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The Effects of Metacognitive Listening Strategies Instruction on Listening Comprehension Performance, Strategy Use, and Perceptions of Iranian Introvert and Extrovert EFL Learners

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Abstract

The present mixed-methods study investigated the comparative effects of metacognitive listening strategies on the listening comprehension performance, strategy use, and perceptions of Iranian EFL learners, with a specific focus on the moderating role of personality traits, such as introversion and extroversion. For this purpose, through the EPQ-R extroversion subscale, 120 Iranian intermediate EFL male and female learners were classified into four groups: introverted EG1 (n = 30), extroverted EG2 (n = 30), introverted CG1 (n = 30), and extroverted CG2 (n = 30). The experimental groups received the metacognitive listening strategies instruction for 12 weeks, while the control groups underwent their regular conventional listening instruction. The quantitative results indicated that the introverted group members outperformed their extroverted counterparts in terms of listening comprehension performance and strategy use, specifically in terms of monitoring and evaluation. The qualitative findings also revealed the positive perceptions of both groups toward metacognitive listening strategies. However, the introverted group members made more mention of the effectiveness, ease of use, and utility of this particular instruction. The findings suggested that the effectiveness of metacognitive listening strategy instruction depends partly on learners' personality traits, supporting the interactionist view of language learning. They challenge a one-size-fits-all approach by showing that introverted learners may have a relative advantage in the reflective domain of metacognition. Pedagogically, the study highlights the need for differentiated listening instruction, with enhanced self-regulated practice for introverted learners and greater collaborative support for extroverted learners.

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1. INTRODUCTION

In the domain of Second Language Acquisition (SLA), listening comprehension stands as one of the most critical yet underdeveloped competencies among English as a Foreign Language (EFL) learners (Bozorgian et al., 2025; Brown, 2001; Vandergrift, 2007). As a foundational skill, listening enables learners to decode spoken language, interpret meaning, and participate in authentic communicative exchanges (Goh & Burns, 2012; Rost, 2016). Despite its centrality in real-world language use, listening remains a persistent challenge for EFL learners, particularly in non-English-speaking contexts such as Iran, where curricula often prioritize grammar, vocabulary, and written expression over oral comprehension (Rahimi & Ghasemi, 2018; Saeidi & Keshavarz, 2015). This pedagogical imbalance results in learners who may possess strong linguistic knowledge but struggle to understand native speakers, academic lectures, or everyday conversations in English (Pourhosein Gilakjani, 2014; Zhang, 2013).

One promising avenue for improving listening comprehension lies in the strategic use of metacognitive listening strategies—learners' conscious awareness and regulation of their cognitive processes during listening tasks (Chamot & O'Malley, 1994; Ghanipour & Bozorgian, 2026; Wenden, 1998). These strategies encompass three core components: planning (e.g., predicting content based on context, setting listening goals), monitoring (e.g., checking comprehension, identifying gaps in understanding), and evaluating (e.g., reflecting on the effectiveness of strategies, adjusting future approaches) (Flavell, 1979; Huang, 2025; Zhang, 2013). Unlike cognitive strategies, which involve direct manipulation of linguistic input (e.g., note-taking, summarizing), metacognitive strategies operate at a higher level of self-regulation, enabling learners to become autonomous, reflective, and adaptive in their learning (Eberhart et al., 2025; Guo, 2026; Zimmerman, 2002).

Empirical evidence supports the efficacy of metacognitive strategy instruction in enhancing listening performance (Zhang & Xu, 2025). For instance, Zhang (2013) demonstrated that learners trained in metacognitive strategies such as goal-setting and self-monitoring significantly improved their comprehension of academic lectures in English. Similarly, Alavi and Rezaei (2016) reported that Iranian EFL learners who received explicit instruction in metacognitive listening strategies outperformed control groups in post-test listening assessments. These findings align with broader research indicating that metacognitive awareness fosters deeper processing, improves retention, and increases learner confidence (Barnett, 2005; Hasim et al., 2025; Wenden, 1998).

However, the effectiveness of metacognitive strategies may not be uniform across all learners (Teng, 2025). Individual differences, particularly personality traits, play a crucial role in shaping how learners engage with and benefit from such strategies (Vakilifard & Heydari Khosro, 2025). According to Eysenck's (1967) biological theory of personality, introversion and extroversion represent two ends of a continuum characterized by differences in arousal levels, social orientation, and information processing styles. Introverts are typically described as reserved, reflective, and internally focused, preferring quiet, solitary environments for deep thinking (Adi, 2019; Ahmadi Safa & Jamshidi, 2017). In contrast, extroverts are sociable, energetic, and externally oriented, thriving in interactive, dynamic settings (Eysenck, 1967; Kayaoglu, 2013).

These personality differences have significant implications for language learning. Extroverted learners are more likely to participate actively in classroom discussions, take communicative risks, and seek feedback (Dörnyei, 2005; Gardner, 1985; Shaojie et al., 2024). Conversely, introverted learners may avoid speaking in class, prefer structured tasks, and rely on internal reflection and self-regulation (MacIntyre & Gardner, 1994; Madarbakus-Ring, 2025). These tendencies suggest that introverted learners may be more inclined to use metacognitive

strategies, such as self-monitoring and reflective evaluation, while extroverted learners might favor interactive, socially mediated strategies (Li & Zhang, 2020; Zhang & Li, 2021).

Despite increasing attention to metacognitive strategies in language education, a significant gap persists in understanding how these strategies influence listening comprehension among learners with differing personality profiles. In Iran, where EFL instruction is predominantly teacher-centered and exam-oriented, listening is often marginalized in favor of grammar drills and reading comprehension (Rahimi & Ghasemi, 2018; Saeidi & Keshavarz, 2015). As a result, learners frequently report anxiety, low confidence, and poor comprehension when exposed to authentic spoken English (Pourhosein Gilakjani, 2014; Tavakoli & Rezaei, 2017).

While several studies have demonstrated the benefits of metacognitive strategy training in listening (e.g., Alavi & Rezaei, 2016; Zhang, 2013), few have examined how personality traits such as introversion and extroversion influence the adoption and effectiveness of these strategies. Furthermore, existing research often relies on quantitative data alone, neglecting learners' lived experiences and perceptions (Dörnyei, 2007; Nunan, 2003). Without understanding how learners feel about using metacognitive strategies, whether they find them helpful, easy to apply, or relevant to their learning styles, pedagogical interventions risk being ineffective or poorly received (Benson, 2011).

The primary purpose of this study is to investigate the effects of metacognitive listening strategies on the listening comprehension performance of Iranian EFL learners, with a specific focus on the moderating role of personality traits, such as introversion and extroversion. The study also aims to explore the learners' perspectives on the usefulness, ease of use, and perceived effectiveness of metacognitive listening strategies in real classroom contexts.

By integrating quantitative performance data with qualitative insights, this research seeks to (1) examine the differential impact of metacognitive strategy instruction on introverted and extroverted learners, (2) identify which metacognitive strategies are most effective for each personality type, (3) provide practical recommendations for EFL teachers in Iran and similar contexts to tailor listening instruction based on learners' personality profiles, and finally (4) contribute to the growing body of literature on individual differences in language learning. To achieve the stated purpose, the following research questions guided the study:

1. What is the comparative effect of metacognitive listening strategies on the listening comprehension performance of Iranian introverted and extroverted EFL learners?
2. How do introverted and extroverted EFL learners differ in their use of metacognitive listening strategies?
3. What are the learners' subjective viewpoints regarding the usefulness, ease of use, and perceived effectiveness of metacognitive listening strategies in listening instruction?
4. How do personality traits (introversion/extroversion) influence learners' perceptions of metacognitive listening strategies?

