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The Impact of Metacognitive Strategies Instruction Through Individual Versus Collaborative Tasks on Iranian Intermediate EFL Learners' Reading Comprehension

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Abstract:

Reading comprehension remains a central goal in EFL education, yet learners' metacognitive awareness often limits transfer of strategies to authentic tasks. Collaborative strategic reading (CSR) integrates metacognitive strategies within group activity, potentially enhancing comprehension through social interaction. In Iranian EFL contexts, limited empirical work compares collaborative versus individual metacognitive interventions against conventional instruction. The present quasi-experimental study examined these approaches to determine their relative effectiveness for intermediate learners; that is, it probed into the impact of metacognitive intervention through collaborative versus individual reading tasks, compared with the conventional reading instruction, through the collaborative strategic reading (CSR) model. To this end, 75 Iranian intermediate EFL learners were identified through Oxford Placement Tests (OPTs) and further randomly assigned to two experimental groups and a control group, each having 25 participants. The experimental groups received the metacognitive intervention through collaborative versus individual reading tasks and the control group followed the conventional reading instruction in place at the two high schools in Sari, Iran. Results revealed the higher impact of the metacognitive intervention through the collaborative reading tasks followed by the individual reading tasks and the conventional reading instruction. Our findings have collectively pointed to the effectiveness of the CSR model and introduced it as an effective reading instructional approach within the metacognitive reading instruction framework, which has the capacity to improve the reading comprehension of Iranian intermediate EFL learners. Implications and directions for future research are also provided at the end.

Keywords: Cognitive strategies, Collaborative strategic reading, Collaborative tasks, CSR model, Individual tasks, Metacognitive intervention, Metacognitive strategies

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INTRODUCTION

Reading is widely regarded as a cornerstone of second language proficiency, shaping learners' professional, social, and personal development (Al Seyabi & Tuzlukova, 2015). In the context of EFL/ESL education, reading is not a static skill but a dynamic, interactive process in

which readers generate hypotheses, use prior knowledge, and deploy strategies to construct meaning from text (Muhammadpour & Khalili Sabet, 2024). Over the years, psycholinguistic and metacognitive perspectives have highlighted how readers' awareness of strategies and their ability to regulate their use of these strategies influence

comprehension outcomes (Sheorey & Mokhtari, 2001). This body of work foregrounds the importance of explicit strategy instruction and metacognitive awareness as levers for improving reading performance.

A substantial part of the literature has emphasized metacognitive reading strategies, such as planning, monitoring, regulating, and evaluating, as essential components of successful comprehension (Al Seyabi & Tuzlukova, 2015). Researchers have argued that learners with higher metacognitive awareness are better able to select and adapt strategies to task demands, thereby enhancing reading outcomes across genres and proficiency levels (Mokhtari & Reichard, 2004). Despite this consensus, studies targeting how metacognitive awareness translates into practical classroom gains, particularly within collaborative learning contexts, remain limited and uneven across learner populations and instructional settings (Baydik, 2011). This gap is especially pronounced in Iranian EFL contexts, where the potential benefits of collaborative approaches to metacognitive strategy instruction warrant closer examination.

Collaborative Strategic Reading (CSR) has emerged as a prominent model for integrating strategy instruction with collaborative learning (Vaughn et al., 2011). Rooted in sociocultural theory and cognitive psychology, CSR combines explicit strategy instruction, scaffolding, and peer-mediated interaction to support diverse learners, including those who struggle with text comprehension (Caverly et al., 2004). Proponents contend that CSR not only equips learners with core cognitive strategies but also fosters metacognitive regulation through structured collaboration, vocabulary support, and connections to prior knowledge (Al-Mekhlafi, 2018; Al Rabah & Wu, 2018). Although CSR has been applied in various EFL/ESL settings and has yielded positive effects on comprehension, there is a need to scrutinize its effectiveness in a specific instructional milieu, namely, Iranian intermediate EFL learners performing academic reading tasks, and to compare collaborative versus individual modes of CSR implementation against conventional teaching approaches (Ziyaeemehr, 2012).

Against this backdrop, the current study investigates the impact of metacognitive strategy instruction embedded in CSR on reading comprehension among Iranian intermediate EFL learners, with particular attention to how collaborative and individual task formats influence outcomes. Informed by the tenets of the sociocultural and metacognitive theories, the study aims to (a) examine changes in learners' metacognitive awareness and strategy use; (b) compare the effects of CSR delivered in collaborative versus individual formats on academic reading comprehension; and (c) situate these effects within a conventional instructional framework to determine relative gains.

The significance of this research extends to multiple stakeholders. For teachers and teacher educators, findings offer evidence-based guidance on designing CSR-oriented interventions that foster metacognitive regulation and strategic reading within collaborative and individual tasks.

For policymakers and curriculum designers, the study provides insights into scalable approaches for enhancing EFL reading proficiency in high school contexts. For learners, the work highlights instructional practices that can cultivate autonomous, reflective readers capable of applying metacognitive strategies across various disciplines. By clarifying the conditions under which CSR produces meaningful gains, this study contributes to a more nuanced understanding of how metacognitive strategy awareness can be cultivated to support effective reading in English as a foreign language.

LITERATURE REVIEW

COLLABORATIVE STRATEGIC READING (CSR)

With its theoretical underpinnings rooted in sociocultural theory (Vygotsky, 1978) and cognitive psychology (Flavell, 1979), Collaborative Strategic Reading (CSR) encompasses explicit pedagogical instruction, scaffolding techniques, peer-mediated learning opportunities, and integrated supports for both struggling readers and English Language Learners. Explicit CSR instruction equips learners with both the cognitive and metacognitive strategies leading to self-regulatory competencies requisite for independent and effective reading. EFL learners receive guidance on the execution of a particular strategy, the appropriate contexts for its application, and the rationale behind its significance. Within the framework of sociocultural theory, there exists a dynamic interplay between the contributions of the learner, their attainable achievements, and the requisite supports necessary for the realization of their optimal learning potential.

