can demonstrate strategies, record processes and provide real-time feedback in order to explore whether they really help to improve MRS and English reading performance. Longitudinal research design can also be used to observe the effect of MRS in the long term. In addition, cross-language research helps to investigate whether the reading strategies used by learners in their first language can be migrated to English reading. Concerning research design, future research can adopt control experiment or quasi-experimental design and include pre- and post-tests to make the research more rigorous. Regarding the study sample, by addressing learners of different ages and English levels it will help to observe which groups are more likely to benefit from MRS. Finally, the effectiveness of using different text types to study MRS is worth further exploring.

7. Limitations

There are several limitations to this study. First, it only includes peer-reviewed English articles, which may exclude studies in other languages. Second, the existing research mainly focuses on junior high school and above, and the evidence on learners in the lower grades is relatively limited. Third, literature retrieval is limited to Web of Science, Scopus and ERIC, which limits the scope of research. Furthermore, since the included studies encompassed both correlational and interventional studies, potential differences exist in their research designs, sample sizes, research instruments, and reporting of results. This review primarily focuses on the overall patterns of findings in the literature. Therefore, no systematic quality appraisal was conducted. The results of this review mainly reflect general patterns in the literature, and conclusions should be interpreted with caution. Finally, differences in sample features, measurement tools, and intervention designs limited direct comparisons between studies.

8. Conclusion

This study systematically reviewed 50 studies on the relationship between metacognitive reading strategies (MRS) and English reading performance between 2016 and 2026, as well as the effectiveness of relevant interventions. In general, correlation studies consistently show that there is a positive correlation between MRS and English reading performance.

However, this relationship is not always stable and may be affected by factors such as the learner's background, strategic dimension, education stage, and research environment. In contrast, the results of the intervention study are more stable. Most studies show that MRS dominant strategy training or technical support interventions can effectively improve English reading comprehension. The above research results indicate that MRS are not only related to better English

reading performance, but also a reading strategy skill that can be trained through teaching. This review provides evidence for cultivating reading strategies in ESL/EFL teaching and gives guidance for future research on MRS and effective intervention methods.

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10. References

Alamer, A., & Alsagoafi, A. (2023). Construct validation of the revised metacognitive awareness of reading strategies inventory (MARSI-R) and its relation to learning effort and reading achievement. *Studies in Second Language Learning and Teaching*, *13*(1), 125–149. https://doi.org/10.14746/ssllt.31990

Alshehri, A., Abdulhaleem, E., & Khan, A. (2025). Exploring the role of language proficiency, gender, track specialization, and IELTS scores in Saudi EFL learners' metacognitive reading strategies. *Cogent Education*, *12*(1). https://doi.org/10.1080/2331186X.2025.2497144

Altay, İ. F., & Altay, A. (2017). The impact of online reading tasks and reading strategies on EFL learners' reading test scores. *Journal Of Language and Linguistic Studies*, *13*(2), 136–152. https://izlik.org/JA29WU36WW

Amini, D., Anhari, M. H., & Ghasemzadeh, A. (2020). Modeling the relationship between metacognitive strategy awareness, self-regulation and reading proficiency of Iranian EFL learners. *Cogent Education*, *7*(1), 1–17. https://doi.org/10.1080/2331186X.2020.1787018

Anderson, N. J. (2003). Scrolling, clicking, and reading English: Online reading strategies in a second/foreign language. *The Reading Matrix 3*(3), 1–33.

Anggita Nasution, E., Kencana, N., & Utami, E. (2026). Reading comprehension difficulties among EFL university students: A case study at prof. Dr. Hazairin, SH university. *JOEEL (Journal of English Education and Literature)*, *7*(1), 27–40. https://doi.org/10.38114/hv26mt53

Arabmofrad, A., Badi, M., & Rajaee Pitehnoee, M. (2020). The relationship among elementary English as a foreign language learners' hemispheric dominance, metacognitive reading strategies preferences, and reading comprehension. *Reading & Writing Quarterly*, *37*(5), 413–424. https://doi.org/10.1080/10573569.2020.1846005

Aryadoust, V., & Zhang, L. (2016). Fitting the mixed Rasch model to a reading comprehension test: Exploring individual difference profiles in L2 reading. *Language Testing*, *33*(4), 529–553. https://doi.org/10.1177/0265532215594640

Aziz, M., & Rawian, R. (2022). Modeling higher order thinking skills and metacognitive awareness in English reading comprehension among university learners. *Frontiers in Education*, *7*, 1–17. https://doi.org/10.3389/feduc.2022.991015

Babaei, S. A., & Rahimi, M. (2021). The relationship between reading strategy use and reading comprehension as mediated by reading rate: the case of eye movement training by rapid serial visual presentation (RSVP). *Teaching English with Technology*, *21*(1), 94–111. https://eric.ed.gov/?id=EJ1283679