2. LITERATURE REVIEW

Metacognitive listening strategies are particularly crucial in EFL (English as a Foreign Language) contexts where learners often face challenges such as unfamiliar accents, fast speech rates, and limited exposure to authentic input (Bozorgian et al., 2022). Research has consistently shown that learners who are trained in metacognitive strategies demonstrate improved listening comprehension performance (Vandergrift, 2007). For instance, Vandergrift and Tafaghodtari (2010) found that explicit instruction in metacognitive strategies significantly enhanced learners' ability to understand spoken discourse, especially when dealing with complex or unfamiliar content. Also, metacognitive strategies were found to enable learners to anticipate content, identify

key information, and adjust their listening approach when comprehension breaks down (Zhang, 2013).

Foundations of metacognitive strategies

The theoretical underpinnings of metacognitive strategies are rooted in cognitive psychology and constructivist learning theory. Flavell's (1979) metacognitive theory posits that learners who are aware of their own cognitive processes can regulate their learning more effectively. This aligns with Vygotsky's (1978) sociocultural theory, which emphasizes the role of guided instruction and scaffolding in developing higher-order thinking skills. In the context of listening, this suggests that learners benefit from structured, teacher-supported instruction in metacognitive strategies before they can independently apply them.

Additionally, the framework proposed by Oxford (1990) and later expanded by Chamot and O'Malley (1994) categorizes metacognitive strategies into three main types: planning, monitoring, and evaluating. These strategies are not only instrumental in improving comprehension but also foster learner autonomy—a key goal in modern EFL pedagogy (Benson, 2011).

Empirical evidence on metacognitive strategy instruction and listening comprehension

A growing body of research supports the efficacy of metacognitive strategy instruction in enhancing listening comprehension (Muhammadpour, 2025). For example, Vandergrift (2007) conducted a meta-analysis of studies on listening strategy instruction and concluded that metacognitive strategies had a moderate to large effect size on listening performance. Similarly, Zhang (2013) found that Iranian EFL learners who received explicit instruction in metacognitive strategies outperformed their peers in a control group on listening comprehension tests.

In a study by Pourhosein Gilakjani (2014), Iranian intermediate EFL learners who were taught metacognitive strategies showed significant gains in listening comprehension, particularly in tasks involving inferential and global understanding. The researchers attributed this improvement to learners' increased ability to set goals, monitor their understanding, and adjust their listening behaviors in real time. Alavi and Rezaei (2016) found that Iranian EFL learners who received explicit training in metacognitive listening strategies significantly outperformed their peers in a post-test measuring listening comprehension. Similarly, Zhang (2013) reported that learners who used metacognitive strategies such as goal-setting and self-monitoring were more effective in understanding academic lectures in English. Moreover, studies by Razavi et al. (2023) and Vandergrift (2005) have demonstrated that metacognitive training not only improves performance but also increases learners' confidence and motivation.

This is particularly relevant in EFL contexts where learners often experience anxiety and low self-efficacy in listening tasks. Recent scholarship has continued to validate these findings across diverse educational contexts. Bozorgian et al. (2025) provided further evidence that metacognitive instruction facilitates the automation of listening processes, allowing learners to shift from cognitive overload to more efficient comprehension strategies. In a quasi-experimental study, Rahimi and Katal (2013) investigated the impact of the Metacognitive Pedagogical Sequence (MPS) on Iranian EFL learners and found that the intervention significantly improved the learners' listening proficiency and their metacognitive awareness over a semester. Finally, a study by Muhammadpour et al. (2025) highlighted that metacognitive strategy training helps reduce listening anxiety, thereby creating a more positive affective environment for language acquisition. Collectively, these recent studies underscore the sustained relevance of metacognitive strategy instruction as a vital component in the development of effective listening skills.

The role of introversion and extroversion in listening comprehension

Personality traits, particularly introversion and extroversion, have been widely studied in relation to language learning. Based on Eysenck's (1967) personality theory, introversion is characterized by a preference for solitude, internal reflection, and cautiousness in social interactions, while extroversion is marked by sociability, assertiveness, and a tendency to seek stimulation from external sources.

In the context of language learning, extroverted learners are often perceived as more active participants in classroom discussions and pair work, which may facilitate oral practice and interactional competence (MacIntyre & Gardner, 1994). Conversely, introverted learners may be more reflective, detail-oriented, and less likely to engage in spontaneous speaking, which can hinder oral fluency but may enhance depth of processing and accuracy (Dörnyei, 2005). These differences may affect how learners adopt and benefit from metacognitive strategies.

However, the relationship between personality and listening comprehension is less explored. Some researchers suggest that introverted learners may possess inherent advantages in listening tasks due to their tendency toward deep processing, heightened attention to detail, and reduced susceptibility to external distractions (Dörnyei, 2005; MacIntyre & Gardner, 1994). Unlike extroverted learners who often thrive in interactive, fast-paced classroom environments, introverted learners are more likely to engage in reflective and internalized cognitive processing, which can enhance their ability to decode complex auditory information, especially when listening to native-like speech with subtle differences in intonation, stress, and rhythm (Alavi & Rezaei, 2016; Zhang, 2013).

Moreover, introverted learners may be more inclined to use metacognitive strategies such as self-monitoring and reflection, particularly in low-stimulation or individualized learning contexts. For instance, Taghizade et al. (2022) found that introverted Iranian EFL learners reported greater use of self-assessment and planning strategies during listening tasks, which contributed to their improved comprehension over time. This suggests that while introverts may be less visible in group discussions, they may be more effective listeners when given opportunities for quiet, focused engagement with audio materials.

Conversely, extroverted learners often demonstrate higher levels of participation and confidence in communicative activities, which can positively influence their listening performance in interactive settings, such as listening to dialogues, debates, or real-time conversations, where immediate feedback and social interaction are integral (Dörnyei, 2007). However, their reliance on external stimulation and social cues may sometimes lead to superficial processing or difficulty maintaining focus during monologues or lectures with minimal interaction (Ahmadi Safa & Jamshidi, 2017). Moreover, the integration of metacognitive strategies into listening instruction has been under-researched in Iranian educational settings. While some studies have addressed general language learning strategies (e.g., Saeidi & Keshavarz, 2015), few have focused on listening or considered the role of personality.

Despite growing recognition of the role of personality in language learning, few studies have examined how introversion and extroversion moderate the impact of metacognitive listening strategies, especially in EFL contexts like Iran. Most existing research treats learners as a homogeneous group, overlooking the nuanced ways in which individual differences shape strategy use and learning outcomes (Pourhosein Gilakjani, 2014; Saeidi & Keshavarz, 2015). Moreover, while some studies have explored metacognitive strategy instruction (e.g., Alavi & Rezaei, 2016; Zhang, 2013), few have integrated personality traits as a moderating variable or gathered qualitative insights into learners' subjective experiences.

This study, therefore, aims to bridge these critical gaps by investigating the effects of metacognitive listening strategies on the listening comprehension performance of Iranian EFL learners, with a specific focus on the moderating role of introversion and extroversion. Additionally, it aims to explore learners' perspectives on the usefulness, ease of use, and perceived effectiveness of these strategies in real classroom settings.