In the CSR model, educators address these individual variances through tailored instruction, constructive feedback, and the strategic facilitation of collaboration within heterogeneous ability groups. Peer interaction constitutes a vital dimension of both learning and cognitive development, particularly among adolescent populations (Johnson et al., 2010). Consequently, CSR employs deliberate cooperative grouping methodologies to foster constructive interactions and enhance learning outcomes. Acknowledging that literacy practices are embedded within social systems and cultural contexts, CSR repudiates conventional perspectives that regard literacy as a discrete activity; instead, it underscores the importance of peer interaction that resonates with the cultural practices prevalent among many EFL learners in educational settings (Kirkland, 2013).

In CSR group settings, EFL learners engage in independent thinking and reading, subsequently leveraging the CSR framework to facilitate immediate feedback through learner-led dialogues. This systematic approach proves particularly beneficial for struggling readers who gain from explicit instruction in reading strategies that are more readily assimilated by proficient readers (e.g., Edmonds et al., 2009). Moreover, for ELLs, the provision of linguistic supports is paramount during the instruction of reading comprehension. CSR incorporates elements that align with

established best practices for ELLs, such as vocabulary pre-teaching, connections to prior knowledge, explicit strategy instruction, and support in the native language (August & Shanahan, 2006).

In fact, CSR operationalizes sociocultural principles by distributing cognitive and metacognitive work across group members through shared tasks, dialogue, and scaffolding. This distribution creates a social space in which learners articulate metacognitive goals, negotiate meaning, and co-regulate strategies, thereby externalizing metacognitive processes that might remain tacit in solitary work (Karabuğaa, 2012). Also, CSR foregrounds “teacher and peer mediation” as mechanisms that scaffold not only strategy use but also the awareness and regulation of those strategies. Through guided questioning, collaborative planning, and reflective discourse within CSR cycles, learners reformulate their understanding of when and why to deploy specific strategies, thus strengthening metacognitive monitoring and self-regulation in a socially situated context (Tavakoli, 2014).

METACOGNITIVE STRATEGIES AND EFL READING

Metacognitive strategies refer to the strategies, such as planning, monitoring, and evaluation, employed by individuals prior to, during, and following the reading process to enhance their awareness of their own reading methods (Jafari & Ketabi, 2012). The cultivation of metacognitive awareness regarding reading empowers EFL learners to effectively monitor and regulate their reading processes, thus enabling them to systematically organize their reading activities (Marboot et al., 2020). In essence, the EFL learner is engaged in a reflective reading process, whereby they read with an intention of self-evaluation, allowing them to identify deficiencies in their reading approach and, if necessary, engage in re-reading, which can be indicative of their heightened cognitive awareness (Öztürk, 2012).

Metacognitive reading strategies are systematically categorized into three principal domains: planning, monitoring, and evaluation (Baker et al., 2013). During the planning phase, the EFL reader is enabled to delineate their learning objectives prior to the initiation of reading the text (Edizer et al., 2018). The planning phase serves as an intellectual schema representing a form of cognitive preparation. Within the planning phase, strategies, such as the establishment of goals, assessment of prior knowledge, and reading rate are encompassed (Cemiloğlu & Ogur, 2016).

During the monitoring phase, the EFL learner engages in monitoring the accuracy of their predictions and adheres to the established reading plan, while posing questions to evaluate their comprehension and interaction with the text (Karatay, 2009). During this process, where the degree of comprehension is assessed by scrutinizing the structural elements of the text, proficient readers govern the comprehension process in real-time, intensifying their focus on salient points to facilitate understanding, aligning

their predictions with outcomes relevant to the text, and endeavoring to analyze intricate expressions (Özbay & Bahar, 2012). Through the application of monitoring strategies, learners can regulate the comprehension process and foster the development of cognitive frameworks. During the monitoring phase, strategies such as emphasizing critical information, consulting a dictionary, and taking notes are employed (Edizer et al., 2018).

During the evaluation phase, the EFL learner reflects on their reading practices, identifies the methodologies, techniques, and approaches to be adopted in subsequent readings, and engages in discourse regarding deficiencies and strengths in their reading capabilities. This stage culminates in the emergence of evaluative outcomes (Özbay & Bahar, 2012). Through evaluation strategies, individuals are able to juxtapose and analyze their interpretations derived from the text. Consequently, it allows for the formation of meaningful structures in a coherent manner, thereby facilitating the development of linguistic competencies (Edizer et al., 2018). In the evaluation phase, strategies such as summarization, assessing validity in everyday contexts, and conducting research are integrated (Karatay, 2009).

Readers lacking in metacognitive awareness frequently allocate excessive time attempting to decipher individual words rather than deriving meaning from cohesive texts. The maintenance and appropriate application of metacognitive reading strategies engenders a greater level of involvement, interactivity, and responsiveness among learners towards the provided materials (Zhang & Seepho, 2013). Therefore, it is imperative for L2 readers to cultivate an awareness of the manner in which they implement reading strategies in the planning, regulation, and evaluation of their reading processes. To date, a number of empirical studies have concentrated on the effects of strategy-based instruction on reading comprehension ability of second language learners in different contexts.

EMPIRICAL STUDIES ON METACOGNITIVE INTERVENTION AND EFL READING COMPREHENSION

The literature on metacognitive awareness and EFL reading has amassed a robust body of empirical findings showing that explicit metacognitive strategy instruction can improve reading comprehension. Yet a tension remains between descriptive accounts of effects and the more demanding task of integrating findings to illuminate how, when, and for whom these strategies are most effective. The goal of this section is to move beyond mere enumeration of studies and toward a critical synthesis that clarifies mechanisms, contextual factors, and gaps that motivate the current CSR-focused inquiry in Iranian EFL settings.