Babashamasi, P., Shakib Kotamjani, S., & Binti Noordin, N. (2022). The effect of explicit training of metacognitive reading strategies on online reading comprehension. *Arab World English Journal*, *8*, 246–261. https://doi.org/10.24093/awej/call8.17

Bai, J., Sulaiman, N. A., Shukor, S. S., & Wahi, W. (2025). Scale validation and intervention effects of metacognitive reading strategies in CET-6: A study in Chinese second-

tier university setting. *Forum for Linguistic Studies*, *7*(1), 808–820. https://doi.org/10.30564/fls.v7i1.7757

Berenji, S. (2021). Enhancing metacognitive scaffolding and comprehension ability through problem-based learning in an EFL context. *Education Research International*, *2021*(1), 1–9. https://doi.org/10.1155/2021/6766793

Bilici, Ö., & Subaşı, G. (2022). EFL learners' metacognitive awareness of global reading strategies and L2 reading comprehension skills: The efficacy of reciprocal teaching. *The Reading Matrix: An International Online Journal*, *22*(2), 170–185. https://readingmatrix.com/files/29-xsxk2f3g

Carcamo, B. (2023). The roles of vocabulary knowledge and metacognitive awareness as mediators between prior knowledge and L2 academic reading. *International Journal of Applied Linguistics*, *33*(2), 292–326. https://doi.org/10.1111/ijal.12466

Chou, M.-H. (2021). Using literature circles to teach graded readers in English: an investigation into reading performance and strategy use. *Innovation in Language Learning and Teaching*, *16*(2), 144-163. https://doi.org/10.1080/17501229.2021.1885412

Dang, V. T. T. (2024). Metacognitive reading strategy usage among Vietnamese university students and its relationship with reading comprehension performance. *REFLections*, *31*(3), 925–943. https://doi.org/10.61508/refl.v31i3.275797

Domingo, M. M., & Casanova, V. S. (2022). Metacognitive online reading, navigational strategies, and the reading performance of the grade 11 HUMMS of Pedro T. Mendiola Sr. Memorial National High School. *Journal of Education and Learning*, *11*(4), 61–73. https://doi.org/10.5539/jel.v11n4p61

Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), *The Nature of Intelligence.* Hillsdale, NJ: Erlbaum.

Mokhtari, K., & Sheorey, R. (2002). Measuring ESL Students' Awareness of Reading Strategies. *Journal of Developmental Education, 25*(3), 2-11.

Ghaith, G. M. (2020). Foreign language reading anxiety and metacognitive strategies in undergraduates' reading comprehension. *Issues in Educational Research*, *30*(4), 1310–1328. https://search.informit.org/doi/abs/10.3316/informit.606167839598214

Ghaith, G., & El-Sanyoura, H. (2019). Reading comprehension: The mediating role of metacognitive strategies. *Reading in a Foreign Language*, *31*(1), 19–43. https://doi.org/10.64152/10125/66748

Guo, L. (2018). Modeling the relationship of metacognitive knowledge, L1 reading ability, L2 language proficiency and L2 reading. *Reading in a Foreign Language*, *30*(2), 209–231. https://doi.org/10.64152/10125/66922

Hasani, A., & Pahamzah, J. (2022). Relationship approach to cognitive and metacognitive strategies on EFL students' reading comprehension. *Eurasian Journal of Applied Linguistics*, *8*(2), 16–23. http://doi.org/10.32601/ejal.911537

Hassan, M., Najat, M., & Bouchaib, B. (2025). Explicit instruction in metacognitive problem-solving reading strategies: Developing reading comprehension and strategy awareness. *Studies in English Language and Education*, *12*(3), 1410–1426. https://doi.org/10.24815/siele.v12i3.42597

Kan, T., Noordin, N., & Ismail, L. (2024). Implementation of metacognitive reading strategies to improve English reading ability: A systematic review. *International Journal of Learning Teaching and Educational Research*, *23*(7), 368–389. https://doi.org/10.26803/ijlter.23.7.19

Khellab, F., Demirel, Ö., & Mohammadzadeh, B. (2022). Effect of teaching metacognitive reading strategies on reading comprehension of engineering students. *SAGE Open*, *12*(4), 1–19. https://doi.org/10.1177/21582440221138069

Leighton, J. P., & Gierl, M. J. (2011). *Learning sciences in educational assessment: The role of cognitive models.* Cambridge University Press.