3. METHODOLOGY

Research Design

This study employed a mixed-methods explanatory sequential design, where quantitative data were collected first, followed by qualitative data to explain and elaborate on the numerical findings. This approach allowed for a comprehensive understanding of both the measurable impact of metacognitive strategy instruction and the learner experiences underlying those outcomes (Creswell & Clark, 2018). Also, methodologically speaking, the study employed a matched-treatment design in which the same metacognitive strategy framework was presented through different delivery formats tailored to introverted and extroverted learners. Therefore, the study was not designed to isolate the independent effect of personality from the independent effect of instructional mode. Rather, it investigated whether metacognitive listening strategy instruction would be beneficial when delivered in ways considered more compatible with learners' personality orientations. A fully crossed design, in which introverted and extroverted learners each experience both reflective and interactive instructional formats, would be needed to disentangle these effects more precisely.

Participants

A total of 120 Iranian EFL learners (60 males, 60 females) aged between 18 and 24 years participated in the study. They were enrolled in intermediate-level English language courses at Azad University of Tonekabon, Iran. Participants were selected through stratified random sampling based on their performance on an IELTS listening pretest and their scores on the Eysenck Personality Questionnaire-Revised (EPQ-R) (Eysenck & Eysenck, 1991). Based on EPQ-R extroversion subscale scores, learners were classified into four groups: introverted EG1 (n = 30), extroverted EG2 (n = 30), introverted CG1 (n = 30), and extroverted CG2 (n = 30). The inclusion criteria were: (a) at least two years of formal English instruction, (b) intermediate proficiency level (CEFR B1–B2), and (c) no prior exposure to metacognitive strategy instruction in listening. All participants provided informed consent, and ethical approval was obtained from the Review Board of the University of Tonekabon.

Instruments

IELTS listening comprehension test

The Cambridge IELTS 19 Academic test, published by Cambridge University Press (UCLES, 2024), was used to measure the participants' EFL listening comprehension skill. The IELTS listening test consisted of 40 items organized into four parts, namely a dialogue, a monologue, a lecture, and a discussion. An equivalent test from the same package was used as the post-test to check their improvement in listening comprehension performance after the treatment. The participants were given 30 minutes to finish the test. The internal consistency reliability of the

Cambridge IELTS test was calculated to be equal to .89, which is considered acceptable (Hashemi & Daneshfar, 2018). The test was validated by three experts from the subject-specific field.

Metacognitive Listening Strategy Inventory (MLSI)

A Metacognitive Listening Strategy Inventory (MLSI) was adapted from Alavi and Rezaei (2016) and Zhang (2013). This 24-item 5-point Likert-scale questionnaire (1 = Never, 5 = Always) measured the frequency of use of metacognitive strategies across three dimensions: planning (5 items) (e.g., "I predict what the speaker will say before listening"), monitoring (13 items) (e.g., "I check if I understand the main idea"), and evaluation (6 items) (e.g., "I reflect on how well I listened after the task"). The participants were given 15 minutes to complete the questionnaire. The instrument demonstrated strong reliability (Cronbach's $\alpha = 0.91$).

Eysenck Personality Questionnaire-Revised (EPQ-R)

An adapted version of the Eysenck Personality Questionnaire (EPQ-R) was used to assess extroversion levels. The extroversion subscale (12 items) has been widely validated across cultures, including Iranian populations (Saeidi & Keshavarz, 2015). The participants were given 15 minutes to complete the questionnaire. That being said, the questionnaire has been validated in terms of face and content validity by three professors from the subject-specific field. Also, the internal consistency reliability of this instrument was calculated to be equal to $\alpha = 0.86$, which is considered acceptable.

Semi-Structured Interview Guide

A semi-structured interview, developed by the researchers, was utilized to explore the participants' perceptions of metacognitive strategies. The participants engaged in one-on-one semi-structured interviews with an average duration of 25 minutes. The face and content validity of the interview items were examined by three experts in applied linguistics. For this purpose, they provided item relevance ratings according to which a Content Validity Index (CVI) was calculated per item. Items achieving a CVI of .78 or higher were recognized as having acceptable content validity. Finally, two of the researchers coded the interview data, and they reached an agreement between their judgments, receiving an inter-rater reliability of .87, which was considered acceptable (Creswell & Creswell, 2017). The finalized guide included open-ended questions, such as:

"How did you feel about using prediction or self-monitoring during listening tasks"?

"Did you find any strategy particularly helpful or difficult? Why"?

"How did your personality affect your approach to listening"?

Procedure

The study spanned 12 weeks and was conducted in two phases:

Phase 1: Quantitative Phase

Participants first completed the IELTS and MLSI pretests, followed by the EPQ-R questionnaire; the entire procedure took approximately 60 minutes. The experimental groups ($n = 60$) received 12 weeks of metacognitive listening strategy instruction, delivered twice weekly (60 minutes per

session). Instruction generally included explicit teaching of planning, monitoring, and evaluation strategies through modeling, guided practice, and reflection journals.

For the introverted EFL learners (n = 30), metacognitive listening strategy instruction was delivered in a more individual and reflective format to match their preference for quiet, self-paced learning (Bouchareb, 2024; Culduz, 2024). During each session, the teacher explicitly introduced one or more strategies related to planning, monitoring, and evaluation. For example, before listening, students were asked to predict the topic, activate prior knowledge, and write down possible vocabulary or key ideas they expected to hear. While listening, they completed individual checklists to monitor their understanding, identify parts they missed, and note whether their predictions were confirmed or needed revision. After listening, they engaged in self-evaluation through reflection journals, in which they described the strategies they had used, the difficulties they encountered, and how they could improve their listening performance in future tasks. Teacher modeling, written prompts, silent pauses for thinking, and individual strategy logs were emphasized to provide a structured and low-pressure environment for strategic listening development.

For the extroverted EFL learners (n = 30), the same metacognitive listening strategies were taught, but the instruction was delivered through more interactive and discussion-based activities to align with their preference for verbal participation and collaborative engagement (Adi, 2019; Ahmadi Safa & Jamshidi, 2017; Ali & Shah, 2018). In the planning stage, students worked in pairs or small groups to predict the content of the listening text, brainstorm likely vocabulary, and discuss possible listening goals. During listening, they were encouraged to monitor comprehension by comparing notes with peers at designated pauses, discussing points of confusion, and verbally checking whether their initial predictions were accurate. In the evaluation stage, students participated in post-listening group discussions and oral reflections on which strategies were most useful, what comprehension problems they faced, and how they could modify their approach in later tasks. For instance, after listening to a short lecture or conversation, students discussed how focusing on key words, speaker tone, or discourse markers helped them understand the text. Thus, while the instructional framework remained based on planning, monitoring, and evaluation, the extroverted group experienced it through a more socially interactive format.

It should be noted that the instructional adaptations for the two experimental groups were made deliberately to align the delivery format with the learners' dominant personality preferences. In both groups, the target metacognitive listening strategies and the overall instructional sequence remained constant, focusing on planning, monitoring, and evaluation; however, the mode of engagement differed (i.e., more individual and reflective for introverted learners, and more interactive and discussion-based for extroverted learners). This design was adopted to examine the effectiveness of metacognitive strategy instruction when implemented in a manner that was pedagogically responsive to learner characteristics rather than to compare identical delivery conditions across personality groups. Accordingly, any differences observed between the two experimental groups should be interpreted with caution, as they may reflect not only personality-related variation but also the influence of the instructional delivery mode or an interaction between personality and delivery format.