Across studies, metacognitive strategy instruction, often framed around planning, monitoring, and evaluating, tends to yield gains in reading comprehension relative to control conditions. For example, Takallou (2011) demonstrated that explicitly teaching planning and self-monitoring produced superior comprehension, with authentic texts

eliciting stronger effects than inauthentic texts. This pattern points to a potential interaction between instructional design and text type, suggesting that authentic materials may provide richer cues that better engage metacognitive processes and, in turn, enhance comprehension. Yet, questions about generalizability and boundary conditions persist. Bozkurt and Memiş (2013) reported gender and proficiency-related nuances in metacognitive awareness and reading motivation, with independent readers showing higher levels of metacognitive awareness. Tavakoli (2014) found a strong positive relationship between metacognitive awareness of reading strategies and reading comprehension, yet the magnitude of this relationship varied with English proficiency; learners' repertoire and language level shape how strategies are deployed in practice. Nosratinia and Mohammadi (2017) compared Metacognitive Strategies (MS) training with Collaborative Strategic Reading (CSR) and found MS superior for reading comprehension, raising a critical question about which dimensions of metacognition, self-regulation versus collaborative coordination, drive the strongest gains. Hadji Seyed Hossein Khani et al. (2023) extended the literature into flipped classrooms, showing improvements in reading and self-regulation, and underscoring the role of collaboration and engaged pedagogy in metacognitive development.

A common thread across these studies is the idea that metacognition functions as a mediator between instruction and performance. Theoretical accounts frequently draw on Flavell's metacognitive framework and Vygotskian sociocultural theory to explain why and how learners regulate comprehension. However, several studies treat metacognition as a unitary construct or rely on self-report measures that may not capture the dynamic regulation learners enact in real-time tasks. This reliance on self-report raises methodological concerns about measurement validity and the extent to which reported awareness translates into adaptive strategy use during authentic reading tasks.

Collaborative Strategic Reading (CSR) emerges as a conceptual convergence point, integrating explicit strategy instruction with peer-mediated learning in line with sociocultural assumptions about learning as a social process. In CSR, metacognitive regulation is distributed across group members and supported by scaffolding, which may facilitate the transfer of strategies to new tasks. The literature suggests that CSR can support struggling readers by providing linguistic and cognitive scaffolds, yet the evidence base is uneven, particularly outside Western or well-resourced contexts. Notably, several CSR studies emphasize general reading outcomes; fewer investigations examine how CSR formats—collaborative versus individual—modulate the relationship between metacognitive awareness and comprehension, especially in Iranian high school settings.

Several gaps and unresolved questions emerge from this body of work. Contextual specificity is paramount: how cultural, educational, and linguistic contexts influence the effectiveness of metacognitive strategies and CSR remains

underexplored, and the Iranian EFL milieu presents distinct instructional realities that warrant direct comparison with CSR in other contexts. Another gap concerns instructional modality: although metacognitive strategy training and CSR have shown promise, there is a paucity of studies that directly compare collaborative versus individual delivery of metacognitive instruction within the same framework and outcome domain. A further area needing attention is measurement and mechanism; triangulating self-reported metacognitive awareness with behavioral indicators and process data, such as think-aloud protocols or log data, would help unpack how strategies are enacted in real-time during reading. The role of text type and genre also requires systematic investigation, particularly across authentic and classroom texts and across proficiency levels. Finally, longitudinal impact and transfer remain areas where evidence is sparse, with most studies focusing on immediate or short-term gains. Consequently, although the above studies have collectively incorporated metacognitive strategy instruction and offered positive results with respect to its effectiveness in EFL reading comprehension, they did not compare collaborative versus individual approaches to CSR-oriented EFL reading instruction whereby EFL learners can engage in discussion and receive feedback from their peers and the teacher.

The present study responds to these concerns by targeting Iranian intermediate EFL learners and explicitly examining CSR as a vehicle for metacognitive strategy instruction, with a focus on collaborative versus individual task formats. By doing so, it directly engages the gap concerning instructional modality effects within a CSR framework in a non-Western high school context. The study also aims to contribute to a more nuanced understanding of how metacognitive regulation operates in classroom practice. Additionally, by situating CSR within a conventional pedagogy backdrop, the research seeks to clarify the boundary conditions under which CSR yields additive benefits and to determine whether those benefits persist across task types and learner profiles.

From a practical standpoint, the literature points to several implications for practitioners. Metacognitive awareness remains a valuable predictor of reading success, but its effectiveness is contingent on how strategies are taught and practiced, the social configuration of the learning environment, and the tasks used. CSR offers a promising route to embed metacognitive strategy instruction within a socialized, scaffolded setting, yet its success depends on carefully designed collaborative structures, adequate linguistic supports, and alignment with learners' proficiency. For Iranian EFL contexts, teachers and teacher educators should consider pairing CSR with explicit metacognitive instruction, balancing collaborative and individual tasks to accommodate diverse learner preferences, and employing multiple measures to capture both awareness and actionable strategy use. These findings also hold relevance for policymakers and curriculum designers seeking scalable approaches to enhancing EFL reading proficiency in high school contexts, as well as for

learners who benefit from instruction that foregrounds autonomous, reflective reading practices. By clarifying the conditions under which CSR yields meaningful gains, this line of inquiry contributes to a more nuanced understanding of how metacognitive strategy awareness can be cultivated to support effective reading in English as a foreign language. The literature thus motivates a targeted investigation into CSR-driven metacognitive development and its impact on reading comprehension in Iranian EFL settings, addressing both instructional design and substantive gaps in the extant evidence base. All in all, due to the importance of reading comprehension, the present study seeks to shed more light on the impact of CSR instruction on fostering reading comprehension ability among Iranian EFL learners.

THE PRESENT STUDY

Due to the significant status that reading comprehension has received in Iranian educational context, it is crucially important to examine whether this gap can be filled through the application of a collaborative approach to reading which involves interaction with other individuals. Regarding the above mentioned need of Iranian EFL learners with little knowledge of metacognitive strategies and reading comprehension ability, there is a need for empirically-based interventions that can (a) promote EFL learners' engagement in today's classrooms and (b) facilitate reading comprehension by developing metacognitive strategic behavior of the EFL learners in EFL reading (c) and increase their interest toward reading. Therefore, the following five research questions were formulated.

