International Journal of Foreign Language Teaching and Research
ISSN: 2322-3898-http://jfl.iaun.ac.ir/journal/about

Please cite this paper as follows:
Jafari, F., Ghafoori, N., & Ahmadi-Azad, Sh. (2023). A Study of the Utility of Meta-Cognitive Strategy Instruction for Ameliorating ESP Learners' Autonomy. *International Journal of Foreign Language Teaching and Research, 11* (46), 97-112. http://doi.org/10.30495/JFL.2023.706389

Research Paper

A Study of the Utility of Meta-Cognitive Strategy Instruction for Ameliorating ESP Learners' Autonomy

Fatemeh Jafari[1], Nasser Ghafoori[2]*, Shima Ahmadi-Azad[3]

[1]Ph.D. Candidate, Department of English Language, Sarab Branch, Islamic Azad University, Sarab, Iran
fatemehjafari.uni1@gmail.com
[2]Assistant Professor, Department of English Language, Tabriz Branch, Islamic Azad University, Tabriz, Iran
ghafoori@iaut.ac.ir
[3]Associate Professor, Department of English Language, Sarab Branch, Islamic Azad University, Sarab, Iran
Sh.ahmadiazad@gmail.com

Received: May 10, 2023 **Accepted: September 19, 2023**

Abstract
The present study made an effort to determine the impacts of proactive and retroactive meta-cognitive strategy instruction on Iranian ESP learners' autonomy. Furthermore, it strived to examine the degree to which the interaction between this instruction and proactive/retroactive instruction conditions influenced these learners' autonomy in their courses. To this end, first, the researchers selected 168 intermediate-level ESP learners from among the ESP learners of Islamic Azad University (Tabriz Branch) as the participants. Second, they non-randomly assigned the participants to four groups including the proactive experimental group, retroactive experimental group, proactive control group, and retroactive control group. Third, the researchers administered the autonomy pretest to all of the groups. Fourth, they used the Adobe Connect Learning Management System to provide the proactive experimental group, and the retroactive experimental group with their relevant treatments in ten sessions. Nonetheless, they used traditional language instruction techniques to provide the control groups with their instruction. Fifth, the researchers administered the autonomy posttest of the study to the participants after the end of the treatment sessions. Finally, they used SPSS 24 to analyze the data. The results showed that meta-cognitive strategy instruction ameliorated the participants' autonomy. Moreover, the retroactive instruction condition was more efficacious than the proactive condition. In addition, the interaction between meta-cognitive strategy instruction and retroactive condition had a significant positive effect on the learners' autonomy development. The results may provide ESP teacher educators, syllabus designers, and instructors with guiding principles regarding meta-cognitive strategy instruction.
Keywords: *ESP; Language Learning Strategies; Learner Autonomy; Meta-cognitive Strategies*

بررسی سودمندی دستورالعمل استراتژی فراشناختی برای بهبود استقلال زبان آموزان
پژوهش حاضر تلاشی برای تعیین تأثیر آموزش راهبرد فراشناختی پیشگیرانه و عطف به گذشته بر استقلال فراگیران ایرانی ESP انجام داده است. علاوه بر این، تلاش شد تا میزان تأثیر متقابل بین این آموزش و شرایط آموزش پیشگیرانه/عقب‌گرد بر استقلال این فراگیران در دوره‌هایشان را بررسی کند. بدین منظور، پژوهشگران ابتدا 168 نفر از فراگیران ESP سطح متوسط را از بین فراگیران ESP دانشگاه آزاد اسلامی (واحد تبریز) به عنوان شرکت کننده انتخاب کردند. ثانیاً شرکت کنندگان را به صورت غیرتصادفی در چهار گروه شامل گروه آزمایشی پیشگیرانه، گروه آزمایشی عطف به گذشته، گروه کنترل پیشگیرانه و گروه کنترل عطف به گذشته قرار دادند. سوم، محققان پیش آزمون خودمختاری را برای همه گروه ها اجرا کردند. چهارم، آنها از سیستم مدیریت یادگیری Adobe Connect برای ارائه گروه آزمایشی پیشگیرانه و گروه آزمایشی عطف به گذشته درمان های مربوطه خود را در ده جلسه استفاده کردند. با این وجود، آنها از تکنیک های آموزش زبان سنتی برای ارائه آموزش به گروه های کنترل استفاده کردند. پنجم، محققان پس آزمون خودمختاری مطالعه را برای شرکت کنندگان پس از پایان جلسات درمانی اجرا کردند. در نهایت از SPSS 24 برای تجزیه و تحلیل داده ها استفاده کردند. نتایج نشان داد که آموزش راهبرد فراشناختی استقلال شرکت کنندگان را بهبود می بخشد. علاوه بر این، شرایط دستورالعمل عطف به ماسبق موثرتر از شرایط پیشگیرانه بود. علاوه بر این، تعامل بین آموزش راهبرد فراشناختی و شرایط عطف به ماسبق تأثیر مثبت معناداری بر رشد خودمختاری فراگیران داشت. نتایج ممکن است به مربیان معلمESP ، طراحان برنامه درسی و مربیان اصول راهنما را در مورد آموزش راهبرد فراشناختی ارائه دهد.
واژگان کلیدی: راهبردهای یادگیری زبان، خودمختاری یادگیرنده، راهبردهای فراشناختی

Introduction

A close scrutiny of the relevant literature (e.g. Alavidoost, & Bozorgian, 2021; Baker & Brown, 1984; Bonds, Bonds & Peach, 1992; Bozorgian, & Alamdari, 2018; Bozorgian, & Muhammadpour, 2020; Fathi, & Hamidizadeh, 2019; Maftoon, & Fakhri Alamdari, 2020; Razmi, & Jabbari, 2021; Razmi, Jabbari, & Fazilatfar, 2020) highlights the fact that the researchers have been concerned with the *language learning strategies* in the field of Second Language Acquisition (SLA).

Strategies have been defined in different ways due mainly to their functions (Vandergrift, 2003). In a broad definition, Nietfeld, and Schraw (2002) defined strategies as the learner plans that are developed and implemented for expediting their task performance in the context of the classroom. On the other hand, in a more specific definition, Baker and Brown (1984) stated that strategies encompass the conscious cognitive processing techniques that are developed and used by the language learners to facilitate their communication with the other users of the target language and to expedite their learning of the formal and functional aspects of the pertinent language.