Finally, the control groups (n = 60) received conventional listening instruction that focused on comprehension practice rather than strategy training. Each session followed a routine format commonly used in EFL classrooms: students were first introduced to the topic of the listening passage through brief warm-up questions, followed by a single uninterrupted listening for gist to identify the main idea. Subsequent listenings directed learners' attention to discrete language points such as vocabulary, collocations, or specific details within the text. Activities included

matching exercises, multiple-choice items, and short-answer comprehension questions, all of which were completed individually or checked collectively as a class. Unlike the experimental groups, control-group learners were not provided with explicit instruction on planning, monitoring, or evaluating their listening processes; instead, they engaged solely with comprehension-based tasks and teacher-led explanations of correct answers. Post-listening stages typically involved summarizing key points or discussing answers, but without any reference to metacognitive reflection or strategy awareness. After the 12-week instruction period, both the experimental groups and control groups completed the post-tests (IELTS and MLSI), which took approximately 45 minutes to complete.

Phase 2: Qualitative Phase

From each experimental group (introverted and extroverted), 12 learners (6 introverts, 6 extroverts) were purposively selected based on their pre- and post-test scores and strategy use patterns. These participants engaged in one-on-one semi-structured interviews (average duration: 25 minutes), which were audio-recorded and transcribed verbatim.

Data Analysis

Quantitative Data

Data were analyzed using SPSS v. 29. A one-way ANCOVA was conducted to examine the effects of metacognitive strategy instruction on listening comprehension performance and metacognitive strategy use of Iranian EFL learners. Effect sizes (partial η^2) were also reported. Post-hoc comparisons were made using Bonferroni corrections.

Qualitative Data

The interview transcripts were analyzed using thematic analysis following the major phases outlined in the literature on qualitative data analysis (e.g., Braun & Clarke, 2006; Creswell & Clark, 2018). First, the two researchers familiarized themselves with the data by reading and rereading the transcripts several times. Second, initial codes were generated independently by the two researchers. In this phase, both deductive and inductive coding were used to capture theory-driven as well as data-driven insights. In the deductive stage, preliminary coding categories were derived from the study's conceptual framework and research questions, particularly those related to metacognitive listening strategies, listening comprehension experiences, strategy awareness, and learners' perceptions of the instructional intervention. These a priori categories guided the identification of data segments related to planning, monitoring, evaluation, classroom engagement, and perceived benefits or challenges of the instruction. In the inductive stage, the researchers remained open to meanings emerging directly from the participants' responses, which enabled the identification of unanticipated issues, such as emotional reactions to listening tasks, personality-related preferences in classroom participation, and individual differences in confidence or self-regulation. Third, the researchers compared and discussed the initial codes, and discrepancies were resolved through discussion; a shared codebook was then finalized. Fourth, the codes were reviewed and grouped into broader categories in order to search for potential themes and subthemes. Fifth, these themes were refined and clearly defined to ensure internal coherence and conceptual distinctiveness. Finally, the themes were organized and reported in relation to the research questions, resulting in a comprehensive interpretation of the qualitative data.

4. RESULTS

Research question one

The first question strove to examine the comparative effect of metacognitive strategies instruction on the listening comprehension performance of Iranian introverted and extroverted EFL learners. To respond to this question, a one-way ANCOVA was run on the participants' scores on the IELTS listening test, whose descriptive and inferential results are presented in the following Tables 1 and 2, respectively.

Table 1: Descriptive Statistics of the Participants' Scores on IELTS Listening Test

		Pretest		Posttest	
Group	*N*	*M*	*SD*	*M*	*SD*
EG1: In	30	32.10	1.34	37.63	1.47
EG2: Ex	30	32.07	1.36	35.43	1.38
CG1: In	30	32.20	1.34	34.03	1.40
CG2: Ex	30	32.13	1.38	33.33	1.29
Total	120	32.12	1.35	35.11	1.39

***Note*. EG = Experimental Group, CG = Control Group, In = Introverted, Ex = Extroverted.**

Table 1 results revealed that the EG1: In group displayed the highest performance in terms of listening comprehension, followed by the EG2: Ex, CG1: In and CG2: Ex groups, respectively. Besides, Table 2 presents the results of one-way ANCOVA run on the participants' listening comprehension posttest scores.

Table 2: Inferential Statistics of the Participants' Scores on IELTS Listening Test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power
Corrected Model	360.24	4	90.06	55.28	.00	.65	221.13	1.00
Intercept	99.16	1	99.16	60.87	.00	.34	60.87	1.00
Listeningpre	36.62	1	36.62	22.48	.00	.16	22.48	.99
Group	327.93	3	109.31	67.10	.00	.63	201.30	1.00
Error	187.34	115	1.62					
Total	148459.00	120						
Corrected Total	547.59	119						

Table 2 results revealed that there was a statistically significant difference among the four groups with respect to their IELTS listening posttest scores: $F(3, 115) = 67.10$; $p < .05$. The partial eta squared also showed that the difference among the groups was large ($\eta p^2 = .63$) (Creswell & Creswell, 2017). This is also evident from the schematic view of the participants' mean IELTS listening posttest scores, as portrayed in Figure 1, below.

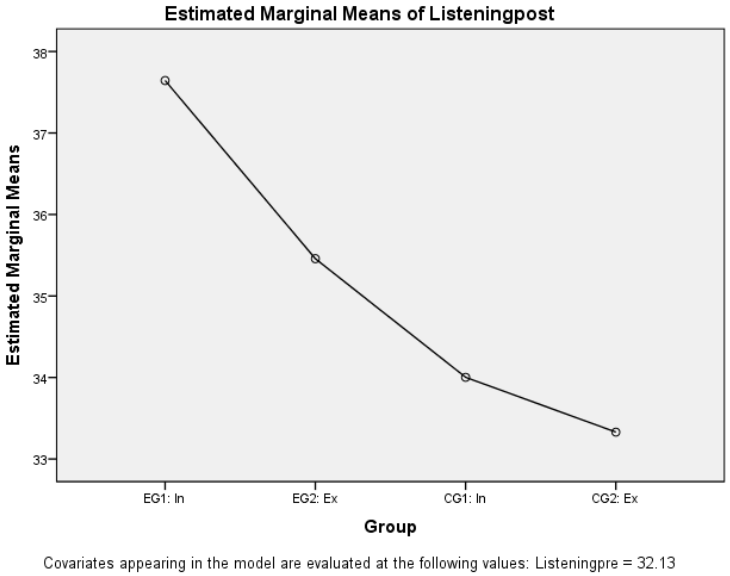

Figure 1: Estimated Marginal Means of the Groups' Listening Posttest Scores

Because we were interested in examining where exactly the difference lay, the Tukey HSD's pairwise test was run, the result of which is shown in Table 3 below.