RQ1. What are the effects of metacognitive strategies instruction through individual tasks on Iranian intermediate EFL learners' reading comprehension performance?

RQ2. What are the effects of metacognitive strategies instruction through collaborative tasks on Iranian

intermediate EFL learners' reading comprehension performance?

RQ3. Is metacognitive strategies instruction more effective through individual tasks or traditional class practice for Iranian intermediate EFL learners' reading comprehension performance?

RQ4. Is metacognitive strategies instruction more effective through individual tasks or collaborative tasks for Iranian intermediate EFL learners' reading comprehension performance?

RQ5. Is metacognitive strategies instruction more effective through individual tasks, collaborative tasks or traditional class practice for Iranian intermediate EFL learners' reading comprehension performance?

METHOD

DESIGN

The present article adopted a quasi-experimental pretest posttest design with a quantitative approach to data collection and analysis to respond to the three research questions (Creswell & Creswell, 2017). To this end, a convenience sampling procedure and an Oxford Placement Test were employed to identify homogeneous participants in terms of language proficiency. Besides, a TOEFL reading comprehension test was used during the pre- and post-tests to collect the quantitative data. A quasi-experimental design was adopted because only the random assignment of the participants to the groups was feasible due to resource constraints (Ary et al., 2019). Table 1 displays the design of the present study.

PARTICIPANTS

The original population of the present study consisted of 118 Iranian high school students who were studying applied science as their field of study. The participants were selected

Table 1. Research Design

Groups	Pretest	Treatment	Posttest
EG1 (MI-I)	TOEFL reading pretest	MI through individual reading tasks	TOEFL reading posttest
EG2 (MI-C)	TOEFL reading pretest	MI through collaborative reading tasks	TOEFL reading posttest
CG (Non-MI)	TOEFL reading pretest	Conventional reading instruction	TOEFL reading posttest

Note. EG1 = Experimental Group One; EG2 = Experimental Group Two; CG = Control Group; MI = Metacognitive Intervention; MI-I = Metacognitive Intervention through Individual Reading Tasks; MI-C = Metacognitive Intervention through Collaborative Reading Tasks; Non-MI = Conventional Reading Instruction without Metacognitive Intervention; TOEFL = Test of English as a Foreign Language

Table 2. OPT Results

Groups	N	M	SD
MI-I	25	8.88	.92
MI-C	25	8.64	.81
Non-MI	25	8.88	.92

MI-I = Metacognitive Intervention through Individual Reading Tasks; MI-C = Metacognitive Intervention through Collaborative Reading Tasks; Non-MI = Conventional Reading Instruction without Metacognitive Intervention

from four intact 12th-grade classes at two high schools in Sari, Mazandaran, each seating 28 to 30 students. They were in the range of 17 to 19 years of age. Through Oxford Placement Tests (OPTs), 75 Iranian intermediate EFL learners were identified and further randomly assigned to two experimental groups and a control group, each having 25 participants. The descriptive information related to the results of the OPTs is given in Table 2, below. The experimental groups received metacognitive intervention through either individual or collaborative reading tasks while the control group followed the conventional reading instruction implemented in their high schools.

INSTRUMENTS AND MATERIAL

Two instruments and a material were used in the present study, which are described below:

An Oxford Placement Test developed by Falla and Davis (2017) and published by Oxford University Press, adopted from the Solutions Placement Tests Series, was used to identify homogeneous participants in terms of language proficiency (i.e., intermediate). The OPT consisted of 50 items organized into three parts: vocabulary and grammar, reading, and writing. All the test items were weighed, after administration, by a single credit with no negative point for wrong answers. According to the interpretation table, those who achieved an overall score of 47 or above would be identified as the ones with intermediate level of language proficiency. The test was initially piloted on an equivalent sample of 10 participants prior to the treatment. The test had an acceptable KR-21 consistency reliability, calculated to be equal to 0.86. The participants had 65 minutes to respond to the test items.

A TOEFL reading comprehension test developed by Broukal and Nolan-Woods (1991) was used to measure the participants' reading comprehension performance prior and subsequent to the treatments. The TOEFL reading test consisted of 30 graded comprehension questions. The overall score of 15 and above was considered the pass mark. The test items were rearranged in the posttest to rule out the testing effect, a threat to internal validity (Ary et al., 2019). The content validity of the test was confirmed by two professors in the subject-specific field. The internal consistency reliability of the test was calculated to be equal to .87 and .89, which was considered acceptable (Creswell & Creswell, 2017). The participants had 40 minutes to complete the test. Finally, to ensure scoring consistency for the TOEFL reading comprehension test, two independent raters scored all responses. Inter-rater reliability was assessed using Cohen's kappa for categorical item judgments and an intraclass correlation coefficient (ICC) for the overall test score. The ICC indicated excellent agreement (ICC = 0.92, $p < .001$), and the Cohen's kappa for item-level scoring was $\kappa = 0.80$, illustrating substantial agreement between raters. Any discrepancies were resolved through discussion and, when necessary, adjudication by a third rater.

The reading material used for the metacognitive intervention sessions was adopted from all the passages contained in

the TOUCHSTONE 4 series, developed by McCarthy et al. (2014). The book was one of the four-level series for adults and young adults and suitable for beginning to intermediate levels (CEFR: A1–B2). The book consisted of 12 units, each containing authentic texts. Besides, it was designed so as to hone the EFL learners' language skills and raise their awareness of grammar and vocabulary required for real-time communication. The content validity of the test was confirmed by two experts in the subject-specific field.

DATA COLLECTION PROCEDURE

The purpose of the present study was to examine the comparative effects of two metacognitive intervention programs, namely MI through individual reading tasks and MI through collaborative reading tasks, as juxtaposed with the conventional reading instruction on Iranian EFL learners' EFL reading comprehension. For this purpose, permission was initially sought from the principals of the two high schools in Sari, Mazandaran. To comply with the ethical considerations, written informed consent was obtained from the participants. The participants were anonymized and they were notified that their information would remain confidential. Besides, they were ensured that their performance on the reading comprehension tests would not affect their final exam grades at high school.