Considering the above-mentioned definition, O'Malley and Chamot (1990) pointed out that, in the field of SLA, strategies can be classified into two underlying categories including the strategies that are used for facilitating *language learning* and the strategies that are used for establishing and improving second language *communication*. According to them, in academic settings, the SLA researchers have predominantly focused on language learning strategies. Consequently, these researchers have tried to specify the different types of language learning strategies that are likely to expedite the learners' acquisition of the diverse aspects of the target language in the context of the classroom (Papaleontiou-Louca, 2014).

In the field of SLA, O'Malley, Chamot, Stewner- Manzanares, Russo, and Kupper's (1985) classification of language learning strategies constitutes one of the most comprehensive classifications. O'Malley et al. (1985) classified language learning strategies into three main categories including *meta-cognitive, cognitive*, and *socio-affective* strategies. As they explained, the metacognitive strategies comprise the strategies that the learners formulate and implement for developing language learning plans, establishing their language learning criteria, monitoring their language learning process, and evaluating the effectiveness of their language learning plans and their progress on the basis of the pre-determined criteria. Moreover, cognitive strategies refer to the techniques that language learners use to facilitate the processing of linguistic information in the various tasks in the context of the classroom. Finally, the socio-affective strategies involve the techniques that are used by the learners to facilitate their interaction with the other language users.

In addition to O'Malley et al.'s (1985) classification, Oxford (1990) provided a comprehensive taxonomy of language learning strategies. This taxonomy integrates the communication strategies into the language learning strategies. More specifically, Oxford (1990) classifies all of the strategies into two main categories including the *direct* and *indirect* strategies. As Oxford (1990) pointed out, the direct strategies refer to the strategies that the learners implement to compensate for their lack of ability to express their intended meanings, to facilitate their processing of second language information, and to take advantage of their short-term memory in an efficient way. On the other hand, the indirect strategies comprise the strategies that the learners develop and utilize to expedite their second language communication with their peers and native speakers, to manage their emotions in the process of second language learning, and to learn the target language in a systematic way. The scrutiny of the indirect strategies highlights the fact that the strategies that are used for systematizing the learners' language learning are similar to O'Malley et al.'s (1985) meta-cognitive strategies. As Oxford (1990) noted, in academic settings, meta-cognitive strategies are regarded to be the prerequisites to successful language acquisition.

The examination of the research studies of meta-cognitive strategies (e.g. Rezvan, Ahmadi, & Abedi, 2006; Rostami Abusaeedi & Khabir, 2017; Veenman, Van Hout-Wolters, & Afflerbach, 2006; Ziegler & Opdenakker, 2018) indicates that among different meta-cognitive strategies, *self-planning*, *self-monitoring*, and *self-evaluation* strategies have attracted considerable attention. Van der Stel and Veenman (2014) stated that self-planning refers to the technique that is used by the learners to develop and implement plans for achieving the language-learning-oriented objectives. Moreover, as they noted, self-monitoring comprises the learners' techniques for determining the degree to which they are able to implement their formulated learning plans. Lastly, the self-evaluating strategy refers to the learners' assessment of their achievements and language performance on the basis of pre-determined criteria. According to them, these strategies may be taught in *proactive* and *retroactive* instruction conditions. They explained that, in the proactive condition, the instruction of the meta-cognitive strategies precedes the language learners' task performance. On the other hand, in the retroactive condition, the learners are provided with strategy instruction in the process of task performance. As they concluded, these strategies may affect the learners' language skills and personal factors.

In the field of SLA, learner autonomy constitutes one of the learner factors that may have a noticeable impact on the learners' process of language acquisition (Benson, 2001, 2006, 2007ab, 2009; Dworkin, 1988; Little, 1991, 2009, 2016, 2022; Oxford, 2003; Parvaneh, Zoghi, & Asadi, 2020; Sedighi, & Hadidi Tamjid, 2016; Smith, 2008; Soodmand Afshar & Bastami, 2012; Vieira, 2009; Zhang & Li, 2004). In a broad definition, Holec (1981) defined autonomy as "the ability to take charge of one's own learning" (p. 3). Likewise, Little and Erickson (2015) pointed out that autonomy encompasses the language learners' capability to rely on their internal resources for making informed decisions without being influenced by diverse contextual factors. On the basis of the above-mentioned definition, Little, Dam, and Legenhausen (2017) made an effort to itemize the characteristics of autonomous language learners. As they pointed out, these learners adopt a methodical approach to language learning and are capable of determining the criteria for evaluating their achievements. Moreover, they reflect on their employed language learning strategies, identify their strengths and weaknesses, and modify their ineffective language learning strategies. Furthermore, they are generally flexible and take advantage of creative techniques in the process of language learning. Lastly, they are self-reliant and take responsibility for their language learning in the context of the classroom.

An examination of the pertinent empirical literature on meta-cognitive strategies and learner autonomy highlights the fact that SLA researchers have focused on certain lines of research to the exclusion of others. First, most of the studies of meta-cognitive strategies (e.g. Alavidoost & Bozorgian, 2021; Bozorgian, 2015; Bozorgian & Muhammadpour, 2020) have focused on the general English courses and have not dealt with the English for Specific Purposes (ESP) courses. Second, the majority of these studies (e.g. Bozorgian, & Alamdari, 2018; Esmaeili, Taki & Rahimian, 2017; Fasih, Izadpanah, & Shahnavaz, 2018; Maftoon, & Fakhri Alamdari, 2020) have examined the utility of meta-cognitive strategies for ameliorating the learners' language skills (e.g. writing) or aspects (e.g. vocabulary) and have disregarded their personal factors including their autonomy. Third, a large number of these studies (e.g. Movahed, 2014; Razmi, Jabbari, & Fazilatfar, 2020) have focused on the meta-cognitive strategy instruction and have not dealt with their proactive and retroactive instruction conditions. Finally, there is a lack of research on the degree to which the interaction between meta-cognitive strategy instruction and proactive/retroactive instruction conditions affects language learners' autonomy. The present study made an effort to deal with the above-mentioned issues in the EFL context of Iran. More specifically, the study made an effort to answer the following research questions:

RQ1. Does the instruction of self-planning, self-monitoring, and self-evaluation meta-cognitive strategies have a significant effect on Iranian ESP learners' autonomy?

RQ2. Do proactive and retroactive instruction conditions of meta-cognitive strategy instruction have significant effects on Iranian ESP learners' autonomy?

RQ3. Does the interaction between meta-cognitive strategy instruction and proactive/retroactive instruction conditions have a significant effect on Iranian ESP learners' autonomy?