Table 3: Pairwise Comparisons of the Groups' Scores on IELTS Listening Test

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
EG1: In	EG2: Ex	2.18	.33	.00	1.30	3.07
	CG1: In	4.64	.33	.00	2.75	4.52
	CG2: Ex	4.31	.33	.00	3.42	5.19
EG2: Ex	EG1: In	-2.18	.33	.00	-3.07	-1.30
	CG1: In	1.45	.33	.00	.57	2.34
	CG2: Ex	2.12	.33	.00	1.24	3.01
CG1: In	EG1: In	-3.64	.33	.00	-4.52	-2.75
	EG2: Ex	-1.45	.33	.00	-2.34	-.57
	CG2: Ex	.67	.33	.26	-.21	1.55
CG2: Ex	EG1: In	-4.31	.33	.00	-5.19	-3.42
	EG2: Ex	-2.12	.33	.00	-3.01	-1.24
	CG1: In	-.67	.33	.26	-1.55	.21

Table 3 results revealed that there was a statistically significant difference between the EG1: In group and all the other groups ($p < .05$). Although the same result was found between the EG2: Ex group and both control groups, the EG2: Ex group failed to outperform the EG1: In group. Consequently, the introverted participants displayed a superior performance compared with their

extroverted counterparts in terms of listening comprehension performance as a result of receiving the metacognitive strategy instruction.

Research question two

The second question investigated the difference between introverted and extroverted EFL learners in terms of their use of metacognitive listening strategies. To address this question, a one-way ANCOVA was run on the participants' scores on the Metacognitive Listening Strategy Inventory (MLSI), whose descriptive and inferential results are presented in Tables 4 and 5.

Table 4: Descriptive Statistics of the Participants' Scores on MLSI

		Pretest		Posttest	
Group	***N***	***M***	***SD***	***M***	***SD***
EG1: In	30	15.33	1.18	19.43	2.25
EG2: Ex	30	15.40	1.16	17.50	1.87
CG1: In	30	15.43	1.25	15.93	1.46
CG2: Ex	30	15.50	1.16	15.80	1.49
Total	120	15.41	1.19	17.16	1.77

***Note*. EG = Experimental Group, CG = Control Group, In = Introverted, Ex = Extroverted.**

Table 4 results revealed that the EG1: In group displayed the highest performance in terms of metacognitive strategy use, followed by the EG2: Ex, CG1: In and CG2: Ex groups, respectively. Besides, Table 5 presents the results of one-way ANCOVA run on the participants' MLSI posttest scores.

Table 5: Inferential Statistics of the Participants' Scores on MLSI

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power
Corrected Model	260.77	4	65.19	20.05	.00	.41	80.21	1.00
Intercept	241.18	1	241.18	74.18	.00	.39	74.18	1.00
Strategypre	1.64	1	1.64	.50	.47	.00	.50	.10
Group	256.58	3	85.52	26.30	.00	.40	78.91	1.00
Error	373.88	115	3.25					
Total	35998.00	120						
Corrected Total	634.66	119						

Table 5 results revealed that there was a statistically significant difference among the four groups with respect to their MLSI posttest scores: $F(3, 115) = 26.30$; $p < .05$. The partial eta squared also showed that the difference among the groups was large ($\eta p^2 = .40$) (Creswell & Creswell, 2017). This is also evident from the schematic view of the participants' mean MLSI posttest scores, as portrayed in Figure 2, below.

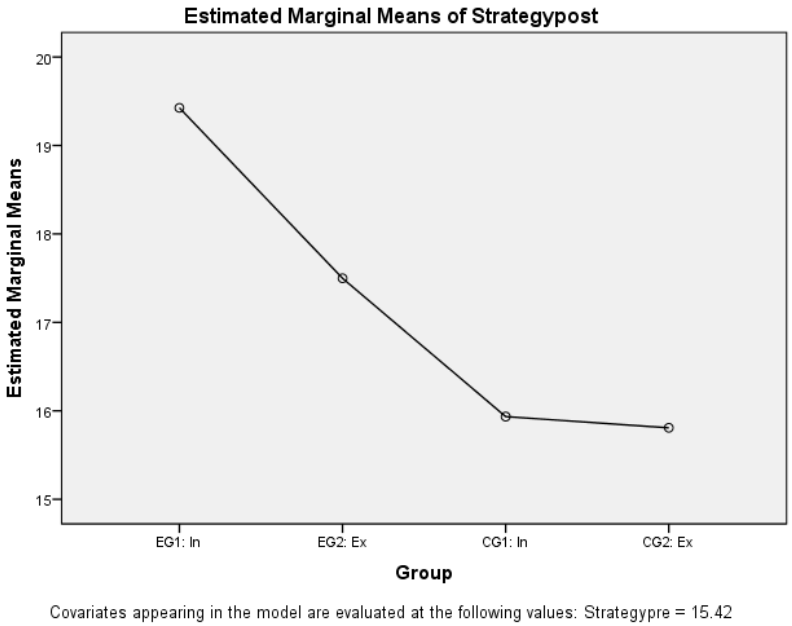

Figure 2: Estimated Marginal Means of the Groups' MLSI Posttest Scores

Because we were interested in examining where exactly the difference lay, the Tukey HSD's pairwise test was run, the result of which is shown in Table 6 below.

Table 6: Pairwise Comparisons of the Groups' Scores on MLSI

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
EG1: In	EG2: Ex	1.92	.46	.00	.67	3.17
	CG1: In	3.49	.46	.00	.24	4.74
	CG2: Ex	3.61	.46	.00	2.36	4.86
EG2: Ex	EG1: In	-1.92	.46	.00	-3.17	-.67
	CG1: In	1.56	.46	.00	.31	2.81
	CG2: Ex	1.69	.46	.00	.44	2.94
CG1: In	EG1: In	-3.49	.46	.00	-4.74	-2.24
	EG2: Ex	-1.56	.46	.00	-2.81	-.31
	CG2: Ex	.12	.46	1.00	-1.12	1.37
CG2: Ex	EG1: In	-3.61	.46	.00	-4.86	-2.36
	EG2: Ex	-1.69	.46	.00	-2.94	-.44
	CG1: In	-.12	.46	1.00	-1.37	1.12

Table 6 results revealed that there was a statistically significant difference between the EG1: In group and all the other groups ($p < .05$). Although the same result was found between the EG2: Ex group and both control groups, the EG2: Ex group failed to outperform the EG1: In group. Consequently, the introverted participants displayed a superior performance compared with their extroverted counterparts in terms of metacognitive listening strategy use as a result of receiving the metacognitive strategy instruction. In particular, we were interested in examining which

metacognitive listening strategies were used more frequently by the introverted group. The descriptive and inferential statistics related to the metacognitive listening strategies taught during metacognitive instruction are presented in Table 7 and Table 8, below.