The interventions occurred within 11 sessions. During session one, 75 Iranian intermediate EFL learners were identified through OPTs and further randomly streamed into three groups: two experimental groups and a control group. During session two, the TOEFL reading pre-tests were administered to all the participants and they were given 40 minutes to complete the test. Then, the experimental groups and the control group received treatments for eight sessions (spanning almost two months); that is, from session three to 10. To this end, the first experimental group ($n = 25$) received the metacognitive intervention through individual reading tasks while the second experimental group ($n = 25$) received the metacognitive intervention through the collaborative reading tasks. Besides, the control group ($n = 25$) underwent the conventional reading instruction in place at their high schools. Each intervention session took approximately 60 minutes. During session 11, the TOEFL reading posttests were given to all the participants and they had 40 minutes to complete the test.

The first experimental group received the metacognitive intervention through individual reading tasks. Initially, following Muhammadpour and Khalili Sabet (2024) and Gholinia and Torabi (2011), the teacher presented cognitive (i.e., brainstorming, predicting, skimming, linking with prior knowledge or experience, fix-up strategies, note-taking, recalling grammar rules, guessing meaning from context, scanning, and summarizing,) and metacognitive (i.e., person knowledge, planning and evaluation, self-monitoring, problem-solving, mental translation, directed attention, reflection, and goal setting) reading strategies explicitly for 20 minutes, both of which are conducive to self-management and self-regulation skills. To this end, she used modeling, role playing, and think-aloud protocol to

Table 3. CSR Model Stages for Teaching Cognitive and Metacognitive Strategies

CSR stages	Reading phases	Cognitive strategies	Metacognitive strategies
1) Preview	Pre-reading phase	» Brainstorming » Predicting » Skimming	» Person knowledge » Planning » Evaluation
2) Click and clunk	While-reading phase	» Linking with prior knowledge or experience » Fix-up strategies » Note-taking » Recalling grammar rules » Guessing meaning from context	» Planning » Evaluation » Self-monitoring » Mental translation » Problem-solving
3) Get the gist	While-reading phase	» Scanning » Underlining » Locating specific information	» Planning » Evaluation » Directed attention » Mental translation » Problem-solving
4) Wrap up	Post-reading phase	» Summarizing	» Planning » Evaluation » Reflection » Goal setting

Adapted from Klingner et al. (1998) and Goh and Vandergrift (2021)

teach the cognitive and metacognitive strategies through the CSR model developed by Klingner et al. (1998), given in Table 3 below. After ensuring that the participants have become proficient in applying the strategies through teacher-facilitated activities, the teacher assigned a passage selected from the TOUCHSTONE 4 series, developed by McCarthy et al. (2014) and requested that the participants read it individually and silently and respond to the reading comprehension questions for 20 minutes. Then, she would ask one participant at a time to answer one comprehension question, thus providing teacher feedback for the last 20 minutes. The intervention session took 60 minutes to complete.

The second experimental group received the metacognitive intervention through collaborative reading tasks. Initially, the teacher presented the same cognitive and metacognitive reading strategies for 20 minutes. To this end, she used modeling, role playing, and think-aloud protocol to teach the strategies. After ensuring that the participants have become proficient in applying the strategies through teacher-facilitated activities, the teacher divided the participants into heterogeneous groups. Then, she would assign a passage selected from the same material and asked the participants to read the passage in pairs in collaboration with their peers so as to maximize their involvement and respond to the reading comprehension questions within 20 minutes. Then, she would ask a volunteer from each group at a time to answer one comprehension question, thus providing teacher feedback for the last 20 minutes. The intervention session took 60 minutes to complete.

The control group followed the conventional reading instruction. To this end, the participants underwent the pre-, while-, and post-reading stages and the same reading

material was used for the control group. Besides, the treatment was given conventionally through a teacher-centered manner. Notably, there was no grouping done and the participants were sitting in pairs in rows (i.e., the theater mode). Therefore, no active peer-to-peer interaction was possible. There was only meager teacher-student interaction and few of them were involved per session. In the pre-reading stage, the teacher asked some warm-up comprehension questions related or unrelated to the passage to activate their prior schemas for 10 minutes. In the while-reading stage, the teacher began the teaching process by initially elaborating on the topic of the passage in L1. Then, she read and translated each line of the passage and wrote the synonyms and antonyms of the new words on the board. Meanwhile, she requested the participants to take notes and write them in their (note)books. This process took almost 40 minutes. Finally, in the post-reading stage, the teacher asked the participants and explained how to complete the post-reading activities either in class or at home within 10 minutes. The intervention session took 60 minutes to complete. Next session, the teacher called on a few names and requested them to read them aloud and gave them scores. Upon noticing any errors, the teacher provided peer correction.

The Procedure for CSR Model

The collaborative strategic reading (CSR) model is a reading strategy instructional model that incorporates the cooperative learning approach, whereby the EFL learners work together in small groups and use reading comprehension strategies previously taught by the teacher in different stages, namely previewing, clicking and clunking, getting the gist, and wrapping up (Khampool &

Chumworatayee, 2023). The first stage (i.e., previewing) occurs in the pre-reading phase. The next two stages (i.e., clicking and clunking and getting the gist) occur within the while-reading phase. Finally, the last stage (i.e., wrapping up) occurs in the post-reading phase (Khonamri & Karimabadi, 2015). In each stage, the EFL learners are allowed to exchange information and hone their social skills. They can receive feedback from the teacher and their peers. Therefore, the role of the EFL teacher is that of a facilitator, especially when they encounter problems with implementing the strategies to comprehend the text (Boardman et al., 2015).

The first stage, previewing, pivots around brainstorming and predicting. To this end, the EFL learners are taught to preview the text by looking at the title, pictures, key vocabulary items, etc. The second stage, clicking and clunking, hinges on comprehending the text and using fix-up (i.e., compensatory) strategies when comprehension breakdown occurs. The former is the clicking process and the latter is the clunking process. To figure out what the unknown word or phrase means, EFL learners can guess the meaning from context (i.e., the words or sentences before or after the clunk) or by breaking down the unknown word or clunk in terms of its affixes and root. The third stage, getting the gist, centers upon scanning and underlining the most important 'who' and 'what' in the text and locating the specific information to answer the comprehension questions. Finally, the fourth stage, wrapping up, revolves around summarizing the main ideas in their CSR logs and responding to the questions.