Method

Design of the Study

In this study, the researcher used the *quasi-experimental pretest-treatment-posttest* design to answer the aforementioned research questions. Mackey and Gass (2016) noted that the experimental design constitutes one of the main design categories in the quantitative approach to research. As they explained, this design empowers the researchers to examine the impact of the independent variables on the dependent variables. According to them, the experimental design is distinguished from the quasi-experimental design based on the researchers' ability to randomly assign the participants to the groups of their studies. In the present study, the researcher made an attempt to examine the impact of explicit meta-cognitive strategy instruction (i.e. independent variable) on the intermediate-level ESP learners' autonomy (i.e. dependent variable). Nonetheless, she was not able to use random assignment and non-randomly assigned the participants to the experimental groups and control groups of the present study.

Participants

Considering the above-mentioned objectives of the present study, the researcher used convenience sampling in order to select 168 intermediate-level ESP learners (i.e. 84 male & 84 female) from among 206 ESP learners of Islamic Azad University (Tabriz Branch) in Tabriz (Iran) as the participants based on their results on a proficiency test. These participants majored in the *science* or *engineering* fields and ranged in age from 18 to 27. Moreover, they were either native speakers of Azeri or bilinguals in Azeri and Persian and resided in various cities of East Azerbaijan province. Prior to the onset of the study, the researcher apprised all of the participants of the intent of the study and assured them of the confidentiality of their data and their anonymity. Finally, she obtained written informed consent from all of the participants.

Materials and Instruments

This section itemizes the materials and instruments that were used in the present study:

Proficiency Test

In this study, the researcher used a modified version of the Preliminary English Test (PET) in order to select intermediate-level ESP learners as the participants. The original version of this test encompasses 3 main sections including *Reading and Writing*, *Listening*, and *Speaking*. The Reading Writing and Listening sections involve 42 and 25 items respectively. Moreover, the Speaking section includes 4 items. In the present study, the researcher did not take advantage of the Speaking section of PET mainly due to practical considerations. Consequently, the test scores ranged from 0 to 75. The researcher selected the learners whose scores were in the range of 1.5 Standard Deviations (SD) above the mean value to 1.5 SDs below the mean value. Furthermore, she used Cronbach's alpha measure of internal consistency in order to determine the reliability of this test in the EFL context of Iran in a pilot study. The pilot study involved 30 ESP learners whose characteristics were similar to the characteristics of the participants in the main study. The obtained results indicated that the reliability index of this test (0.83) was satisfactory and it could be used in the present study. The students answered the items of this test in 80 minutes.

Autonomy Questionnaire

The researcher used Zhang and Li's (2004) Learner Autonomy Questionnaire (LAQ) as a pretest and a posttest in order to assess the participants' autonomy before and after the treatment sessions of the present study respectively. This questionnaire encompasses 21 Likert-scale items which are scored on a 5-point scale ranging from *never* to *always*. As Zhang and Li (2004) noted, the reliability (.85) and validity (.87) indices of the questionnaire are satisfactory. Notwithstanding, in this study, the researcher used Cronbach's alpha measure of internal consistency in order to examine the reliability of this instrument in Iranian EFL context. The results of the study showed that the reliability index of the questionnaire (.81) was satisfactory and it could be used in the present study.

Learning Management System

In this study, the researcher used the *Adobe Connect Learning Management System* in order to provide the experimental groups and the control groups with their relevant instructions. This system enables its users to take advantage of various features including the *microphone, camera, public chat, private chat, file sharing*, and *screen-sharing* features to interact with the other users of the system.

Procedure

In the present study, first, the researcher used convenience sampling in order to select 168 intermediate-level ESP learners (i.e. 84 male & 84 female) from among the ESP learners of Islamic Azad University (Tabriz Branch) as the participants based on their results on PET. Second, she non-randomly assigned the participants to four groups including the *proactive experimental group, reactive experimental group, proactive control group*, and *retroactive control group*. There were 42 learners including 21 male and 21 female learners in each of the above-mentioned groups. Third, the researcher administered the autonomy pretest to all of the groups. More specifically, she prompted the participants to answer the items of the autonomy pretest in 15 minutes.

Fourth, during the treatment sessions, the researcher used the Adobe Connect Learning Management System to provide the proactive experimental group, and the retroactive experimental group with their relevant treatments in ten 90-minute sessions in a 10-week period of time (i.e. 1 session per week). More specifically, in the treatment sessions of the proactive experimental group, the researcher provided the participants with adequate information on the diverse functions of the self-planning, self-monitoring, and self-evaluation meta-cognitive strategies (O' Malley & Chamot, 1990) using examples before the onset of the writing tasks and encouraged them to use the relevant strategies to write a 400-word picture description in a 50-minute period of time. Consequently, the learners used the self-planning strategy to determine the target audience of their piece of writing, to brainstorm ideas about the relevant topic, and to create an outline of the relevant writing task. Moreover, they used the self-monitoring strategy and self-evaluation strategy to make the necessary corrections to their texts during the process of task performance and to examine the efficacy of their strategies subsequent to the termination of the pertinent tasks respectively. The researcher followed the same routine in the treatment sessions of the reactive experimental group. Nonetheless, in this group, she provided the participants with explicit meta-cognitive strategy instruction during the process of their writing task performance.

Moreover, the researcher used the explicit meta-cognitive strategy instruction as the demarcation line between the experimental groups and the control groups. That is, she deprived the control groups of this kind of instruction and used traditional language instruction techniques

for providing the control groups with their instruction during the same period of time. More specifically, in the treatment sessions of the proactive control group, the researcher used Adobe Connect Learning Management System to provide the participants with information on the pertinent grammatical structures and writing mechanics (e.g. capitalization, punctuation, & spelling) before the onset of the task and asked them to write a 400-word description of the relevant picture prompt in a 50-minute period of time. Furthermore, she followed the same routine in the treatment sessions of the reactive control group. Nonetheless, she provided the participants of this group with information on the relevant grammatical structures and writing mechanics during the process of the learners' writing task performance.

Fifth, the researcher administered the autonomy posttest of the study to the participants subsequent to the termination of the treatment sessions to examine the effectiveness of the treatment of the study. The participants answered the items of the autonomy posttest in 15 minutes. Finally, the researcher used SPSS 24 in order to analyze the obtained data of the present study. To this end, she used descriptive statistics including the Mean Value and SD along with the parametric statistics including the Kolmogorov–Smirnov test, Shapiro–Wilk test, one-way ANOVA, and two-way ANOVA to analyze the data on the participants' autonomy pretest and posttest and to answer the research questions.