Table 7: Descriptive Statistics of the Participants' Scores on Planning, Monitoring, and Evaluation

			Pretest		Posttest	
Strategy	**Group**	***N***	***M***	***SD***	***M***	***SD***
Planning	EG1: In	30	2.77	.67	3.10	.92
	EG2: Ex	30	2.93	.86	3.10	1.09
	CG1: In	30	2.83	.69	2.60	1.19
	CG2: Ex	30	2.70	.59	2.73	1.08
	Total	120	2.80	.70	2.88	1.07
Monitoring	EG1: In	30	7.53	.97	10.63	1.73
	EG2: Ex	30	7.47	.77	9.07	1.20
	CG1: In	30	7.57	.85	8.13	.81
	CG2: Ex	30	7.63	.96	7.90	.75
	Total	120	7.55	.88	8.93	1.12
Evaluation	EG1: In	30	5.03	.85	5.70	.46
	EG2: Ex	30	5.00	.83	5.33	.60
	CG1: In	30	5.03	.76	5.20	.55
	CG2: Ex	30	5.17	.69	5.17	.69
	Total	120	5.05	.78	5.35	.57

Table 8: Inferential Statistics of the Participants' Scores on Planning, Monitoring, and Evaluation

Strategy	**Source**	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**	**Noncent. Parameter**	**Observed Power**
Planning	Group	5.44	3	1.81	1.63	.18	.04	4.90	.42
	Error	127.42	115	1.10					
Monitoring	Group	137.35	3	45.78	32.13	.00	.45	96.41	1.00
	Error	163.83	115	1.42					
Evaluation	Group	6.39	3	2.13	17.53	.00	.31	52.60	1.00
	Error	13.96	115	.12					

Table 8 results revealed that the introverted group outperformed their extroverted peers in terms of only two metacognitive listening strategies, namely monitoring ($F(3, 115) = 32.13$; $p < .001$) and evaluation ($F(3, 115) = 17.53$; $p < .001$). The partial eta squared for the two strategies also showed that the difference was large ($\eta p^2 = .45$, $\eta p^2 = .31$), respectively (Creswell & Creswell, 2017).

Research question three

The third research question sought to capture the Iranian EFL learners' subjective viewpoints regarding the usefulness, ease of use, and perceived effectiveness of metacognitive listening

strategies in listening instruction. To respond to this question, six introverted participants and six extroverted participants were kindly invited from the two experimental groups, respectively, and the following themes were extracted through thematic analysis.

Theme 1: Perceived usefulness of metacognitive listening strategies

All the introverted participants (n = 6) believed that these metacognitive listening strategies were useful, as evident from the following two excerpts.

> "Initially, I was a bit worried these strategies might be time-consuming, but in practice, I saw how useful they are. When I can predict before listening or organize what I've heard afterwards in my mind, I feel I have a more complete understanding of the main message." (IP1)
> "I find these strategies very practical, especially for those like me who like to examine everything step by step and carefully. It helped me listen to audio files with more calmness and understand the material without stress. I feel my performance on tests has also improved." (IP2)

It appears from the above excerpts that the metacognitive listening strategies improved their prediction and self-regulation and alleviated their stress, which assisted them with achieving higher gains in their listening comprehension. On the other hand, most of the extroverted participants (n = 5) believed that these metacognitive listening strategies were useful, as evident from the following two excerpts.

> "These strategies were helpful, especially the parts related to asking questions about what we were hearing. Although I might not have gotten the highest score in our group, I feel I can now guess the speaker's meaning more easily and participate more in class." (EP7)
> "I think these strategies, especially those that encouraged us to exchange ideas about what we heard with others, were very beneficial. Since we're extroverts, we love to talk, and these methods gave us the opportunity to share our knowledge and learn more." (EP8)

Aside from the usefulness, it can be fathomed from the above excerpts that the metacognitive listening strategies could assist them with guessing the speaker's meaning, improve their participation and engagement with the task, and encourage their knowledge sharing and peer scaffolding.

Theme 2: Ease of use of metacognitive listening strategies

Some introverted interviewees (n = 3) opined that the metacognitive listening strategies were easy to use while listening, as appears from the following two excerpts.

> "Honestly, I'm usually very quiet in class because I'm an introvert, you know. But these strategies, which to me were really easy to use, allowed me to engage with the material in my own way, by thinking and analyzing. This boosted my confidence in listening comprehension." (IP3)
> "Using these methods wasn't overly complicated, but it had a big impact. When I took notes on what I understood while listening, or reviewed it in my mind, I less

> often missed something. I think it helped me process the concepts more deeply." (IP4)

It can also be observed from the above excerpts that the metacognitive listening strategies boosted their involvement with the task, self-monitoring and evaluation, and finally confidence in listening comprehension. On the other hand, a number of extroverted interviewees (n = 2) pointed to the strategies' ease of use, which is evident from what follows.

> "I think it was really good that we learned how to discuss what we heard with each other after listening, using these strategies. It was easy to do. This way, even if I missed something initially, I could understand it from my friends' contributions, making my comprehension more complete." (EP9)
> "Using these techniques was very simple, and more importantly, it made me feel like I wasn't just passively listening. These methods helped me engage with the topic and actively try to learn the concepts. My listening comprehension has definitely gotten better." (EP10)

They maintained that peer-scaffolding, discussion, and evaluation were among the other benefits of metacognitive strategy instruction.

Theme 3: Perceived effectiveness in boosting listening comprehension

Finally, most of the introverted participants (n = 5) maintained that metacognitive listening strategies were very effective in terms of bolstering their listening comprehension. This can be understood from the following two excerpts.

> "For me, these strategies were really helpful. For instance, before listening, I'd try to guess the topic, and that made me focus more. I felt that after this instruction, my ability to understand specific sentences and key points improved significantly." (IP5)
> "I've always wanted to understand conversations better, but sometimes I got confused. These strategies, especially the techniques that taught me how to focus on keywords and grasp the overall context, were truly effective. Listening feels more enjoyable now." (IP6)

It is also evident from the above that the strategies learned could improve their prediction, directed attention, and overall comprehension. On the other hand, some extroverted interviewees (n = 4) declared that learning these strategies was very effective in terms of boosting their listening comprehension performance.

> "This instruction really changed my perspective on learning English. I used to think I just had to listen and try to understand, but now I know that by using these strategies, I can control my learning and make it more effective. I feel my comprehension is much stronger now, and I can speak with more assurance." (EP11)
> "Wow, these strategies were great! I felt like I could listen to English conversations with more confidence now. What was interesting for me was that these methods made me more active, trying to rephrase everything I heard in my own words." (EP12)

Other than effectiveness, they touched upon gains in their monitoring and self-regulation, more self-confidence, an increase in their engagement, and taking more agency for their own learning. Although both groups made mention of the three main pillars, namely the usefulness, ease of use, and perceived effectiveness of metacognitive listening strategies in listening instruction, the introverted group was larger in number, especially with regard to the two metacognitive strategies, namely monitoring and evaluation.

Research question four

The fourth research question probed into how personality traits (introversion/extroversion) influenced Iranian EFL learners' perceptions of metacognitive listening strategies. To address this question, content coding and thematic analysis of the above extracts from the 12 interviews revealed the following results, presented in Table 9.

Table 9: Iranian EFL Learners' Perceptions of Metacognitive Listening Strategies

Criteria	Introverted group	Extroverted group
Usefulness and Effectiveness	Deeper processing Improved pretask planning Better evaluation Directed attention Deeper understanding Increased confidence	Active engagement Class participation Peer-scaffolding Knowledge sharing More agency for learning More involvement
Ease of Use	More readily adoptable Less immediate interaction More enjoyable Less stressful	Faster connection More social interaction More self-expression Willing acceptance

Table 9 revealed that the introverted group tended to find strategies that aided in deeper processing, pre-listening planning, mental review, and information organization highly useful and effective. They placed greater value on strategies that allowed them to comprehend material in their own way, with individual focus. Strategies requiring internal thought and analysis seemed to align better with their introverted nature, leading to deeper understanding and increased confidence. Concerning ease of use, these learners more readily adopted and utilized strategies that required less immediate interaction or group work. Their preference for a step-by-step and careful approach was satisfying and led to less stress.