The learners are organized in small groups and each learner has a specific role and responsibility. They share ideas and ask and answer questions every time they come across problems. The teacher also stands next to each group facilitating their discussions and providing final feedbacks (Khampool & Chumworatayee, 2023).

DATA ANALYSIS

The SPSS package, ver. 29 (IBM SPSS Statistics 29.0), was used to analyze the data. To compare the reading comprehension scores of the three groups during the pretest and posttest phases, a one-way ANCOVA was used to examine whether there were any statistically significant differences among them. The choice of the one-way ANCOVA was informed by an analysis of the effect of

one categorical independent variable (i.e., metacognitive reading intervention) with three levels (i.e., individual tasks, collaborative tasks, and conventional tasks) on one continuous dependent variable (i.e., reading comprehension posttest) while controlling for the effect of a continuous independent covariate (i.e., reading comprehension pretest). Also, the post-hoc Tukey test was run to probe into the paired comparisons between each two groups. Finally, to further reveal the effectiveness of each single treatment from the pretest to the posttest, paired-sample *t*-tests were used.

RESULTS

The internal consistency reliability of the TOEFL reading comprehension tests was initially examined in terms of the Cronbach's Alpha statistic, which was calculated to be .87 and .89 for the pretest and posttest, respectively. Then, a one-way ANCOVA was run to compare the reading comprehension performance among the three groups. However, the assumptions for running ANCOVA; that is, normality of the data, Levene's homogeneity of variances, random independent samples, homogeneity of regression slopes, scatterplot, and linearity, were checked and confirmed. Effect sizes were also reported in terms of the statistical tests performed.

Table 4 and Figure 1 present the descriptive statistics of the three groups while Table 5 presents the inferential statistics related to the performances of the three groups on the TOEFL reading comprehension pre- and posttests. Table 4 indicated that there was a statistically significant difference among the three groups in terms of their reading comprehension performance ($F(2, 71) = 19.20; p < .05$) with a large effect size ($\eta^2 = .35$).

RESEARCH QUESTION ONE

The first research question examined the effects of the metacognitive strategies instruction through individual tasks on Iranian intermediate EFL learners' reading comprehension performance. To arrive at the answer, paired samples *t*-tests were run on the TOEFL reading tests of the MI-I group from time one to time two. As reported in Table 6 below, the results revealed that the MI-I treatment could improve the participants' reading comprehension from the pretest to the posttest in a statistically significant manner.

Table 4. Descriptive Statistics Related to the TOEFL Reading Comprehension Pretest and Posttest Scores

Group	Pretest			Posttest		
	Mean	Std. deviation	N	Mean	Std. deviation	N
MI-I (Exp. 1)	18.28	2.15	25	20.88	2.69	25
MI-C (Exp. 2)	18.16	1.93	25	21.40	2.46	25
Non-MI (CG)	18.36	2.34	25	20.12	2.71	25
Total	18.27	2.12	75	20.80	2.64	75

Note. Exp. = Experimental Group; CG = Control Group; MI-I = Metacognitive Intervention through Individual Reading Tasks; MI-C = Metacognitive Intervention through Collaborative Reading Tasks; Non-MI = Conventional Reading Instruction without Metacognitive Intervention

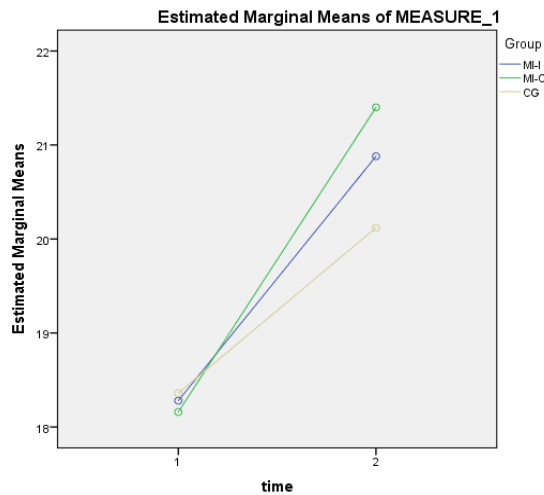


Figure 1. The Estimated Marginal Means of the Three Groups from Time One to Time Two

Table 5. One-way ANCOVA on TOEFL Reading Posttest

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared	Noncent. Parameter	Observed Power
Corrected Model	465.02	3	155.00	207.73	.00	.89	623.19	1.00
Intercept	.10	1	.10	.14	.70	.00	.14	.06
Pretest	444.30	1	444.30	595.42	.00	.89	595.42	1.00
Group	28.66	2	14.33	19.20	.00	.35	38.41	1.00
Error	52.97	71	.74					
Total	32966.00	75						
Corrected Total	518.00	74						

Table 6. Paired Samples t-Test on TOEFL Reading Test Scores of Each Group from Pretest to Posttest

Group	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig (2-tailed)
				Lower	Upper			
MI-I (Exp 1)	-2.60	.86	.17	-2.95	-2.24	-15.01	24	.00
MI-C (Exp 2)	-3.24	.97	.19	-3.64	-2.84	-16.70	24	.00
Non-MI (CG)	-1.76	.92	.18	-2.14	-1.37	-9.50	24	.00

Note. Exp. = Experimental Group; CG = Control Group; MI-I = Metacognitive Intervention through Individual Reading Tasks; MI-C = Metacognitive Intervention through Collaborative Reading Tasks; Non-MI = Conventional Reading Instruction without Metacognitive Intervention

RESEARCH QUESTION TWO

The second research question investigated the effects of the metacognitive strategies instruction through collaborative tasks on Iranian intermediate EFL learners' reading comprehension performance. To arrive at the answer, paired

samples *t*-tests were run on the TOEFL reading tests of the MI-C group from time one to time two. As reported in Table 6 above, the results revealed that the MI-C treatment could improve the participants' reading comprehension from the pretest to the posttest in a statistically significant manner.