Results

The researcher had to specify the appropriate statistical test for performing the data analysis of the present study. To this end, she analyzed the characteristics of the obtained data. Based on the results of the analysis, the data did not violate the underlying assumptions of the parametric tests since they were interval and were gathered independently. Furthermore, they were normally distributed based on the results of Kolmogorov–Smirnov and Shapiro–Wilk tests. Consequently, she used one-way ANOVA and Two-way ANOVA tests to analyze the data and to answer the relevant research questions of the present study. Prior to the onset of the data analysis, it was necessary to ensure that the groups of the study were homogeneous in terms of their autonomy. Consequently, the researcher compared their performances on the autonomy pretest. Table 1 shows the results of this comparison:

Table 1

Descriptive Statistics for the Performances of the Proactive Experimental Group, Reactive Experimental Group, Proactive Control Group, and Reactive Control Group on the Autonomy Pretest

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Proactive Experimental Group	42	64.79	5.335	.823	63.12	66.45	51	73
Reactive Experimental Group	42	63.88	5.735	.885	62.09	65.67	54	75
Proactive Control Group	42	62.81	5.688	.878	61.04	64.58	51	75
Reactive Control Group	42	63.43	4.586	.708	62.00	64.86	52	76

Total	168	63.73	5.356	.413	62.91	64.54	51	76

In order to determine the significance of the differences between the performances of the above-mentioned groups on the autonomy pretest, the researcher had to examine the results of the one-way ANOVA test. The results of Levene's test of homogeneity of variance showed that the variances of the relevant groups were homogeneous (p=.461) and the results of the ANOVA test could be examined. Table 2 shows the relevant results:

Table 2

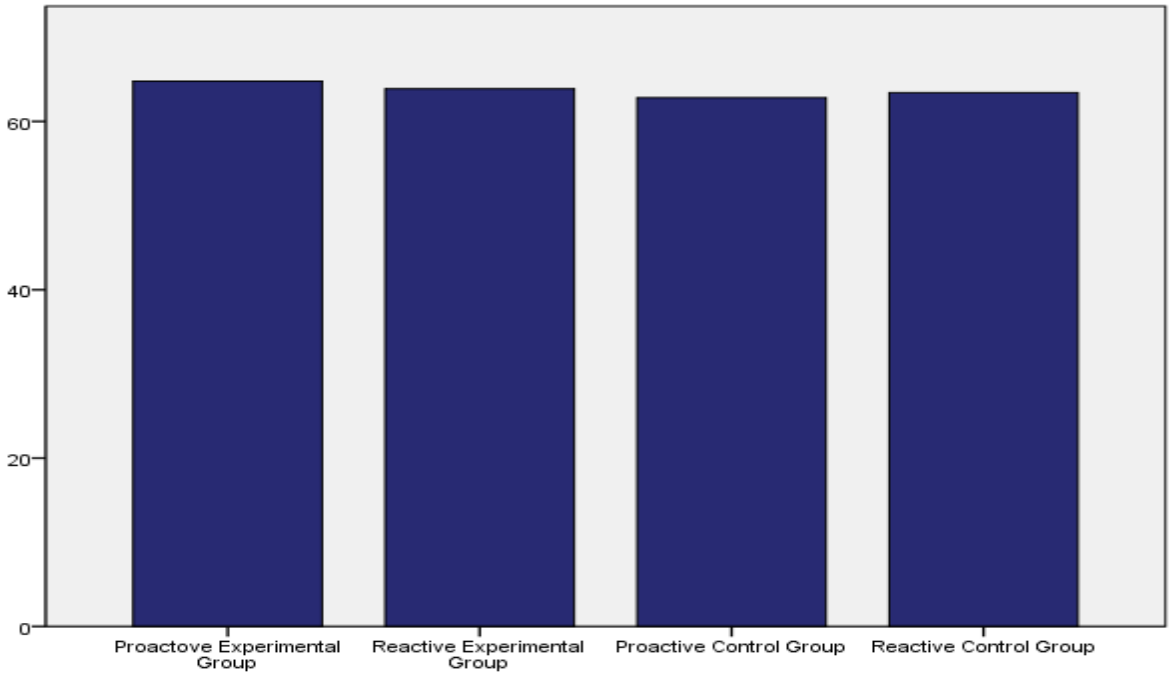
ANOVA Test of the Performances of the Proactive Experimental Group, Reactive Experimental Group, Proactive Control Group, and Reactive Control Group on the Autonomy Pretest

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	87.167	3	29.056	1.013	.389
Within Groups	4704.238	164	28.684		
Total	4791.405	167			

As shown in Table 4, there were not any significant differences between the experimental and the control groups of the study on the autonomy pretest (p>0.05). Figure 1 shows these results:

Figure 1

Performances of the proactive experimental group, reactive experimental group, proactive control group, and reactive control group on the autonomy pretest.



Considering these results, the researcher analyzed the collected data to answer the relevant research questions. The following section expounds on these results:

The first research questions made an effort to determine the impact of the instruction method (i.e. metacognitive strategy instruction & traditional language instruction) on the ESP learners'

autonomy. Furthermore, the second research question strived to specify the impacts of Instruction conditions (i.e. proactive & reactive language instruction) on these learners' autonomy in their language classes. Finally, the third research question made an endeavor to determine the interaction effect between the instruction method and instruction condition on the participants' development of language learning autonomy.

Considering the objectives of these research questions, the researcher used a two-way ANCOVA test to determine the impacts of instruction method (i.e. categorical independent variable 1) and instruction condition (i.e. categorical independent variable 2) on the ESP learners' autonomy (continuous dependent variable). The results of Levene's test of homogeneity of variance showed that the variances of the relevant groups were homogeneous (p=.524) and the results of the two-way ANCOVA test could be examined. Table 5 shows the relevant results:

Table 3

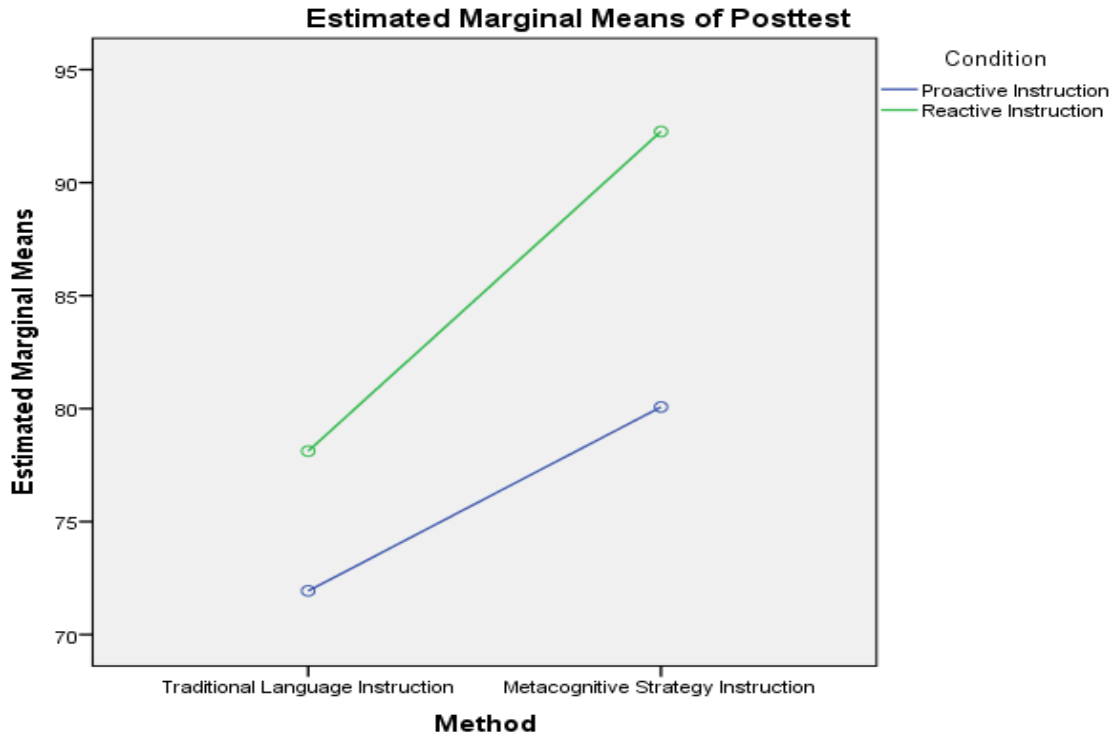
Two-Way ANCOVA Test of the Performances of the Proactive Experimental Group, Reactive Experimental Group, Proactive Control Group, and Reactive Control Group on the Autonomy Pretest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8167.048	3	2722.349	114.145	.000
Intercept	992083.420	1	992083.420	41597.062	.000
Method	4738.753	1	4738.753	198.691	.000
Condition	3223.351	1	3223.351	135.152	.000
Method * Condition	344.182	1	344.182	14.431	.000
Error	3625.176	152	23.850		
Total	1041961.000	156			
Corrected Total	11792.224	155			

As shown in Table 5, the main effects of the method of instruction the ESP learners' autonomy were statistically significant ($p<0.05$). That is, meta-cognitive strategy instruction had a more significantly positive impact on these learners' autonomy compared to traditional language instruction. Likewise, the condition of instruction had a significant main effect on these learners' autonomy ($p<0.05$). More specifically, the reactive instruction approach was more significantly effective for ameliorating the participants' autonomy than the proactive approach. Finally, the interaction effect of the method of instruction and condition of instruction variables on the participants' autonomy was significant ($p<0.05$). That is, the reactive instruction of the metacognitive strategies was more efficacious for improving the ESP learners' autonomy than the other instructional approaches. Figure 2 shows these results:

Figure 2

The main effects and interaction effects of the method of instruction and condition of instruction variables on the ESP learners' autonomy.



Discussion

The first research question of this study is intended to examine the impacts of meta-cognitive strategy instruction on ESP learners' autonomy in the context of the classroom. The obtained results highlighted the fact that this kind of instruction had a significant positive impact on the participants' autonomy development. In general, these results corroborate the results of the studies that were carried out by Goudarzi, Ghonsooly, and Pishghadam (2014), Movahed. (2014), Khoshsima and Rezaeian Tiyar (2014), Bozorgian (2015), Esmaeili, Taki, and Rahimian (2017), Bozorgian and Alamdari (2018), Fasih, Izadpanah, and Shahnavaz (2018), Mobaraki, and Nia (2018), Fathi and Hamidizadeh (2019), Bozorgian and Muhammadpour (2020), Rahbar, Ahangari, and Saeidi (2020), Maftoon and Fakhri Alamdari (2020), and Alavidoost and Bozorgian (2021). The above-mentioned studies indicated that metacognitive strategy instruction had beneficial impacts on the language learners' development of language skills (e.g. listening skills), aspects (e.g. vocabulary), and individual factors (e.g. self-efficacy & motivation).

Pitenoee, et al. (2017) pointed out that the instruction of meta-cognitive strategies is likely to have an advantageous impact on the language learners' personal factors including their autonomy. According to them, the acquisition of these strategies empowers the learners to rely on their internal resources in the process of learning and to carry out their tasks in an independent way. Likewise, Papaleontiou-Louca (2014) noted that the learning of metacognitive strategies has a beneficial effect on the language learners' processing of linguistic information. As he noted, these strategies provide the learners with a better understanding of their abilities, make them cognizant of problem-solving techniques, and help them to make hard decisions quickly. Moreover, Oxford (2003) pointed out that, the learners with high levels of autonomy are capable of optimally determining their objectives, developing and implementing plans on the basis of their objectives, monitoring their progress, and evaluating their performance on the basis of pre-determined criteria.

Considering these issues, it can be argued that, in the present study, meta-cognitive strategy instruction had a beneficial effect on the language learners' autonomy since it prompted them to

rely on their internal resources in the process of task performance, facilitated and expedited their information processing, made them aware of their capabilities, increased their self-confidence, and helped them to develop and implement efficacious language learning plans in the context of the classroom.

The second research question made an effort to determine the utility of the proactive and retroactive instruction conditions on the participants' autonomy. The results accentuated the fact that retroactive condition was more beneficial for improving the participants' autonomy. In general, these results corroborate the results of the studies that were carried out by Rezvan, Ahmadi, and Abedi (2006), Coşgun Ögeyik (2011), Soleimani and Hajghani (2013), Farias, Obilinovic, and Orrego (2011), Rahimi, and Abedi (2014), Ghaziabad, Hashemnejad, and Amirian (2015), Cárcamo, Cartes, Velásquez, and Larenas (2016), Rostami Abusaeedi and Khabir (2017), Razmi, Jabbari, and Fazilatfar (2020), Razmi and Jabbari (2021), and Sharif Hosseini (2022).

Ghalimberti and Miralpeix (2018) pointed out that retroactive language instruction strategies including reactive meta-cognitive instruction may be more effective than proactive strategies due mainly to their learner-need-oriented nature. As they explained, the retroactive teacher feedback in this instructional condition is tailor-made to the learners' needs and enables them to deal with language learning problems in an effective way. Likewise, Ghelichi (2017) stated that the retroactive meta-cognitive strategy instruction is likely to be more beneficial than the proactive condition since retroactive feedback is less demanding in terms of information processing compared to proactive feedback and instruction. More specifically, proactive instruction increases the information processing load in the learners' short-term memory and requires them to retrieve linguistic information in the process of task performance. On the other hand, retroactive instruction reduces the learners' information-processing load by being provided based on their needs in a piecemeal fashion. Furthermore, Hu and Zhang (2017) pointed out that, the learners' ability to process information in an efficient way may have a positive effect on their self-efficacy and self-confidence. As they noted, the learners' self-efficacy is a prerequisite to the development of their autonomy.