Liao, R. J. T., & Lee, K. (2024). The interplay between metacognitive knowledge, L2 language proficiency, and question formats in predicting L2 reading test scores. *Education Sciences*, *14*(4), 370. https://doi.org/10.3390/educsci14040370

Lindholm, A., & Tengberg, M. (2019). The reading development of Swedish L2 middle school students and its relation to reading strategy use. *Reading Psychology*, *40*(8), 782–813. https://doi.org/10.1080/02702711.2019.1674432

Meniado, J. C. (2016). Metacognitive reading strategies, motivation, and reading comprehension performance of Saudi EFL students. *English Language Teaching*, *9*(3), 117–129. https://doi.org/10.5539/elt.v9n3p117

Mijušković, M., & Simović, S. (2016). The 21st century English language reading classroom in Montenegro: The influence of metacognitive strategies on university students' attitudes regarding the process of reading in English. *Porta Linguarum: revista internacional de didáctica de las lenguas extranjeras*, (*26)*, 23–36. https://doi.org/10.30827/digibug.53921

Mohamed, R. (2023). Reciprocal teaching as a cognitive and metacognitive strategy in promoting Saudi university students' reading comprehension. *Open Education Studies*, *5*(1), 1–18. https://doi.org/10.1515/edu-2022-0200

Mohseni, F., Seifoori, Z., & Ahangari, S. (2020). The impact of metacognitive strategy training and critical thinking awareness-raising on reading comprehension. *Cogent Education*, *7*(1), 1–9. https://doi.org/10.1080/2331186x.2020.1720946

Mokhtari, K., & Reichard, C. (2002). Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology, 94*(2), 249–259. https://doi.org/10.1037/0022-0663.94.2.249

Mokhtari, K., Dimitrov, D. M., & Reichard, C. A. (2018). Revising the Metacognitive Awareness of Reading Strategies Inventory (MARSI) and testing for factorial invariance. *Studies in Second Language Learning and Teaching, 8*(2), 219–246. https://doi.org/10.14746/ssllt.2018.8.2.3

Monika, M., & Devi, V. A. (2022). A study on the use of metacognitive reading strategies by learners with psychosomatic conditions. *Journal Human Research in Rehabilitation*, *12*(2), 138–147. https://doi.org/10.21554/hrr.092204

Moradi, E., Ghapanchi, Z., & Pishghadam, R. (2023). A probe into cognitive and metacognitive reading strategy use and reading comprehension test performance in light of emotioncy. *Journal of College Reading and Learning*, *53*(1), 20–37. https://doi.org/10.1080/10790195.2022.2121784

Muche, T., Simegn, B., & Shiferie, K. (2023). Self-efficacy and metacognitive strategy use in reading comprehension: EFL learners' perspectives. *The Asia-Pacific Education Researcher*, *33*, 219–227. https://doi.org/10.1007/s40299-023-00721-5

Muhid, A., Amalia, E. R., Hilaliyah, H., Budiana, N., & Wajdi, M. B. N. (2020). The effect of metacognitive strategies implementation on students' reading comprehension achievement. *International Journal of Instruction*, *13*(2), 847–862. https://doi.org/10.29333/iji.2020.13257a

Noipa, J., & Phusawisot, P. (2025). The effects of metacognitive reading strategy instruction on Thai EFL engineering students: Metacognitive strategy use and students' attitudes. *World Journal of English Language*, *15*(2), 263–263. https://doi.org/10.5430/wjel.v15n2p263

Novita Sari, H., & Fauziyyah, R. (2026). Metacognitive strategies in English reading comprehension among EFL university students. *GLOBAL: Education Language and Humanity Journal*, *3*(2), 133–144. https://doi.org/10.66355/q2e1dz35

Oxford, R. L. (1990). Language learning strategies and beyond: A look at strategies in the context of styles. In S. Sieloff Magnan (Ed.), *Shifting the Instructional Focus to the Learner* (pp. 35−55). Middlebury, VT: Northeast Conference on the Teaching of Foreign Languages.

Peng, C., Gu, W., & Jiang, L. (2025). Effects of mobile-assisted language learning (MALL)-

delivered explicit metacognitive intervention on Chinese EFL students' receptive skills and metacognitive awareness. *Journal of Computer Assisted Learning*, *41*(5), 1–18. https://doi.org/10.1111/jcal.70125

Razkane, H., Sayeh, A. Y., Diouny, S., & Yeou, M. (2023). Eleventh-grade students' use of metacognitive reading strategies in Arabic (L1) and English (L3). *International Journal of Instruction*, *16*(1), 573–588. https://doi.org/10.29333/iji.2023.16132a

Rianto, A. (2022). Exploring correlation between metacognitive online reading strategy use and online reading comprehension of EFL students. *Turkish Online Journal of Distance Education*, *23*(2), 223–235. https://doi.org/10.17718/tojde.1096448

Rumelhart, D. E. (1980). *Schemata: The building blocks of cognition*. In R. J. Spiro, B. C. Bruce, & W. F. Brewer (Eds.), *Theoretical issues in reading comprehension* (pp. 33–58). Erlbaum.