Table 7. Pairwise Comparisons Related to the One-Way ANCOVA on TOEFL Reading Test

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
MI-I	MI-C	-.65	.24	.02	-1.25	-.06
	Non-MI	.85	.24	.00	.25	1.45
MI-C	MI-I	.65	.24	.02	.06	1.25
	Non-MI	1.51	.24	.00	.91	2.11
Non-MI	MI-I	-.85	.24	.00	-1.45	-.25
	MI-C	-1.51	.24	.00	-2.11	-.91

Note. Exp. = Experimental Group; CG = Control Group; MI-I = Metacognitive Intervention through Individual Reading Tasks; MI-C = Metacognitive Intervention through Collaborative Reading Tasks; Non-MI = Conventional Reading Instruction without Metacognitive Intervention

RESEARCH QUESTION THREE

The third research question queried whether the metacognitive strategies instruction was more effective through individual tasks or traditional class practice for Iranian intermediate EFL learners' reading comprehension performance. Figure 1 and Table 7 presenting the results of the pairwise comparisons indicate that the metacognitive instruction was more effective through individual tasks than the traditional class practice for Iranian intermediate EFL learners' reading comprehension performance.

RESEARCH QUESTION FOUR

The fourth research question probed whether the metacognitive strategies instruction was more effective through individual tasks or collaborative tasks for Iranian intermediate EFL learners' reading comprehension performance. Figure 1 and Table 7 presenting the results of the pairwise comparisons indicate that the metacognitive instruction was more effective through collaborative tasks than the individual tasks for Iranian intermediate EFL learners' reading comprehension performance.

RESEARCH QUESTION FIVE

The fifth research question inquired whether the metacognitive strategies instruction was more effective through individual tasks, collaborative tasks or traditional class practice for Iranian intermediate EFL learners' reading comprehension performance. A quick look at the results of pairwise comparisons given in Table 7 and Figure 1, above, indicated that all three treatments were statistically effective in terms of improving the reading comprehension of the Iranian intermediate EFL learners. However, the most effective treatment was metacognitive strategies instruction through collaborative reading tasks followed by individual reading tasks, followed by the conventional reading instruction. Thus, results pointed to the more significant effectiveness of the MI-C in terms of improving the reading comprehension of the Iranian intermediate EFL learners.

DISCUSSION

A review of the related literature on metacognitive

intervention reveals that few studies to date have examined the effect of a collaborative strategic reading (CSR) approach (Vaughn et al., 2011) to teaching cognitive and metacognitive strategies aimed at facilitating and improving the reading comprehension of Iranian intermediate EFL learners. To this end, the present study implemented a collaborative approach to EFL reading comprehension whereby EFL learners could engage in cooperative discussion with their peers and receive feedback from them and their teacher. Our findings collectively revealed that the three proposed treatments, namely MI-I, MI-C, and Non-MI, were successful in improving the Iranian intermediate EFL learners' reading comprehension from the pretest to the posttest. However, the metacognitive instruction was more effective through collaborative tasks than the individual tasks for Iranian intermediate EFL learners' reading comprehension performance. Besides, both the MI-C and MI-I groups outperformed their Non-MI control group counterparts. Therefore, the most effective treatment was metacognitive strategies instruction through collaborative reading tasks followed by individual reading tasks, followed by the conventional reading instruction.

To explain the findings, the employment of diverse cognitive and metacognitive reading strategies during the reading process may have enhanced the comprehension of the text's content; focusing on the text's lexical and structural attributes and augmenting the speed of comprehension (İşeri, 2017). In addition, facilitating active engagement in the reading endeavor in the treatment groups, both collaboratively and individually, laid the groundwork for the cultivation of strategies, such as monitoring, reflection, evaluation, and retention of the text content (Akyol et al., 2014). At each phase of the reading process, EFL readers who harnessed metacognitive strategies reflected upon their comprehension of the text, oversaw the reading process, and assessed the efficacy of the strategies they employed (Tavakoli, 2014), thus leading to their outstanding performance in reading comprehension. In other words, through the knowledge of cognitive and metacognitive strategies, they reassessed the reading strategies applicable to the text, ascertained suitable methods, endeavored to comprehend the text's structure, sought inferential

pathways, and finally retained information that might have been requisite for future references, and utilized resources, such as dictionaries and more knowledgeable others, as necessary (Cemiloğlu & Oğur, 2016).

Our results are generally in agreement with those of the previous studies (e.g. Nosratinia & Mohammadi, 2017; Takallou, 2011) in terms of the positive effect of metacognitive intervention on the reading comprehension of EFL learners. To explain more, the EFL learners possessed an understanding of the strategies that were essential for accomplishing the intended reading objectives and were knowledgeable regarding their application at that particular phase as a result of undergoing the metacognitive intervention. This awareness situated them within the metacognitive framework, encompassing a comprehension of the lexical and structural components of the text and an intentional regulation of the reading process (Hadji Seyed Hossein Khani et al., 2023). Throughout the act of reading, EFL learners employed cognitive and metacognitive processes deliberately to interpret the meanings embedded within the texts. These methodologies, referred to as reading strategies, significantly contributed to the attainment of reading comprehension (Bozkurt & Memiş, 2013).

That being said, since CSR was only implemented with a specific text type adopted from TOUCHSTONE 4 series, it might not have allowed for transfer of cognitive and metacognitive skills across various passages, which could have provided broader opportunity to practice reading various text types and was more likely to bolster the EFL reading comprehension outcomes through the proposed CSR model (Conley & Wise, 2011). Generally speaking, high-achieving readers are capable of interacting better with a wide array of texts and they seem to be able to integrate a wide variety of reading strategies throughout the entire reading comprehension process.