Considering these results, it can be stated that in this study, the retroactive instruction of meta-cognitive strategies was more effective for ameliorating the participants' autonomy since it was tailor-made to the learners' needs, enabled them to deal with their language learning problems in the process of task performance, increased their self-efficacy, and decreased their information processing load.

Lastly, the third research question made an effort to determine the interaction effect between the meta-cognitive strategy instruction and traditional language teaching methods and the proactive and retroactive teaching conditions. The results showed that the interaction between the meta-cognitive teaching method and the retroactive instruction condition was more efficacious than the other interaction effects between the above-mentioned methods and conditions. In general, these results are in line with the results of the studies that were carried out by Hall, Bowman, and Myers (1999), Moses and Baird (1999), Nietfeld and Schraw (2002), Vandergrift (2003), Veenman, Van Hout-Wolters, and Afflerbach (2006), Vandergrift and Tafaghodtari (2010), Narang and Saini (2013), Khoshsima and Rezaeian Tiyar (2014), Van der Stel, and Veenman (2014), Iobidze (2019), Ziegler and Opdenakker (2018), and Ko (2019).

Iobidze (2019) noted that meta-cognitive strategies are similar to road maps since they guide language learners in the process of task performance. According to him, the learners use these strategies on the basis of their needs. As a result, the teachers' instruction of these strategies during the performance of the relevant tasks enables the learners to use them as their guidelines. Furthermore, Ko (2019) stated that meta-cognitive strategies are similar to instruments that

facilitate the performance of tasks. As he explained, the learners may need different meta-cognitive strategies at various stages of task performance. Consequently, the retroactive instruction of these strategies during the tasks may be more effective than their proactive instruction prior to the onset of task performance.

Based on these issues, it can be averred that, in this study, the interaction between the meta-cognitive teaching method and the retroactive instruction condition was the most efficacious interaction for ameliorating the participants' autonomy since the retroactive instruction of these strategies provided the learners with guidelines that acted as their road maps at different stages of task performance.

Conclusion

This study strived to determine the utility of proactive and retroactive meta-cognitive strategy instruction for ameliorating ESP learners' autonomy. Moreover, it made an endeavor to determine the degree to which the interaction between meta-cognitive strategy instruction and proactive/retroactive instruction conditions affected the learners' autonomy in the process of task performance. The obtained results indicated that meta-cognitive instruction was more effective than traditional language teaching. Furthermore, the retroactive instruction condition was more efficacious than the proactive instruction condition. Finally, the interaction between meta-cognitive strategy instruction and retroactive instruction condition ameliorated the learners' autonomy.

A number of tentative conclusions can be drawn based on the above-mentioned findings. First, it is necessary to redress the current ESP teacher education courses. The overhaul process of these courses has to target their educators and content. The scrutiny of the characteristics of ESP teacher educators highlights the fact that most of them are experienced lecturers or professors who have obtained numerous national and international ESP teacher education certificates. As a result, they are mainly concerned with the practical considerations of ESP instruction including the instruction of technical vocabulary items of the relevant fields of study and their academic writing styles among others. Nonetheless, most of these educators disregard the utility of language learning strategies including meta-cognitive strategies in the process of task performance. Consequently, there is a need to re-educate the ESP teacher educators in order to make them cognizant of the effectiveness of these strategies in the ESP courses. The ESP teacher educators' knowledge about the above-mentioned strategies can empower them to make the pre-service and in-service teachers aware of the necessity of using these strategies in their classes.

Moreover, there is a need to include a specific module in the ESP teacher education courses in order to make the ESP instructors aware of the learner factors, including learner autonomy, that have a noticeable effect on the process of language acquisition. The relevant module has to provide the prospective ESP instructors with adequate information on the theoretical discussions of the relevant learner factors and should empower them to take account of them in their relevant courses.

Second, the examination of the current instructional materials highlights the fact that the syllabus designers have completely disregarded the ESP instructors' need for teacher manuals. More specifically, the syllabus designers have developed ESP course books for different fields of study based on their relevant texts. Moreover, they have developed a number of activities on the basis of the utilized ESP texts in order to examine the degree to which the learners comprehend their field-specific texts and are able to recognize their pertinent vocabulary items. None of the relevant ESP course books is accompanied by a teacher manual in the EFL context of Iran. Considering this issue, it can be averred that, the ESP syllabus designers need to develop useful ESP teacher manuals in order to ameliorate the ESP instructors' process of language instruction in their classes. These manuals have to provide the instructors with adequate information about

various types of language learning strategies including meta-cognitive strategies. Furthermore, they have to enable the teachers to use both proactive and reactive instruction conditions of these meta-cognitive strategies on the basis of their contextual factors. In addition, these teacher manuals need to make the instructors aware of the consequential learner factors including learner autonomy which are likely to have a major effect on the process of language instruction.

Lastly, on the basis of the obtained results, it can be argued that the ESP teachers have to obtain adequate information on the efficacious meta-cognitive language learning strategies and learner factors such as autonomy to ameliorate their language instruction. For instance, they can use the results of recent empirical studies (including the present study) to obtain information on these strategies. Furthermore, they can form peer groups on social media applications in order to take advantage of their peers' constructive feedback on the use of the meta-cognitive strategies in ESP courses. Finally, the teachers should make an attempt to: a) use the retroactive approach to meta-cognitive strategy instruction more than the proactive approach due mainly to its need-oriented nature; and b) integrate the proactive approach into the retroactive approach to the instruction of these strategies in order to ameliorate the learners' acquisition of the various aspects of the target language.

References

Alavidoost, M. A., & Bozorgian, H. (2021). Using fuzzy logic in assessing metacognitive intervention in relation to Less-/more-skilled L2 listeners. *Journal of Foreign Language Research, 11*(1), 139-152.

Baker, L. & Brown, A. L. (1984). Metacognitive skills and reading. In P. D. Pearson, R. Barr, M. L. Kamil & P. Mosenthal (Eds.), *Handbook of reading research*, (pp. 353-394). New York: Longman.

Benson, P. (2001). Learner autonomy in the classroom. In D. Nunan (Ed.), *Practical English language teaching* (pp. 289-308). New York: McGraw Hill.

Benson, P. (2006). Autonomy in language teaching and learning. *Language Teaching, 40*(1), 21-40.