Sarbazi, M., Khany, R., & Shoja, L. (2021). The predictive power of vocabulary, syntax and metacognitive strategies for L2 reading comprehension. *Southern African Linguistics and Applied Language Studies*, *39*(3), 244–258. https://doi.org/10.2989/16073614.2021.1939076

Satori, M. (2025). The effects of reading motivation and reading strategy are on L2 reading comprehension. *Reading Psychology*, 1–24. https://doi.org/10.1080/02702711.2025.2551552

Seedanont, C., & Pookcharoen, S. (2019). Fostering metacognitive reading strategies in Thai EFL classrooms: A focus on proficiency. *English Language Teaching*, *12*(7), 75–86. https://doi.org/10.5539/elt.v12n7p75

Seng, S. (2025). Metacognitive reading strategies used by Cambodian EFL undergraduates to comprehend English texts. *THAITESOL Journal*, *38*(1), 44–61. https://eric.ed.gov/?id=EJ1478370

Shang, H.-F. (2016a). Exploring metacognitive strategies and hypermedia annotations on foreign language reading. *Interactive Learning Environments*, *25*(5), 610–623. https://doi.org/10.1080/10494820.2016.1171787

Shang, H.-F. (2016b). Online metacognitive strategies, hypermedia annotations, and motivation on hypertext comprehension. *Educational Technology & Society*, *19*(3), 321–334. https://www.learntechlib.org/p/192686/

Shang, H.-F. (2017). EFL medical students' metacognitive strategy is used for hypertext reading comprehension. *Journal of Computing in Higher Education*, *30*(2), 259–278. https://doi.org/10.1007/s12528-017-9156-y

Shen, W., & Park, H. (2018). The effects of meta-cognitive strategies, working memory capacity and syntactic awareness on L2 reading comprehension. *Journal of Pan-Pacific Association of Applied Linguistics*, *22*(2), 87–112. https://doi.org/10.25256/paal.22.2.5

Shukri, N., & Albazi, S. (2016). Evaluating the effect of metacognitive strategy training on reading comprehension of female students at KAU. *International Journal of Applied Linguistics and English Literature*, *5*(3), 172–183. https://doi.org/10.7575/aiac.ijalel.v.5n.3p.172

Supramaniam, K., Halim, N., & Mohd Arif, M. (2020). Enhancing reading comprehension through metacognitive reading strategies and peer tutoring among year 7 students at a home school centre. *Asian Journal of University Education*, *16*(1), 22–31. https://doi.org/10.24191/ajue.v16i1.8981

Tang, K., Noordin, N., & Ismail, L. (2025). Evaluating the think-aloud method for English reading: a systematic review. *Cogent Education*, *12*(1), 1–16. https://doi.org/10.1080/2331186x.2025.2497150

Tavakoli, H., & Koosha, M. (2016). The effect of explicit metacognitive strategy instruction on reading comprehension and self-efficacy beliefs: The case of Iranian university EFL students. *Porta Linguarum Revista Interuniversitaria de Didáctica de Las Lenguas Extranjeras*, *25*, 119–133. https://doi.org/10.30827/digibug.53893

Teng, M. F. (2020). The benefits of metacognitive reading strategy awareness instruction for young learners of English as a second language. *Literacy*, *54*(1), 1–11. https://doi.org/10.1111/lit.12181

Uçak, G., & Kartal, G. (2022). Scaffolding design to increase reading comprehension for learners of English through online strategy training. *E-Learning and Digital Media*, *20*(4), 402–423. https://doi.org/10.1177/20427530221111268

Weng, T. (2025). Effects of motivation on reading performance among Han and Tibetan EFL learners: The mediating role of reading strategies. *International Journal of Applied Linguistics*, 1–14. https://doi.org/10.1111/ijal.70000

Wongdaeng, M., & Higgins, S. (2022). Effectiveness of metacognitive interventions in tertiary EFL contexts: evidence from a systematic review and meta-analysis. *Innovation in Language Learning and Teaching*, *17*(4), 1–17. https://doi.org/10.1080/17501229.2022.2146122

Yoshikawa, L., & Leung, C. (2020). Transitional shift of metacognitive awareness of reading strategy along with L2-English reading proficiency. *The Reading Matrix: An International Online Journal*, *20*(1), 36–44. https://www.readingmatrix.com/files/22-01511t8p.pdf

Yulita, D., & Napitupulu, M. H. (2023). Metacognitive reading strategies in EFL context: A systematic literature review. *Indonesian Educational Research Journal*, *1*(1), 18–25. https://doi.org/10.56773/ierj.v1i1.13