On the other hand, the extroverted group found strategies involving active engagement, class participation, asking questions, and discussion with others to be very useful and effective. They welcomed strategies that allowed them to share their knowledge or complete their learning through conversations with classmates. These methods made them feel less passive and more involved in the learning process. Finally, regarding ease of use, they embraced and connected with strategies that provided opportunities for social interaction and self-expression more easily. Their social nature meant these strategies naturally became part of their learning process.

Consequently, the introverted learners appeared to have benefited more from and perceived as more effective those strategies that assisted them in processing information independently and deeply. Conversely, the extroverted learners found strategies involving interaction, collaboration, and active participation with others to be more beneficial and easier to implement. Both groups, despite differences in preferences and learning styles, benefited from the instruction in

metacognitive listening strategies; however, the perceived effectiveness and ease of use of these strategies varied depending on their personality traits.

5. DISCUSSION

The present study examined the differential effect of metacognitive strategy instruction on introverted and extroverted learners' listening comprehension and strategy use. To this end, the first research question strove to examine the comparative effect of metacognitive strategies instruction on the listening comprehension performance of Iranian introverted and extroverted EFL learners. Results revealed that the introverted group outperformed the extroverted one in terms of listening comprehension from the pretest to the posttest. This superior performance could be because of the inherent compatibility between metacognitive strategies and the cognitive style of introverted learners. According to Eysenck's theory of personality, introverts generally exhibit higher levels of cortical arousal and tend to be more inward-oriented, engaging in deeper cognitive processing and self-reflection compared to extroverts. Metacognitive listening strategies, such as planning, monitoring, and evaluating, require a deliberate and conscious focus on one's own mental processes, which aligns perfectly with the introspective nature of introversion. While extroverts often seek external stimulation and social interaction to facilitate learning, introverts benefit more from internal cognitive regulation. The instruction provided them with the necessary tools to structure their internal thought processes, allowing them to compensate for the lack of social interaction by actively directing their attention to the listening task, thereby reducing cognitive load and enhancing comprehension.

The findings should also be interpreted in light of the instructional design of the experimental conditions. Although both experimental groups received explicit instruction in the same metacognitive listening strategies, the delivery format differed in order to align with the learners' personality profiles. As a result, any between-group differences cannot be attributed solely to introversion or extroversion. They may also be associated with the reflective versus collaborative nature of the instructional procedures, or with an interaction between personality and treatment format. This issue does not weaken the evidence for the overall value of metacognitive strategy instruction; however, it does limit the extent to which causal claims can be made about personality as an isolated explanatory factor.

These results are in tandem with those of Ali and Shah (2018) and Taghizade et al. (2022), who found that metacognitive instruction significantly benefits learners with higher levels of reflectivity and introversion. This agreement originates from the shared understanding that introverted learners possess a distinct advantage in tasks requiring sustained attention and self-monitoring. Our findings confirmed the previous literature that while extroverts may excel in communicative fluency, introverts are more adept at the analytical side of language processing. The strategies taught, specifically planning before listening and evaluating comprehension after, provided a structured framework that resonated with the introverts' preference for systematic and deliberate learning, thereby maximizing their listening performance more effectively than it did for the extroverts.

However, the results are in contrast to those of Alavi and Rezaei (2016) and Alavinia and Sameei (2012), reporting that extroverted learners generally outperformed introverts in language acquisition tasks, particularly those involving listening. The reason could be the extroverts' sociability and risk-taking, and that listening tasks were heavily integrated with social interaction or immediate oral response. In contrast, the present study focused on the specific application of metacognitive strategies to individual listening comprehension, a context where the extroverts' usual advantage of social scaffolding was neutralized. Also, the extroverts here might have initially

found the introspective nature of metacognitive regulation less engaging or more difficult to sustain than their introverted peers, leading to a lower degree of strategy implementation and, consequently, lower performance gains.

The second research question investigated the difference between introverted and extroverted EFL learners in terms of their use of metacognitive listening strategies. Results indicated that the introverted group outperformed their extroverted counterparts in terms of metacognitive strategy use, particularly monitoring and evaluation. The finding that the introverted group demonstrated superior use of metacognitive strategies, specifically in terms of monitoring and evaluation, can be explained by the intrinsic relationship between personality traits and self-regulatory mechanisms. Introverted learners typically possess higher levels of cognitive self-awareness and are naturally inclined toward introspection, which facilitates the internal monitoring of one's own comprehension processes. According to Flavell's (1979) metacognitive theory, effective monitoring requires a pause in cognitive processing to assess understanding, a behavior that aligns seamlessly with the introvert's preference for deliberate, reflective thought over rapid, external reaction. While extroverts often prioritize social interaction and fluency of speech, potentially bypassing the internal check of comprehension, introverts are more comfortable directing their cognitive resources inward. Consequently, the introverted learners in this study were likely more adept at recognizing gaps in their understanding (monitoring) and judging the effectiveness of their listening outcomes (evaluation), leading to higher reported strategy use.

Results of the study are in agreement with those of Liu (2020) and Guo (2026), who observed that learners with higher levels of reflective behavior, often correlated with introversion, tend to report more frequent use of monitoring and evaluation strategies. This alignment is rooted in the shared finding that effective listening strategy use is not merely about cognitive ability but about the willingness to engage in self-reflection. It originates from the quiet nature of introversion, which provides a fertile ground for the development of metacognitive habits. Monitoring and evaluation could be considered as individual internal activities that were not contingent upon the social scaffolding that extroverts might prefer; rather, they relied on the very self-sufficiency and internal focus that characterizes introverted learners, thereby confirming the positive link between this personality type and strategic depth.

However, results are also in contrast to those of Li and Zhang (2020) and Zafar et al. (2017), who proposed that extroversion, often associated with lower anxiety and higher willingness to communicate, should facilitate better strategy use and performance. It mainly focused on general language proficiency where social confidence plays a decisive role, whereas the present study isolated the specific, internal mechanisms of listening comprehension. In this study, the extroverts' tendency to seek external stimulation may have detracted from the patience required for continuous self-monitoring. Furthermore, while extroverts might perceive themselves as successful communicators due to their social ease, this perception may have led to the illusion of competence, reducing their motivation to rigorously evaluate their listening performance compared to their more cautious and self-critical introverted counterparts.

The third research question sought to capture the Iranian EFL learners' subjective viewpoints regarding the usefulness, ease of use, and perceived effectiveness of metacognitive listening strategies in listening instruction. Both groups pointed to these three criteria; however, the introverted group members were larger in number compared with their extroverted counterparts. The qualitative findings regarding the learners' perceptions revealed that while both introverted and extroverted participants acknowledged the value of metacognitive strategies, the introverted group exhibited a significantly stronger appreciation for their usefulness, ease of use, and effectiveness. This difference can be attributed to the concept of cognitive match, where

instructional strategies align more naturally with the learner's preferred cognitive style. Introverted learners, who typically process information internally and value autonomy, likely perceived the metacognitive framework as a structured tool that validated their natural learning tendencies. For them, strategies such as planning and evaluating provided a sense of control and reduced the stress associated with the unpredictable nature of listening input. In contrast, while extroverts recognized the logical benefits of the strategies, the higher number of positive responses from introverts suggests that these strategies resonated more deeply with their psychological need for reflection and self-regulation, making the strategies feel not just useful, but intuitively easy to adopt.