Benson, P. (2007a). Teachers' and learners' perspectives on autonomy. In T. E. Lamb & H. Reinders (Eds.), *Learner and teacher autonomy: Concepts, realities and responses*. Amsterdam: John Benjamins.

Benson, P. (2007b). *Learner autonomy: Teacher and learner perspectives*. Dublin: Authentik.

Benson, P. (2009). Making sense of autonomy in language learning. In R. Pemberton, S. Toogood, & A. Barfield (Eds.), *Maintaining control: Autonomy and language learning* (pp. 13-26). Hong Kong: Hong Kong University Press.

Bonds, C. W., Bonds L. G. & Peach W. (1992). Metacognition: Developing independence in learning. *Clearing House, 66*, 56-59.

Bozorgian, H. (2015). Less-skilled learners benefit more from metacognitive instruction to develop listening comprehension. *Journal of Foreign Language Research, 4*(1), 3-12.

Bozorgian, H., & Alamdari, E. F. (2018). Multimedia listening comprehension: Metacognitive instruction or metacognitive instruction through dialogic interaction. *ReCALL, 30*(1), 131-152.

Bozorgian, H., & Muhammadpour, M. (2020). Metacognitive Intervention: High WMC learners' listening performance and metacognitive awareness. *Foreign Language Research Journal, 9*(4), 1055-1084.

Cárcamo, M., Cartes, R., Velásquez, N., & Larenas, C. (2016). The impact of multimodal instruction on the acquisition of vocabulary. *Trabalhos em Linguística Aplicada, 2*, 135-152.

Coşgun Ögeyik, M. (2011). Form-focused discovery activities in English classes. *The Reading Matrix*, 1, 122-140.

Dworkin, G. (1988). *The theory and practice of autonomy*. Cambridge: Cambridge University Press.

Esmaeili, Z., Taki, S. & Rahimian, Y. (2017). EFL learners' metacognitive strategy use in academic listening tasks. *Journal of Applied Linguistics and Language Research, 4* (3), 254-268.

Farias, M. A., Obilinovic, K., and Orrego, R. (2011). Engaging multimodal learning and second/foreign language education dialogue. *Multimodality and Learning, 2*, 133-151.

Fasih, P., Izadpanah, S., & Shahnavaz, A. (2018). The effects of mnemonic vocabulary instruction on content vocabulary learning of students. *Journal of Language and Education, 4*(1), 42-62

Fathi, J., & Hamidizadeh, R. (2019). The contribution of listening strategy instruction to improving second language listening comprehension: A case of Iranian EFL learners. *International Journal of Instruction, 12*(2), 17-32.

Ghalimberti, V., & Miralpeix, I. (2018). Multimodal Input for Italian beginner learners of English. *La didattica delle lingue nel nuovo millennio, 1,* 615-626.

Ghelichi, M. (2017). Contextualizing grammar instruction through meaning-centered planned pre-emptive treatment and enhanced input in an EFL context. *The Journal of English Language Pedagogy and Practice, 40*(1), 72-91.

Ghaniabadi, S., Hashemnejad, E., & Amirian, M. (2015). The effect of proactive versus reactive focus on form on Iranian EFL learners' grammatical accuracy. *International Journal of Education and Research, 52*(2), 227-236.

Goudarzi, E., Ghonsooly, B., & Pishghadam, R. (2014). An exploration of the interrelationships among EFL learners' English self-efficacy, metacognitive awareness, and their test performance. *Pragmatics & Cognition, 22*, 25–339.

Holec, H. (1980). *Autonomy and foreign language learning.* Nancy: Centre de Recherchéet et d'Applications Pedagogiques en Langsues, Council of Europe.

Hu, P., & Zhang, J. (2017). A pathway to learner autonomy: A self-determination theory perspective. *Journal of Asia Pacific Education Review, 18*(1), 147-157.

Kamiya, N. (2018). *Proactive versus reactive focus on form*. New Jersey: John Wiley & Sons.

Keyvanfar, A., & Bakshiri, N. (2011). Time matters: Proactive vs. reactive FoF. *Journal on English Language Teaching, 22*,145-166.

Hall, K., Bowman H. & Myers J. (1999). Metacognition and reading awareness among samples of nine-year-olds in two cities. *Educational Research, 1*, 99-107.

Iobidze, M. (2019). Effective metacognitive strategies to boost English as a foreign language reading comprehension. *Journal of Education in Black Sea Region, 4*, (2), 41-57.

Khoshsima, H., & Rezaeian Tiyar, F. (2014). The effect of summarizing strategy on reading comprehension of Iranian intermediate EFL learners. *International Journal of Language and Linguistics, 2*(3), 134-139.

Ko, L. Y. (2019). A study of metacognitive strategies utilized in reading and listening comprehension: An investigation of nursing junior college English Learners. *European Journal of Education Studies, 5*(11), 176-188.

Little, D. (1991). *Learner autonomy: Definitions, issues and problems.* New York: Authentik.

Little, D. (2009). Learner autonomy in action: Adult immigrants learning English in Ireland. In Kjisik, F., Voller, P., Aoki, N., & Nakata, Y. (Eds.), *Mapping the terrain of learner autonomy: Learning environments, learning communities and identities* (pp. 51–85). Tampere: Tampere University Press.

Little, D. (2016). Learner autonomy and tele-collaborative language learning. In S. Jager, M. Kurek, & B. O'Rourke (Eds.), *New directions in tele-collaborative research and practice* (pp. 44–55). New York: Research Publishing Net.

Little, D. (2022). Language learner autonomy: Rethinking language teaching. *Language Teaching*, *55*(1), 64-73.

Little, D., Dam, L., & Legenhausen, L. (2017). *Language learner autonomy: Theory, practice and research*. Bristol: Multilingual Matters.

Little, D., & Erickson, G. (2015). Learner identity, learner agency, and the assessment of language proficiency: Some reflections prompted by the common European framework of reference for languages. *Annual Review of Applied Linguistics, 35*, 120–139

Maftoon, P., & Fakhri Alamdari, E. (2020). Exploring the effect of metacognitive strategy instruction on metacognitive awareness and listening performance through a process-based approach. *International Journal of Listening, 34*(1), 1-20.

Mobaraki, M., & Nia, M. R. (2018). The effect of listening strategy instruction on Iranian pre-intermediate EFL learners' listening ability. *International Journal of Applied Linguistics and English Literature, 7*(3), 188-192.

Moses, L. J. & Baird, J. A. (1999). Metacognition. In A. Robert, F. Wilson, & C. Keil (Eds). *The MIT Encyclopedia of the cognitive sciences* (pp. 533-535). London: The MIT Press.