However, CSR could arm the EFL learners divided into heterogeneous and small groups with the opportunity to receive proper feedback from their peers and the teacher, which would increase their motivation and active engagement with the text and give them the agency to hone their EFL reading skill. To this end, they discussed the content in small student-led groups, asked and answered their questions, and tested their metacognitive theories, whereby they could fine-tune their way of thinking about the text and resolve their miscomprehensions (Klingner et al., 2004). This was achieved because the CSR model provided collaborative reading opportunities that promoted the peer-to-peer interaction. Finally, the teacher observed that they used compensatory or fix-up strategies every time they experienced comprehension breakdowns. This occurred since they were armed with the planning, monitoring, evaluating, and problem-solving skills, which were taught to them during the metacognitive reading instruction through the CSR model (Murphy et al., 2009). Despite the overall positive pattern we observed, where metacognitive instruction improved reading comprehension and was enhanced by collaborative formats, our findings diverge from some prior work. Notably, Nosratinia and

Mohammadi (2017) reported that teaching Metacognitive Strategies (MS) yielded greater gains in reading comprehension than Collaborative Strategic Reading (CSR), suggesting that solitary, trainer-led metacognitive training can outperform CSR in certain contexts. This contrasts with our central claim that CSR-enhanced, collaborative metacognitive instruction produced the strongest outcomes, at least for Iranian intermediate EFL learners.

Several factors could account for this discrepancy. First, the comparative designs differ: Their study focused on direct MS versus CSR without a fixed CSR implementation in a heterogeneous classroom, whereas our study explicitly embedded metacognitive instruction within CSR and compared collaborative versus individual CSR-like formats against a conventional instructional condition. Second, the contexts and text types may differ in ways that influence which approach yields greater gains. They conducted their study in a different EFL setting and with different text genres, whereas our CSR treatment used a particular classroom text type drawn from TOUCHSTONE 4, which may affect generalization and transfer. Third, measurement and timing differ: the durability and scope of gains (immediate post-test versus longer-term transfer) can shift relative advantages between MS and CSR. These considerations underscore that the relative efficacy of MS versus CSR may be contingent on instructional design, task demands, and learner characteristics.

In our study, the superiority of collaborative metacognitive instruction aligns with sociocultural accounts of learning that emphasize social mediation and distributed cognition. The CSR environment provides scaffolded opportunities for learners to articulate, monitor, and regulate their thinking in dialogue with peers and the teacher, which may enhance the externalization and refinement of metacognitive processes beyond what individual MS instruction achieves. Yet the mixed findings in the literature caution against single-category generalizations. For example, Takallou (2011) found that both planning and self-monitoring improved comprehension, with authentic texts amplifying effects, suggesting that task authenticity interacts with metacognitive training. Our results resonate with this line of evidence insofar as collaborative tasks may provide authentic, observable contexts for metacognitive regulation to emerge and be reinforced through peer feedback.

In sum, our findings support the broader conclusion that metacognitive instruction benefits EFL reading, with the collaborative modality offering additional gains in our Iranian intermediate sample. However, the contrasting results reported by Nosratinia and Mohammadi (2017) highlight that the relative effectiveness of MS versus CSR is not universal. Future research should adopt more nuanced design rationales that vary task types, text genres, duration of intervention, and measurement approaches (including process data and transfer tasks) to delineate the conditions under which CSR-driven metacognitive development yields the most durable and transferable gains.

CONCLUSION

Due to the importance of reading comprehension, the present study sought to shed more light on the impact of CSR instruction on fostering reading comprehension ability among Iranian intermediate EFL learners. To this end, the present study was designed to raise the Iranian intermediate EFL learners' awareness of cognitive and metacognitive reading strategies they could use while reading graded passages. Therefore, this study examined the usefulness of metacognitive strategies instruction through collaborative versus individual reading tasks, as juxtaposed with the conventional reading instruction, among different groups of learners. Our findings collectively revealed the higher effectiveness of the metacognitive intervention through the collaborative reading tasks followed by the individual tasks, when compared with the conventional reading instruction without the metacognitive intervention.

We believed that the results of such a study could provide teacher educators and instructors with practical suggestions and implications for helping EFL learners increase their metacognitive awareness and use of metacognitive reading strategies. A point to remember is that although the CSR model proved efficacious in terms of boosting the Iranian intermediate EFL learners' reading comprehension, EFL teachers and curriculum designers need to know that they need to tailor the reading content to address the specific learning needs of all the EFL learners with varying reading proficiency levels so that they can specialize in the cognitive and metacognitive strategies that they need to accomplish their reading tasks through the CSR model. To this end, the metacognitive reading instruction through collaborative reading tasks can assist EFL learners with initially acquiring the strategies and then practicing the application of those strategies regularly, which needs great time and effort.

The present study was limited in a number of ways. Firstly, we used convenience sampling to identify our participants from intact classes of two high schools in Sari, Iran, which might jeopardize the generalizability of the findings to other contexts and populations. The relatively short duration of the treatments also raises questions about their validity. A consideration of the long-term effects of the metacognitive reading instruction through the CSR model on EFL reading comprehension performance of the Iranian intermediate EFL learners might suggest that researchers need to consider extended periods for the treatments. Besides, mere consideration of quantitative measures of reading comprehension might ignore other critical aspects of reading comprehension, such as strategic knowledge, vocabulary knowledge, and reading or cognitive deficit, pointing to the need to consider a broader evaluative lens in subsequent studies.

Given that the present study was conducted during a term period, controlling the participants' possible exposure to other learning content was not feasible. Therefore, although there was not much going on outside the classroom, some learning from other resources might have happened. In

addition, it may be required to replicate the present study with a larger population in future studies. Although the MI-C groups outperformed the MI-I and conventional groups, this does not suggest that we need to dismiss the conventional reading instruction already in place in high schools as they can provide several advantages, still in need of further investigations. A future line of research can consider the effect of age, gender, and reading proficiency on the reading comprehension of Iranian intermediate EFL learners through the CSR model.

Authors' contributions

All authors have contributed equally to prepare the paper.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Conflict of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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