Results of this study are in agreement with those of Goh and Burns (2012), Vandergrift (2007), and Zarrabi (2020), who argued that the effectiveness of strategy instruction is heavily mediated by the learner's stylistic preferences and that more analytic or reflective learners often report higher satisfaction with metacognitive tools. The cause of this agreement lies in the understanding that strategy use is not a mechanical process but a psychological one. Similar to the previous literature indicating that learners who are comfortable with self-analysis employ metacognitive regulation more readily, our study found that the introverted Iranian EFL learners were more numerous in voicing positive perceptions. This indicates that the introverts in our sample were able to integrate the strategies into their learning schema more effortlessly than the extroverts, who may have found the solitary nature of monitoring and evaluating somewhat at odds with their preference for interactive learning.

However, the results are in contrast to those of Oxford (1990) and Wakamoto (2007), who suggested that extroverts, being more communicative and open to new experiences, might initially show greater enthusiasm for learning strategies that promise to improve performance. Their research focused on a broader range of communicative strategies where social engagement is key, whereas the present study focused specifically on metacognitive strategies, which are inherently introspective and non-social. The extroverts in our study, despite acknowledging the strategies' utility, may have found the process of continuous self-monitoring less engaging or more cognitively demanding than the introverts, resulting in a lower proportion of participants expressing strong positive perceptions regarding the ease and effectiveness of the instruction.

The fourth research question probed into how personality traits (introversion/extroversion) influenced Iranian EFL learners' perceptions of metacognitive listening strategies. Results showed that the introverted learners applied strategies for deep and independent information processing more than their extroverted peers. Conversely, the extroverted learners found strategies involving interaction, collaboration, and active participation with others to be more beneficial and easier to implement. Both groups, despite differences in preferences and learning styles, benefited from the instruction in metacognitive listening strategies. The finding that introverted learners favored strategies for deep and independent processing, while extroverts preferred interactive and collaborative approaches, underscores the critical role of personality in shaping strategy preference and application. This dichotomy aligns with the fundamental distinction between introverts' preference for internal stimulation and extroverts' drive for external social engagement. Introverted learners likely perceived metacognitive strategies, such as self-monitoring and evaluation, as tools that empowered them to manage their cognitive resources independently without the need for external validation. Conversely, extroverted learners, who typically process information through social interaction and verbalization, found strategies involving peer collaboration or discussion to be more natural and less cognitively taxing. This suggests that while the mechanism of metacognition was beneficial to all, the modality of its application was filtered through the lens of personality, with introverts leveraging it for solitary depth and extroverts for social connectivity.

The current study's results are in agreement with those of Oxford (1993) and Chamot and O'Malley (1994), who have long argued that language learning strategies are not employed in a vacuum but are heavily influenced by the learner's temperament and preferred style of engagement. The cause of this agreement lies in the validation of the good language learner model, which acknowledges that there is no single best way to learn; rather, effectiveness depends on the fit between the strategy and the learner's personality. These findings support the previous literature in confirming that introverts thrive on strategies that allow for analytical, solitary reflection, whereas extroverts gravitate toward strategies that incorporate a social dimension. This congruence reinforces the idea that strategy instruction must be sensitive to individual differences to maximize perceived utility.

However, our results are in contrast to those of earlier behaviorist views or simplified instructional models, such as Kayaoglu (2013), which often assumed that metacognitive strategies are uniformly applied regardless of learner type, or that extroverts, due to their outgoing nature, would naturally excel at all forms of strategy use. The reason for this difference in views could probably be because those traditional perspectives failed to distinguish between the social aspect of language learning and the cognitive aspect of self-regulation. The present study highlighted that extroverts did not necessarily reject metacognition, but rather adapted it to fit their social worldview, preferring strategies that involved active participation with others over solitary introspection. This finding was probably lacking in previous literature that did not differentiate between specific sub-categories of strategy use based on personality traits, leading to an overgeneralized view of strategy application.

6. CONCLUSIONS

The present study aimed to investigate the comparative effects of metacognitive listening strategies instruction on the listening comprehension performance and strategy use of Iranian introvert and extrovert EFL learners, while also exploring their subjective perceptions regarding the process. The results collectively indicated that while both personality groups benefited from the metacognitive strategies instruction, the introverted learners outperformed their extroverted peers in terms of listening comprehension and displayed a higher frequency of metacognitive strategy use, particularly with respect to monitoring and evaluation. Also, the qualitative findings revealed that introverted learners perceived these strategies as highly useful for deep, independent processing, whereas extroverted learners exhibited a stronger preference for strategies involving interaction and collaboration. Finally, the study confirmed that although metacognitive instruction is effective across personality types, the degree of efficacy and the nature of strategy application are significantly moderated by the learners' introversion or extroversion.

The findings of this study offer significant pedagogical and theoretical implications for the field of Teaching English as a Foreign Language. Theoretically, the research reinforces the interactionist hypothesis, suggesting that the effectiveness of learning strategies is not definite but depends on individual differences, such as personality traits. It challenges the "one-size-fits-all" approach to strategy instruction, highlighting that introverts may naturally possess a cognitive advantage in the introspective domain of metacognition. Pedagogically, these results urge EFL teachers and curriculum designers to adopt a more differentiated approach to listening instruction. While metacognitive strategies should be taught to all learners, instructors are encouraged to provide extroverted learners with additional opportunities to practice these strategies through collaborative and social activities to bridge the gap with their introverted peers. Conversely, introverted learners can be encouraged to leverage their natural tendency for self-regulation to further enhance their autonomous listening skills.

Despite its contributions, this study is subject to several limitations that must be acknowledged. First, the reliance on self-report questionnaires to determine personality traits and strategy use carries the risk of response bias, as participants may have answered in a manner they believed was socially desirable rather than entirely truthful. Second, the study was conducted with a specific population of Iranian EFL learners within a particular cultural and educational context, which may limit the extent to which these findings can be applied to EFL learners in other regions or native English speakers. Third, the research focused exclusively on listening comprehension; therefore, the results regarding the interaction between personality and metacognitive strategies may not necessarily hold true for other language skills, such as speaking, reading, or writing. Finally, the instructional delivery for the two experimental groups was intentionally adapted to match learner personality characteristics. While this increased ecological and pedagogical relevance, it also introduced a potential confounding variable, since personality type and instructional mode were not manipulated independently.

Future studies could employ a factorial design in which introverted and extroverted learners are randomly assigned to both reflective and interactive versions of metacognitive strategy instruction. Such a design would allow researchers to determine whether outcomes are primarily explained by personality, instructional format, or the interaction between the two. Also, it is advisable that further research replicate this study with a larger and more diverse sample size to increase the generalizability of the findings. Future scholars could also explore the longitudinal effects of metacognitive strategy instruction to determine whether the initial advantage held by introverts persists over time or if extroverts eventually catch up as they become more accustomed to the reflective nature of the strategies. Also, qualitative research methods, such as case studies or verbal protocols, could be used to gain a more in-depth understanding of the real-time cognitive processes occurring during listening tasks for both personality types. Investigating other personality factors, such as neuroticism or openness to experience, alongside introversion and extroversion, could also provide a more comprehensive picture of the learner's strategic profile.

Statements and Declarations

Authors contributions

All the authors have participated sufficiently in the intellectual content, conception, and design of this work or the analysis and interpretation of the data (when applicable), as well as the writing of the manuscript.

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