Movahed, R. 2014. The effect of metacognitive strategy instruction on listening performance, meta-cognitive awareness and listening anxiety of beginner Iranian EFL students. *International Journal of English Linguistics, 4* (2),88-102.

Narang, D., & Saini, S. (2013). Metacognition and academic performance of rural adolescents. *Studies on Home and Community Science, 7*(3), 167-175.

Nietfeld, J. L., & Schraw, G. (2002). The effect of knowledge and strategy training on monitoring accuracy. *The Journal of Educational Research, 95*(3), 131-142.

O'Malley, M. J., & Chamot, A. U. (1990). *Learning strategies in second language acquisition*. Cambridge: Cambridge University Press.

O'Malley, J.M, Chamot, A.U., Stewner- Manzanares, G., Russo, R.P. & Kupper, L. (1985). Learning strategy application with students of English as a second language. *TESOL Quarterly, 19*, 557-584.

Oxford, R. L. (1990). *Language learning strategies: What every teacher should know*. New York: Newbury House.

Oxford, R. L. (2003). Toward a more systematic model of L2 learner autonomy. In D. Palfreyman & R. C. Smith (Eds.), *Learner autonomy across cultures: Language education perspectives* (pp. 75-91). Basingstoke: Palgrave Macmillan.

Papaleontiou-Louca, E. (2014). Metacognition. In D. C. Phillips (Ed.). *Encyclopedia of educational theory and philosophy* (pp. 522-525). Los Angeles: Sage.

Parvaneh, H., Zoghi, M., & Asadi, N. (2020). Flipped classroom approach: Its effect on learner autonomy and language anxiety of Iranian EFL learners. *Journal of Foreign Language Research, 10*(2), 330-347.

Pitenoee, M., Modaberi. A., & Ardestani, E. (2017). The effect of cognitive and metacognitive writing strategies on the content of the Iranian intermediate EFL learners' writing. *Journal of Language Teaching and Research, 8* (3), 594-600.

Rahbar, S., Ahangari, S., & Saeidi, M. (2020). Raising the learners' awareness of prosodic features in pronunciation and its impact on listening comprehension: Insights from noticing hypothesis. *Foreign Language Research Journal, 10*(2), 260-271.

Rahimi, M., & Abedi, S. (2014). The relationship between listening self-efficacy and metacognitive awareness of listening strategies. *Procedia-Social and Behavior Sciences, 98*, 1454–1460.

Razmi, M. H., & Jabbari, A. A. (2021). An investigation into the impact of multidimensional perfectionism on second language listening comprehension through the mediating roles of general self-efficacy and metacognitive listening strategies: A multicategorical multiple mediation analysis. *Journal of Language and Translation Studies, 54*(2), 123-151.

Razmi, M. H., Jabbari, A. A., & Fazilatfar, A. M. (2020). Perfectionism, self-efficacy components, and metacognitive listening strategy use: A multicategorical multiple mediation analysis. *Journal of Psycholinguistic Research, 49*, 1047–1065.

Rezvan, S., Ahmadi, S. A., & Abedi, M. R. (2006). The effects of metacognitive training on the academic achievement and happiness of Esfahan University conditional students. *Counselling Psychology Quarterly, 19*(4), 415-428.

Rostami Abusaeedi, A. A., & Khabir, M. (2017). EFL learners' metacognitive reading strategy preferences in relation to their perfectionism regarding gender. *Open Journal of Modern Linguistics, 7*, 108-118.

Sedighi, E., & Hadidi Tamjid, N. (2016). The relationship between Iranian EFL learners' autonomy and their vocabulary learning strategies with a focus on gender. *Journal of English Language Pedagogy and Practice, 9*(18), 183-196.

Smith, R. C. (2008). Learner autonomy (Key concepts in ELT). *ELT Journal, 62*(4), 395-397.

Soodmand Afshar, H., & Bastami, T. (2012). The effect of portfolio assessment on Iranian pre-intermediate EFL learners' autonomy. *Journal of Teaching English Language and Literature, 6*(1), 71-102.

Sharif Hosseini, M. (2022). Analyzing the effect of using meta-cognitive strategies on Iranian EFL learners' writing skill. *Journal of Language and Translation, 12*(1), 141-155.

Soleimani, H., & Hajghani, S. (2013). The effect of teaching reading comprehension strategies on Iranian EFL pre-university students' reading comprehension ability. *International Research Journal of Applied and Basic Sciences, 5*(5), 594-600.

Vandergrift, L. (2003). Orchestrating strategy use: Toward a model of the skilled second language listener. *Language Learning, 53*(3), 463-496.

Vandergrift, L., & Tafaghodtari, M. H. (2010). Teaching L2 learners how to listen does make a difference: An empirical study. *Language Learning, 60*(2), 470-497.

Van der Stel, M., & Veenman, M. V. (2014). Metacognitive skills and intellectual ability of young adolescents: A longitudinal study from a developmental perspective. *European Journal of Psychology of Education, 29*(1), 117-137.

Veenman, M. V. J., Van Hout-Wolters, B. H. A. M., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition and Learning, 1*, 3-14.

Vieira, F. (Ed.). (2009). *Struggling for autonomy in language education*. Frankfurt: Peter Lang.

Zhang, L., & Li, X. (2004). A comparative study on learner autonomy between Chinese students and West European students. *Foreign Language World, 4*, 15-23.

Ziegler, N., & Opdenakker, M-C. (2018). The development of academic procrastination in first-year secondary education students: The link with metacognitive self-regulation, self-efficacy, and effort regulation. *Learning and Individual Differences, 64*, 71–82.

Biodata

Fatemeh Jafari is a lecturer of English Language Teaching at the Islamic Azad University, Tabriz Branch. Her research interests include sociology and psychology. She has been teaching undergraduate EFL students since 2017.
Email: *fatemehjafari.uni1@gmail.com*

Nasser Ghafoori holds a Ph.D. in TEFL and is an assistant professor at Islamic Azad University, Tabriz Branch. He has more than 25 years of experience in teaching various courses in applied linguistics and English translation studies. He has published several articles in local and international journals and participated in several international conferences. His research interests are applied linguistics, EFL teaching, and testing.
Email: *ghafoori@iaut.ac.ir*

Shima Ahmadi-Azad is an associate professor of English Language Teaching at the Islamic Azad University, Sarab Branch. She has been heading the Department of English since 2021. Her research interests include sociology, psychology, and SLA issues. She has been teaching undergraduate and postgraduate EFL students since 2008.
Email: *Sh.ahmadiazad@gmail.com*